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Biologia Computacional na Identificação dos Reguladores Mestres da Transcrição em Câncer Pancreático

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DEDICATÓRIA

Dedico esta dissertação aos meus maiores exemplos de caráter e coragem que tanto contribuíram para minha vida, meus pais Ivo e Elaine. Obrigada por todo apoio e amor.

Basically, I'm not interested in doing research and I never have been.
I'm interested in understanding, which is quite a different thing.
– David Blackwell

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SUMÁRIO

APRESENTAÇÃO

Esta dissertação está estruturada em três partes. A **PARTE I** apresenta uma introdução geral sobre as características comuns ao câncer, seguida de descrição mais detalhada sobre o adenocarcinoma pancreático. Os mecanismos que regulam a expressão gênica e o papel da Biologia Computacional também são abordados neste tópico.

A **PARTE II** apresenta um capítulo na forma de artigo científico, o qual ressalta um possível biomarcador prognóstico para o adenocarcinoma pancreático.

Por fim, a **PARTE III** é composta da discussão geral sobre os resultados obtidos, seguida de conclusões e perspectivas.

PARTE I

RESUMO

O adenocarcinoma de ducto pancreático é reconhecido mundialmente como uma doença extremamente agressiva a qual apresenta um prognóstico desfavorável para pacientes sem cirurgia de ressecção. Portanto, é fundamental ampliar o conhecimento sobre os mecanismos biológicos envolvidos no câncer pancreático a fim de permitir a identificação de marcadores moleculares e alvos terapêuticos com o intuito de melhorar o diagnóstico precoce e tratamento. Os fatores de transcrição, reconhecidos por serem os efetores finais de vias de sinalização, regulam diversas funções celulares e, alterações na expressão transcricional destes podem contribuir para a transformação celular bem como para a progressão tumoral. Assim, o objetivo do presente estudo foi identificar os reguladores mestres da transcrição, possivelmente envolvidos no câncer pancreático. Para tanto, utilizamos dados de microarranjos para associar os reguladores mestres com o fenótipo tumoral. As análises foram realizadas no ambiente estatístico R utilizando os pacotes RTN, Limma e Survival. O gene *TULP3* foi identificado como um regulador mestre da transcrição em amostras de câncer pancreático. O valor prognóstico de *TULP3* foi verificado através de análises de sobrevivência em três coortes independentes. Estas análises revelaram que pacientes com adenocarcinoma pancreático, exibindo altos níveis de expressão do gene *TULP3*, apresentam uma sobrevida global desfavorável. Os altos níveis transcricionais de *TULP3* podem desempenhar um papel fundamental na progressão do adenocarcinoma pancreático e conduzir a um resultado clínico desfavorável. Contudo, este estudo destaca a potencial aplicação de TULP3 como um biomarcador de prognóstico clínico para pacientes com adenocarcinoma pancreático.

Palavras-chaves: adenocarcinoma pancreático, *regulon*, câncer, fator de transcrição, regulador mestre.

ABSTRACT

Pancreatic ductal adenocarcinoma is world-wide recognized as an aggressive disease with poor prognosis in patients who did not undergo resection. Efforts to better comprehend the biological mechanisms of pancreatic cancer are needed to enable the identification of novel molecular markers and therapeutic targets for improving early diagnosis and treatment. Transcription factors are the final effectors of signaling pathways and regulate a number of cellular functions. Changes in expression of transcription factors may contribute to cellular transformation and tumor progression. Thus, the aim of the present study was to identify transcriptional master regulators potentially involved in pancreatic cancer disease. To achieve this goal, we utilized microarray data to associate master regulators with tumor phenotype. Analyses were performed with RTN, Limma, and Survival packages at R environment. We identified *TULP3* as a master regulator of transcription in pancreatic cancer samples. *TULP3* prognostic value was accessed in three independent cohort analyses. Our data demonstrate that patients with pancreatic cancer, exhibiting high *TULP3* transcriptional levels, show a poor overall survival. High levels of *TULP3* expression may play an essential role in pancreatic cancer progression and lead to poor clinical outcome. Our results highlight the potential use of *TULP3* as a clinical prognostic biomarker for pancreatic adenocarcinoma.

Keywords: pancreatic adenocarcinoma, *regulon*, cancer, prognosis, transcription factor, master regulator.

LISTA DE ABREVIATURAS

ARACNe	do inglês *Algorithm for the Reconstruction of Accurate Cellular Networks*
DOCK7	do inglês *Dedicator of Cytokinesis Protein 7*
FT	Fator de Transcrição
GEO	do inglês *Gene Expression Omnibus*
HR	do inglês *Hazard Ratio*
IFT-A	do inglês *Intraflagellar Transport - A complex*
MRA	do inglês *Master Regulator Analysis*
PanIN	do inglês *Pancreatic Intraepithelial Neoplasia*
PDAC	do inglês *Pancreatic Ductal Adenocarcinoma*
RASSF8	do inglês *Ras-Association Domain Family Protein 8*
RM	Regulador Mestre
TULP3	do inglês *Tubby-like Protein 3*

INTRODUÇÃO

O termo câncer é aplicado a uma classe ampla e heterogênea de patologias que apresentam um descontrole na proliferação celular. Uma característica comum aos diferentes tipos de câncer é o acúmulo de alterações genéticas, necessárias para o desenvolvimento do processo tumoral (Hanahan & Weinberg, 2000; Vogelstein & Kinzler, 2004). Essas alterações são basicamente encontradas em três grupos de genes: os oncogenes, os supressores de tumor e os genes de estabilidade.

Em tecidos normais o sistema celular encontra-se em um estado dinâmico, no qual a síntese de novas células e a extinção das mais antigas está em equilíbrio. Os genes de estabilidade não contribuem diretamente na proliferação tumoral, no entanto conferem a integridade genômica necessária para a manutenção do sistema celular, e mutações nesta classe de genes podem levar a um aumento na taxa de mutações em outros genes. Apesar do processo de crescimento celular ser estritamente controlado tem-se observado, em células transformadas, a ativação de oncogenes e a inativação dos genes supressores de tumor. Os oncogenes são derivados mutados dos proto-oncogenes, cuja função é promover o crescimento celular, sendo assim, uma vez transformados, os oncogenes estimulam de maneira contínua a proliferação. Os genes supressores de tumor são responsáveis por inibir o crescimento celular, e mutações nesta classe de genes geram proteínas disfuncionais. Sendo assim, a combinação destas características conduz à perda do controle dos mecanismos de proliferação celular (Vogelstein & Kinzler, 2004).

Mutações em proteínas de vias de controle da proliferação e diferenciação podem levar a uma sinalização *downstream* contínua e a consequente *up-regulação* de proteínas que garantem a sustentação das células tumorais, mesmo que não haja qualquer estímulo no ambiente extracelular. Além disso, as células transformadas adquiriram a habilidade de evitar a apoptose, imortalizando-se e, assim, causando desequilíbrio entre crescimento e morte celular, bem como a habilidade de evitar sua destruição pelo sistema imune (Hanahan & Weinberg, 2011).

1. ADENOCARCINOMA PANCREÁTICO

1.1. FISIOPATOLOGIA

O pâncreas é uma glândula derivada do endoderma, encontrado na parte superior do abdômen, entre o estômago e o duodeno, que desempenha funções exócrina e endócrina. O pâncreas exócrino compreende 80% da massa do órgão e é composto por uma rede ramificada de células acinares e ductais. As células acinares são responsáveis pela síntese, estocagem e secreção de enzimas digestivas e encontram-se agrupadas no final dos ductos formando clusters, enquanto que as células ductais estendem-se do lúmen dos ácinos até o duodeno adicionam muco e bicarbonato na secreção produzida pelos ácinos, liberando esta mistura no duodeno. O pâncreas endócrino consiste de células especializadas denominadas Ilhotas de Langerhans e são encontradas incorporadas ao pâncreas exócrino. As ilhotas compreendem principalmente as células α e β, responsáveis pela secreção dos hormônios que regulam a homeostase da glicose, insulina e glucagon (Bardeesy & DePinho, 2002; Hezel et al., 2006).

O termo câncer pancreático abrange tanto os tumores exócrinos quanto endócrinos, no entanto, mais de 80% destes são adenocarcinomas e atingem a parte exócrina do pâncreas (**Tabela 1**). Dentre outros tipos de câncer pancreático de origem exócrina estão o carcinoma de célula acinar e o neoplasma intraductal papilar mucinoso. Os tipos de câncer provenientes da parte endócrina compreendem os insulinomas e gastrinomas (Bond-Smith et al., 2012). Neste estudo o termo câncer pancreático refere-se ao adenocarcinoma de ducto pancreático.

Tabela 1. Tipos de câncer pancreático (Bond-Smith et al., 2012).

Câncer do Pâncreas Exócrino	Câncer do Pâncreas Endócrino (Tumores neuroendócrinos pancreáticos)
Adenocarcinoma	Gastrinoma
Carcinoma das células acinares	Glucagonoma
Carcinoma adenosquamoso	Insulinoma
Tumor das células gigantes	Tumor das ilhotas não funcionais
Neoplasma mucinoso papilar intraductal	Somatostatinoma
Cistadenocarcinoma mucinoso	Tumor liberado pelo peptídeo intestinal vasoativo (VIPoma)
Pancreatoblastoma	
Cistadenocarcinoma seroso	
Tumor pseudopapilar e sólido	

O Adenocarcinoma de Ducto Pancreático (PDAC) é um tipo de câncer altamente agressivo e é conhecido como a quarta causa de morte nos Estados Unidos. Dados referentes ao ano de 2013 estimaram que 45.220 norte-americanos, sendo 22.740 homens e 22.480 mulheres, seriam diagnosticados com câncer pancreático e que 38.460 iriam morrer em decorrência da doença

(SEER Cancer Statistics Review). Enquanto que, em 2010 no Reino Unido, foram diagnosticadas 8.455 pessoas com câncer pancreático e relatadas 7.921 mortes, conferindo ao PDAC o quinto lugar no ranking de mortes relacionadas ao câncer (Pancreatic Cancer Action, 2013). No Brasil o PDAC é responsável por cerca de 2% do diagnóstico dentre todos os tipos de câncer e por 4% do total de mortes por essa doença. Em 2010 foram relatadas 7.740 mortes por PDAC, sendo 3.671 homens e 3.769 mulheres (INCA).

Praticamente metade dos casos de câncer pancreático são diagnosticados em atendimentos de emergência, nos quais os pacientes exibem sintomas como dores abdominais não específicas, icterícia ou ambos. O sinal de Courvoisier, caracterizado por apresentar vesícula biliar palpável acompanhada de icterícia sem dores abdominais, é um indicativo de PDAC, no entanto, ocorre em menos de 25% dos pacientes (Bond-Smith et al., 2012). A maioria dos tumores localiza-se na cabeça do pâncreas e frequentemente causam icterícia devido ao bloqueio do ducto biliar (Hidalgo et al., 2010).

O diagnóstico precoce de PDAC continua sendo um desafio da medicina, uma vez que os sintomas da doença apresentados são dores abdominais não específicas, perda de peso e náusea (Bond-Smith et al., 2012) e, quando diagnosticado, cerca de 80% dos pacientes apresentam doença irressecável (Bilimoria et al., 2007). O PDAC apresenta um prognóstico desfavorável, tanto em pacientes que não sofreram cirurgia de ressecção (sobrevida de 3 a 5% em 5 anos) quanto àqueles que passaram pelo procedimento de ressecção do órgão (sobrevida de 10 a 20% em 5 anos) (Hezel et al., 2006).
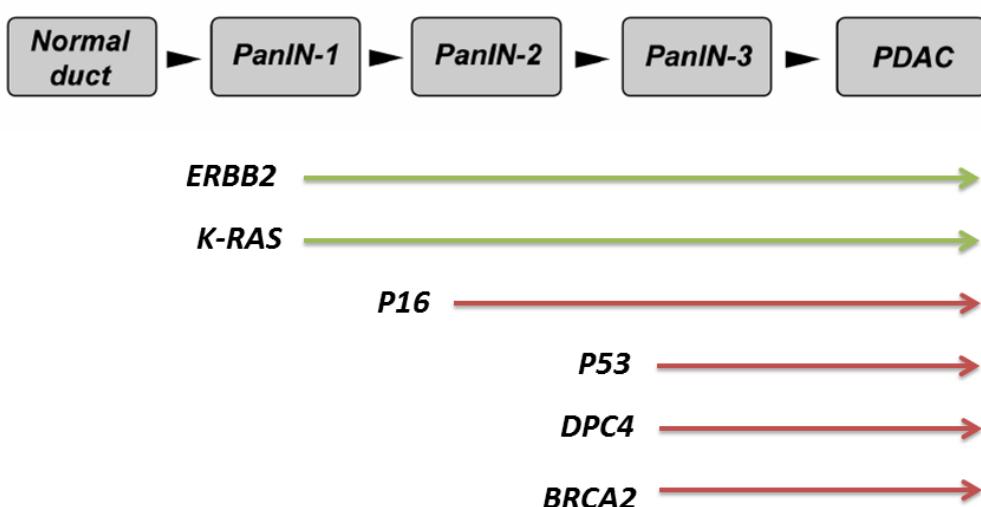
A escolha para o tratamento do câncer pancreático é dependente do estágio em que a doença se apresenta. Tumores primários limitados ao pâncreas (estágio I) e tumores localmente invasivos (estágio II) geralmente são ressecáveis enquanto que os tumores localmente avançados (estágio III) e metastáticos (estágio IV) não podem ser removidos cirurgicamente (Bilimoria et al., 2007). As terapias convencionais como rádio e quimioterapia possuem efeitos paliativos para os estágios mais avançados, tornando a cirurgia o único tratamento com chances de cura para o paciente (Yokoyama et al., 2009). O procedimento mais comum é a pancreatoduodenectomia ou procedimento de Whipple, o qual envolve a ressecção do pâncreas proximal, juntamente com o estômago distal, duodeno, ducto biliar distal e vesícula biliar (Bond-Smith et al., 2012).

1.2. *FATORES DE RISCO E PREDISPOSIÇÃO GENÉTICA*

O PDAC é uma doença associada a idades avançadas, apresentando maior incidência entre 70 e 80 anos, quando atinge um risco aumentado de desenvolvimento da doença em 40 vezes (Bardeesy & DePinho, 2002). Fatores ambientais, como o tabagismo, podem contribuir para o desenvolvimento do câncer pancreático, uma vez que este hábito aumenta as taxas de risco de 1.6 para 5.4 (Li et al., 2004), bem como o consumo excessivo de álcool, associado à pancreatite crônica, pode conduzir ao estabelecimento do câncer (Nitsche et al., 2011). Outros fatores de risco como síndromes genéticas que podem modular o desenvolvimento de câncer incluem pancreatite hereditária, fibrose cística, síndrome de Peutz-Jeghers, síndrome de Lynch (também conhecida como câncer colorretal hereditário não polipoide HNPCC), síndrome do nevo

atípico familiar – melanoma (FAMMM), câncer de mama e ovário hereditários e câncer pancreático hereditário (Decker et al., 2010).

O adenocarcinoma pancreático é uma neoplasia sólida de caráter infiltrante o qual surge a partir de precursores denominados neoplasias intraepiteliais pancreáticas (PanIN). A progressão histológica de neoplasias intraepiteliais de baixo grau (PanIN-1) para intermediário (PanIN-2) e alto (PanIN-3) graus e, posteriormente para o carcinoma invasivo está associada ao acúmulo de alterações genéticas. A superexpressão de *ERBB2/HER2/NEU*[1] e mutações em *K-RAS* estão presentes em PanIN-1, enquanto que a inativação do gene *P16* é verificada no grau intermediário destas lesões intraepiteliais e a inativação de *P53*, *DPC4* e *BRCA2* ocorrem tardiamente em PanIN-3 (Hruban et al., 2001).


Figura 1. Modelo de progressão do câncer pancreático. Ativação dos genes é representada pelas setas em verde, enquanto que a inativação é mostrada em

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[1] Genes e mRNA de *Homo sapiens* são apresentados com todas as letras maiúsculas e formatação em itálico.
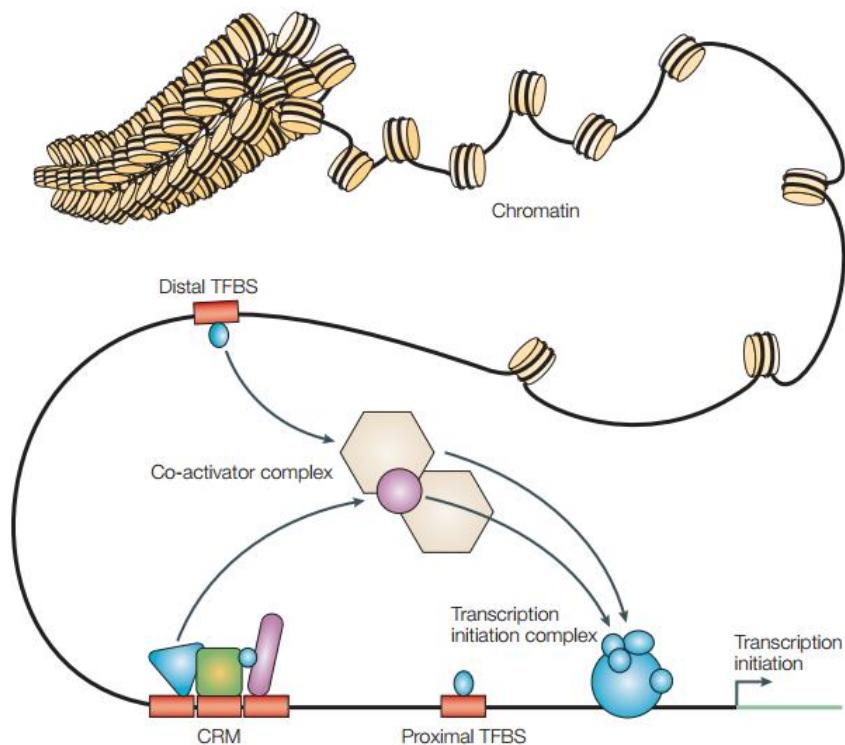
vermelho. Alterações genéticas são acumuladas durante a transformação do ducto normal em lesões intraepiteliais ao câncer invasivo (Hruban et al., 2001 modificado).

2. FATORES DE TRANSCRIÇÃO

O dogma central da biologia molecular envolve a conversão da informação gênica contida no DNA em RNAm, sendo este, posteriormente, traduzido em proteína. A transcrição é o processo no qual um RNAm qualquer é sintetizado a partir de um molde de DNA. Este mecanismo transcricional torna-se essencial para a expressão gênica, uma vez que falhas neste processo afetam todos os passos subsequentes. Este sistema de expressão de informação gênica é complexo e possui mecanismos regulatórios para o controle da mesma. A cromatina, porção na qual o DNA encontra-se associado a proteínas histonas, confere maior controle do processo transcricional, uma vez que mudanças estruturais na cromatina são requeridas para facilitar a ligação e atividade dos fatores de transcrição.

Fatores de transcrição, portanto, são proteínas que se ligam a sequências específicas de DNA, sendo responsáveis pela modulação da transcrição através da ativação ou repressão deste processo. Cada fator de transcrição regula a expressão de genes específicos, reconhecendo-os através dos elementos de resposta (regiões específicas do DNA). O processo transcricional é o passo essencial da expressão gênica para a síntese proteica, uma vez que os fatores de transcrição são os efetores finais das vias de sinalização e regulam funções celulares como proliferação, diferenciação e apoptose (Fernandez-Zapico et al., 2003).

Portando, modificações na expressão de fatores de transcrição possuem um impacto significante na biologia celular e possivelmente conduzem à progressão tumoral. O estudo dos fatores de transcrição na regulação da expressão gênica de PDAC torna-se fundamental quando permite um aumento na compreensão da biologia tumoral, conduzindo ao desenvolvimento de ferramentas para diagnósticos, prognósticos e métodos de tratamentos.

Figura 2. Componentes da regulação transcricional. Fatores de transcrição (TFs) ligam-se a sítios específicos (transcription-factor binding sites; TFBS), proximais ou distais ao sítio de início da transcrição. Conjuntos de TFs podem operar em módulos funcionais de regulação em cis (cis-regulatory modules CRMs) para adquirir propriedades regulatórias específicas. Interações entre TFs e cofatores estabilizam a maquinaria de iniciação da transcrição, permitindo assim, a expressão gênica. A regulação da transcrição é definida pela ligação de TFs a sequências-específicas é altamente dependente da estrutura tridimensional da cromatina (Wasserman and Sandelin, 2004).

3. BIOLOGIA COMPUTACIONAL

É cada vez maior o volume de dados produzido em estudos de Biologia Molecular e Celular através de técnicas como sequenciamento e microarranjo. Estas técnicas são capazes de produzir uma enorme quantidade de dados de maneira rápida a custos cada vez mais acessíveis. A crescente demanda na busca de maior capacidade de armazenamento de dados deu origem a repositórios públicos como o *Gene Expression Omnibus* (GEO) no ano 2000, o qual, originalmente, tinha o propósito de hospedar dados de expressão gênica, gerados a partir de microarranjo. No entanto, a utilização de técnicas de larga escala foi rapidamente aplicada em estudos cujo objetivo era examinar a variação do número de cópias do genoma e também identificar o perfil de proteínas de ligação ao DNA no genoma (Barrett et al., 2011). Com isso, a criação de neologismos como "transcritoma", "proteoma", "metaboloma", "exoma" e "ORFeoma" surgiu para referenciar este conjunto de informação.

O grande desafio desta era "ômica" baseia-se na busca de informações biologicamente relevantes, o que requer análises que consigam processar as interações complexas, geradas através de técnicas como microarranjos. Neste sentido, o emprego de métodos estatísticos é fundamental, pois confere robustez às análises de dados "ômicos", uma vez que levam em conta a variedade de fatores e a complexidade das interações gênicas.

Neste trabalho utilizamos dados de expressão gênica de pacientes com adenocarcinoma pancreático, provenientes de banco de dados públicos, como GEO (Edgar et al., 2002) e ArrayExpress (Rustici et al., 2013) e analisamos os mesmos através de métodos estatísticos implementados em ferramentas como

Algorithm for the Reconstruction of Accurate Cellular Networks (ARACNe) (Margolin et al., 2006) e *Master Regulator Analysis* (MRA) (Carro et al., 2010) no ambiente R.

OBJETIVOS

OBJETIVO GERAL

Identificar os reguladores mestres da transcrição em dados de expressão gênica de biópsias de pacientes com adenocarcinoma pancreático obtidos de bancos de dados públicos utilizando uma abordagem de Biologia Computacional.

OBJETIVOS ESPECÍFICOS

- Identificar os reguladores mestres, bem como os genes regulados por estes, que contribuem para o fenótipo tumoral utilizando pacotes estatísticos do programa R;
- Analisar os perfis de expressão gênica dos reguladores mestres quanto à sobrevida de pacientes com adenocarcinoma pancreático, provenientes de dados obtidos em repositórios públicos;
- Analisar os perfis de expressão gênica dos reguladores mestres quanto à sobrevida de pacientes com outros tipos de câncer, utilizando a ferramenta web Kaplan-Meier Plotter.

PARTE II

CAPÍTULO I

MATERIAL E MÉTODOS

Os materiais, bem como os métodos utilizados nesta dissertação estão apresentados em detalhe no artigo científico que compõe o item Resultados.

RESULTADOS

Os resultados estão apresentados a seguir na forma de artigo científico, o qual foi publicado no periódico **Molecular Biosystems**.

Computational Analyses Reveal a Prognostic Impact of *TULP3* as a Transcriptional Master Regulator in Pancreatic Ductal Adenocarcinoma. *Mol. BioSyst.*, DOI:10.1039/C3MB70590K

PAPER

Computational analyses reveal a prognostic impact of *TULP3* as a transcriptional master regulator in pancreatic ductal adenocarcinoma†

I. T. S. Sartor,* F. Zeidán-Chuliá, R. D. Albanus, R. J. S. Dalmolin and J. C. F. Moreira

Pancreatic ductal adenocarcinoma (PDAC) is recognized world-wide as an aggressive disease with poor prognosis in patients with or without resection. Further knowledge about the biological mechanisms of PDAC is necessary to enable the identification of novel molecular markers and therapeutic targets for early diagnosis and improved treatment. Transcription factors are the final effectors of signaling pathways and regulate a number of cellular functions. Changes in their expression may contribute to cellular transformation and tumor progression. Thus, the aim of the present study was to identify the Master Regulators (MRs) of transcription potentially involved in PDAC disease. To achieve this goal, we utilized microarray data to correlate MR genes with the tumor phenotype. Analyses were performed with RTN, Limma, and Survival packages in the R environment. We identified Tubby-like protein 3 (*TULP3*) as a MR of transcription in PDAC samples. The prognostic value of *TULP3* was assessed in three independent cohort analyses. Our data demonstrated that pancreatic cancer patients exhibiting high transcriptional levels of *TULP3* showed a poor overall survival rate. High expression levels of *TULP3* may play an essential role in pancreatic cancer progression and possibly lead to a poor clinical outcome. Our results highlight the potential use of *TULP3* as a clinical prognostic biomarker for pancreatic adenocarcinoma.

Introduction

Pancreatic ductal adenocarcinoma (PDAC) is recognized as the 4th biggest cause of death in the United States due to its aggressive nature. In 2013, it was estimated that 45 220 North Americans were diagnosed with pancreatic cancer and 38 460 died due to the disease.[1] In the UK, in 2010, 8455 people were diagnosed with PDAC and 7921 deaths were reported, which makes it the 5th most common type of cancer-related deaths.[2] In Brazil, PDAC is responsible for about 2% of diagnoses and 4% of the total deaths among all types of cancer. In 2010, 7740 deaths were reported due to PDAC.[3]

About 50% of the total number of pancreatic cancer cases are diagnosed in emergency assistance, where patients exhibit diverse and general symptoms such as non-specific abdominal pain, jaundice, or both. Courvoisier's sign, which is characterized by the presence of a palpable gall bladder accompanied with jaundice and without abdominal pain, is indicative of

PDAC; nonetheless, it occurs in less than 25% of patients.[4] The majority of tumors are located in the head of the pancreas and usually cause jaundice due to blockage of the bile duct.[5]

PDAC can be defined as a solid and infiltrative neoplasia, arising from precursors named Pancreatic Intraepithelial Neoplasia (PanIN). The histological progression of low-grade intraepithelial neoplasia (PanIN-1) to intermediate-grade (PanIN-2) and high-grade (PanIN-3) and, subsequently, to invasive carcinoma is associated with the accumulation of different genetic alterations.[6] For instance, over-expression of *ERBB2* and *KRAS* mutations are present in PanIN-1, whereas inactivation of the *P16* gene is observed in PanIN-2 and inactivation of *P53*, *DPC4*, and *BRCA2* occur in PanIN-3 lesions.[6]

Early diagnosis of PDAC still remains a challenge for clinicians, since the symptoms are generally non-specific (*e.g.*, abdominal pains, weight loss and nausea).[4] When diagnosed, approximately 80% of patients present an unresectable form of the disease.[7] In patients who do not undergo resection, the survival rate varies between 3 and 5%, and for those who have the organ resection, it varies from 10 to 20%, all within 5 years,[8] leading to a poor prognosis of the PDAC disease.

The choice of PDAC treatment depends on the disease stage. For example, primary tumors limited to the pancreas (stage I) and locally invasive tumors (stage II) are usually resectable, while locally advanced (stage III) and metastatic (stage IV)

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tumors cannot be removed surgically.[7] Conventional therapies such as radio and chemotherapy have palliative effects for more advanced stages, rendering surgery the only treatment with a chance of a cure.[9]

Transcription factors are the final effectors of signaling pathways and are involved in regulating cellular functions such as proliferation, differentiation, and apoptosis.[10,11] Therefore, changes in transcription factor expressions may impact cell biology, possibly leading to tumor progression. In the present study, we aimed to identify the transcriptional Master Regulators (MRs) involved in pancreatic adenocarcinoma. Our analyses highlighted Tubby-like protein 3 (*TULP3*) as a transcription factor with a potential contribution to the PDAC phenotype.

Materials and methods

Data acquisition

PDAC microarray data were obtained from the Gene Expression Omnibus database – GEOdatabase –[12] under accession number GSE21501, and were originally contributed by Stratford *et al.* in 2010.[13] Only human PDAC samples with clinical data were used in the present study. The genome-wide human transcription factors were obtained from the Animal Transcription Factor DataBase.[14] These data were essential to develop the transcriptional network.

Transcriptional network

The transcriptional network was constructed in the R environment[15] with the RTN package,[16] which applies Mutual Information (MI) measures for a pair of random variable expression data, generating a degree of statistical dependency between these variables. These values were transformed into MI estimated values. Pearson correlation was used as a Gaussian estimator.[17] Statistical relations, applied for expression data and transcription factors, were the basis for the transcriptional network development.

The ARACNe algorithm was used to eliminate the majority of indirect interactions inferred, since it explores the MI estimated values of a gene triplet (triangle of two TFs (transcription factors) and a gene target) and removes the smallest one.[17] Therefore, the PDAC transcriptional network was comprised of the greatest MI estimated values of a TF–target pair. This method infers candidate interactions of TFs and target genes from a transcriptional network. A collection of genes that are directly regulated by the same TF is referred to as regulon.[17]

Master regulator analysis

GSE16515 microarray data, obtained from the GEOdatabase,[12] which contained normal and tumor samples, were used as phenotype data to determine the statistical significance of the overlap between each regulon and the phenotype data. The Limma R-package[18] was used to estimate differentially expressed genes between normal and tumor samples (*i.e.* hits). Master Regulator Analysis (MRA) identified differentially expressed genes in each regulon by using Fischer's exact test, appointing

a TF as a Master Regulator (MR) in the PDAC phenotype array[19,20] (*p*-value < 0.001).

Filters

GSE10780 normal breast tissue expression data, publicly available from the GEOdatabase,[12] were used as a negative control network of a non-related tissue. Since our goal was to maintain the genetic features of the pancreatic tissue, characteristics shared by tissues of different embryonic derivation were discarded. Thus, common data between the transcriptional network and the negative control network were removed. MetaPCNA,[21] which is a proliferation-based signature presenting genes that are involved in cancer progression, was used to discard proliferative MRs; whereas it is known that these genes are related to tumorigenesis.

Survival analysis

GSE21501, GSE28735 and MEXP2780 microarray data, publicly available from the GEOdatabase[12] and ArrayExpress,[22] were used for survival analysis, taking as a parameter the expression of MR genes. The analysis was performed using the R-Survival package.[23] To compare the prognostic value of different gene expressions of MRs, an optimal cut-off was used to dichotomize the cohort, which is defined as the point with the most significant split.[24] The Kaplan–Meier method was used to estimate survival curves for the patients and the LogRank test was used to compare the survival. The hazard ratio (HR), which describes the measurements of how often an event occurs in one group compared to another over time, was calculated with 95% confidence intervals.

Statistical analysis

Statistical analysis was performed using R-Student's *t*-test for GSE15471 normal and tumor expression data, obtained from the GEOdatabase.[12] In order to select an optimal microarray probe to represent a gene, we used the JetSet score on Affymetrix gene expression microarrays, assigning the 221964_at probe for the *TULP3* gene.[25]

Kaplan–Meier plotter web tool

The prognostic value of the *TULP3* expression was analyzed in three different types of cancer (breast, ovarian and lung cancer), using the Kaplan–Meier plotter web tool, which performs a meta-analysis based on *in silico* biomarker assessment. Overall survival and auto select best cut-off were used as parameters for the analysis. All clinical and gene expression data were accessed from GEO,[12] EGA[26] and TCGA[27] public repositories. The dichotomized patient cohorts were then compared by LogRank test and the HR, with 95% confidence intervals, was calculated.[28,29]

Results

Transcription factors identified as master regulators of PDAC by computational analyses
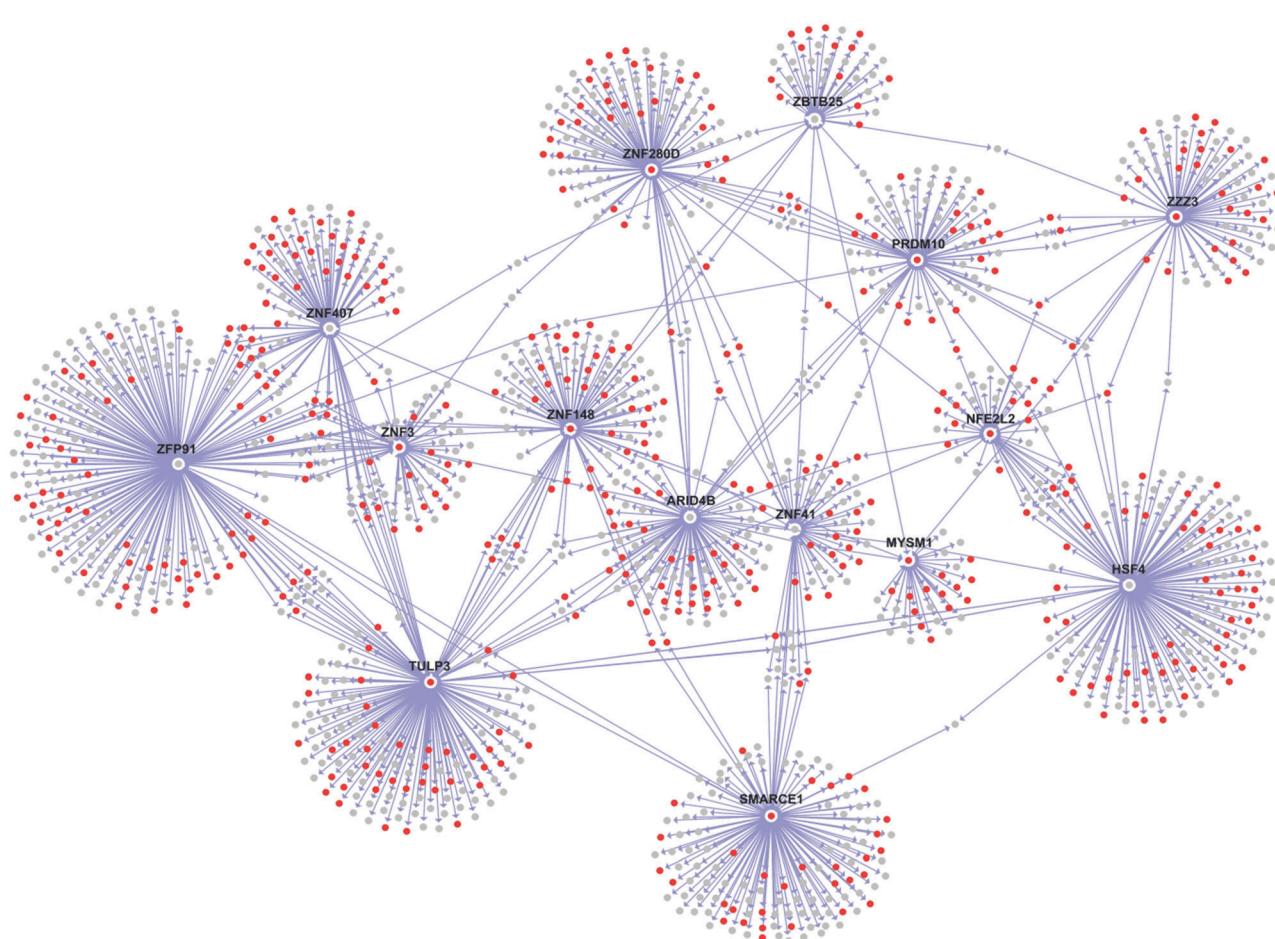
A total of 19 751 genes and 5476 hits were analyzed and 15 transcription factors were identified as significant MRs

Table 1 Significant master regulators of transcription in PDAC expression data (p-value < 0.001). Each MR was assigned to the corresponding probe of the Agilent gene expression microarray (GSE21501), to the total number of genes which composed the regulon, to the differentially expressed genes observed in each regulon, to the p-value and to the adjusted p-value

MR	Probe	Regulon size	Observed hits	p-value	Adjusted p-value
ZNF407	A_23_P380954	108	67	2.09×10^{-14}	2.04×10^{-11}
MYSM1	A_23_P348992	60	42	1.84×10^{-12}	5.99×10^{-10}
ZNF148	A_23_P139408	122	63	6.51×10^{-09}	1.27×10^{-06}
ZZZ3	A_23_P11507	128	65	9.44×10^{-09}	1.53×10^{-06}
ZFP91	A_24_P56052	255	106	6.15×10^{-07}	7.49×10^{-05}
ZNF41	A_23_P45234	63	35	8.83×10^{-07}	9.57×10^{-05}
HSF4	A_23_P3592	195	82	5.53×10^{-06}	4.90×10^{-04}
ARID4B	A_23_P201951	126	57	8.39×10^{-06}	6.82×10^{-04}
PRDM10	A_32_P228699	102	48	9.80×10^{-06}	7.35×10^{-04}
SMARCE1	A_23_P333063	231	93	1.31×10^{-05}	7.98×10^{-04}
ZBTB25	A_23_P48628	66	34	1.23×10^{-05}	7.98×10^{-04}
ZNF3	A_23_P219084	71	36	1.18×10^{-05}	7.98×10^{-04}
ZNF280D	A_23_P14708	131	58	1.61×10^{-05}	8.71×10^{-04}
TULP3	A_23_P116980	200	82	1.74×10^{-05}	8.94×10^{-04}
NFE2L2	A_23_P5761	67	34	1.89×10^{-05}	9.21×10^{-04}

(p-value < 0.001), essential for the PDAC signature (Table 1 and Fig. 1). These TFs regulate genes that possibly have an essential role in promoting and sustaining transformed cells. For this reason, we decided to study how these MRs were expressed in PDAC samples and how their expressions could be related to survival. Therefore, survival analyses were done for the 15 MR genes in the GSE21501, GSE28735 and MEXP2780 arrays, and Tubby-like protein 3 (*TULP3*) was the only MR which presented the same survival curve profile in all arrays. Those MRs which did not present the same profile curve or were not verified in all arrays, were then excluded (ESI,† figures).
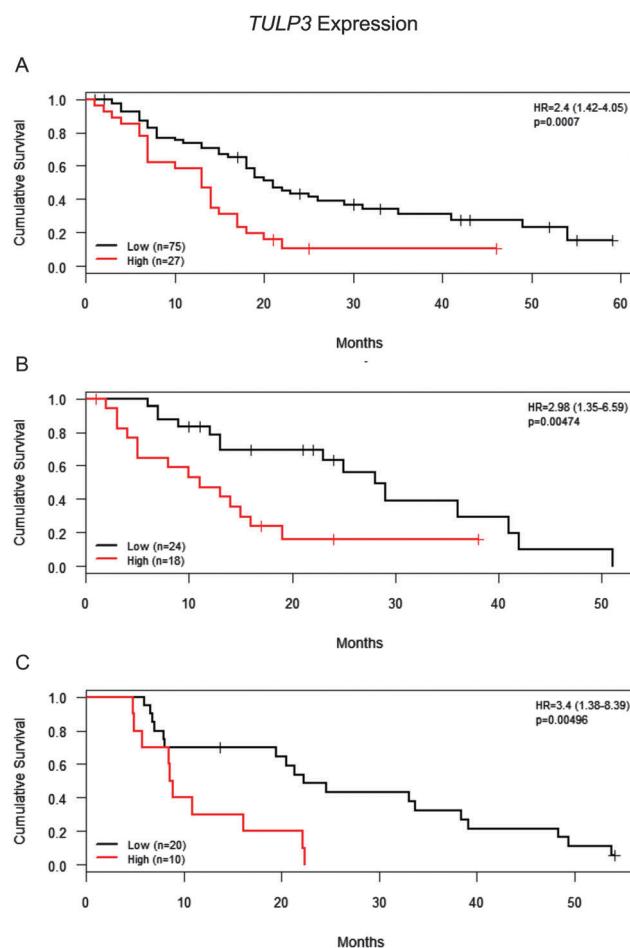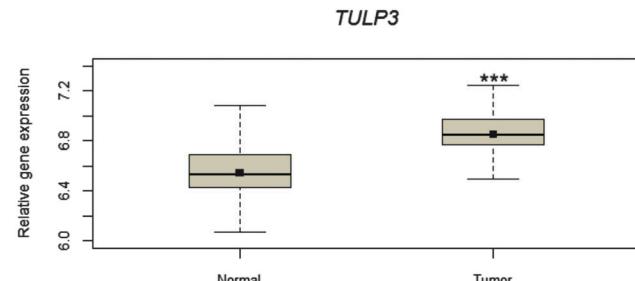

Fig. 1 Master regulator network. The 15 significant MRs of transcription and the respectively regulated genes (p-value < 0.001). Hits are shown in red.

TULP3 is a master regulator with prognostic value in PDAC

Analysis of *TULP3* expression in subjects with PDAC revealed that lower transcription levels of *TULP3* are associated with better prognosis. The GSE21501 cohort was dichotomized for the *TULP3* gene and patients with low- (n = 75) *vs.* high-expression (n = 27) showed a difference of p-value = 0.0007 and exhibited a 2.4 times greater chance of survival (Fig. 2A). For the GSE28735 cohort, patients with low- (n = 24) *vs.* high-expression of *TULP3* (n = 18) showed a significance of p-value = 0.00474 and a 2.98 times greater chance of survival (Fig. 2B). Finally, the MEXP2780 cohort was divided in patients with low- (n = 20) *vs.* high-expression of *TULP3* (n = 10) (p-value = 0.00496) and exhibited a 3.4 times greater chance of survival for patients with low expression of *TULP3* (Fig. 2C).


Fig. 3 Boxplot of relative *TULP3* mRNA levels in normal and PDAC patients in the GSE15471 array. The *t*-test appointed a significant difference between normal and tumor expression values. The mean value of $\log_2$ *TULP3* expression in normal patients was 6.54 whereas in PDAC patients the mean value of $\log_2$ *TULP3* expression was 6.86. Mean: black square, median: solid black line, maximum and minimum values: whiskers, lower and upper quartiles: bottom and top of each box. ***p-value = 2.096×10^{-7}.


Fig. 2 Kaplan–Meier curves of three independent arrays comparing *TULP3* expression. (A) In the GSE21501 data, we observed a 2.4 times greater chance of survival for patients who had low *TULP3* expression levels and a difference of p-value = 0.0007 between low–high *TULP3* expression, identified by the LogRank test. (B) In the GSE28735 microarray data, patients with low expression levels had a 2.98 times greater chance of survival than patients who had high expression levels, with a difference between low–high *TULP3* transcriptional levels of p-value = 0.00474. (C) In the MEXP2780 sample data, patients who had low *TULP3* expression levels exhibited a 3.4 times greater chance of survival compared to those who had high expression levels and a difference between the two expression groups of p-value = 0.00496.

The next step was to verify the levels of *TULP3* (mRNA) in normal and PDAC individuals. To achieve this goal, we used the GSE15471 array with both normal and PDAC samples. The mean value for $\log_2$ *TULP3* expression in normal patients was 6.54 and 6.86 for PDAC patients, with a difference between these two groups of p-value = 2.096×10^{-7}. This provides further evidence of alterations in *TULP3* expression in individuals with PDAC (Fig. 3).
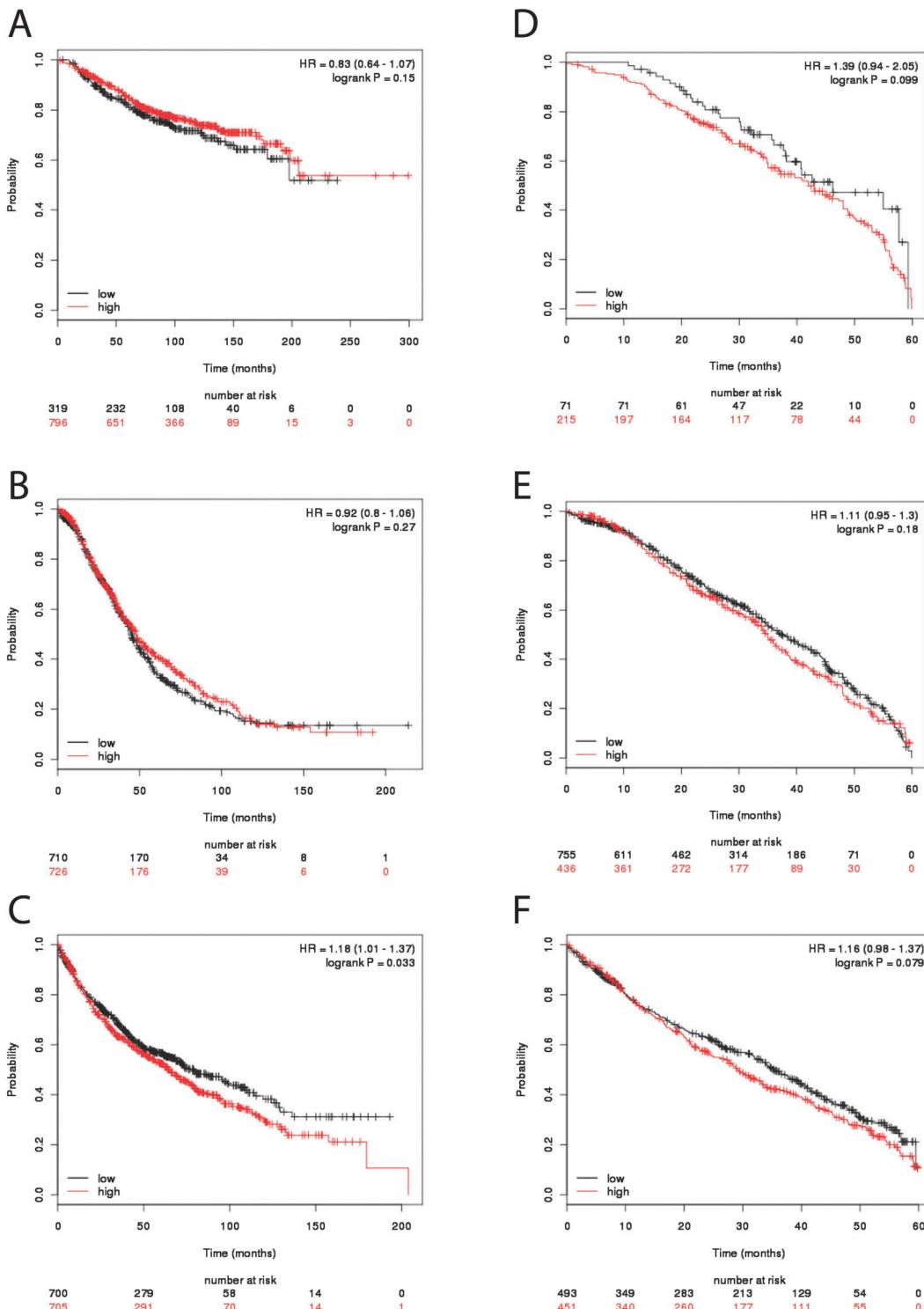
In order to confirm that the aberrant expression of *TULP3* may serve as a pancreatic cancer biomarker, we analyzed its expression levels in other types of cancer by using the Kaplan–Meier plotter web tool. Breast and ovarian cancer presented no statistical difference in *TULP3* expression comparisons (Fig. 4A and B, respectively). Nonetheless, we found a significant difference in lung cancer samples (p-value = 0.033) (Fig. 4C). However, at an overall survival of 60 months, which is the same time used for the PDAC dataset, no statistical significance in *TULP3* expression was detected for either breast, ovarian, or lung cancers (p-value = 0.099, p-value = 0.18 and p-value = 0.079, respectively) (Fig. 4D–F). All these results taken together, may suggest *TULP3* as a potentially specific biomarker for pancreatic cancer prognosis.

Developing a regulon model to identify the potential *TULP3*-associated target genes

Very little is known about the *TULP3*-associated target genes. Therefore, we here provide the possible *TULP3*-regulated genes in PDAC (Fig. 5). Among the over-expressed genes associated with the *TULP3* regulon, which contribute to the tumor phenotype, we found the Dedicator of Cytokinesis protein 7 (*DOCK7*) with p-value = 0.0002 and the Ras-Association Domain Family protein 8 (*RASSF8*) with p-value = 0.006 (ESI,† Table S1).

Discussion
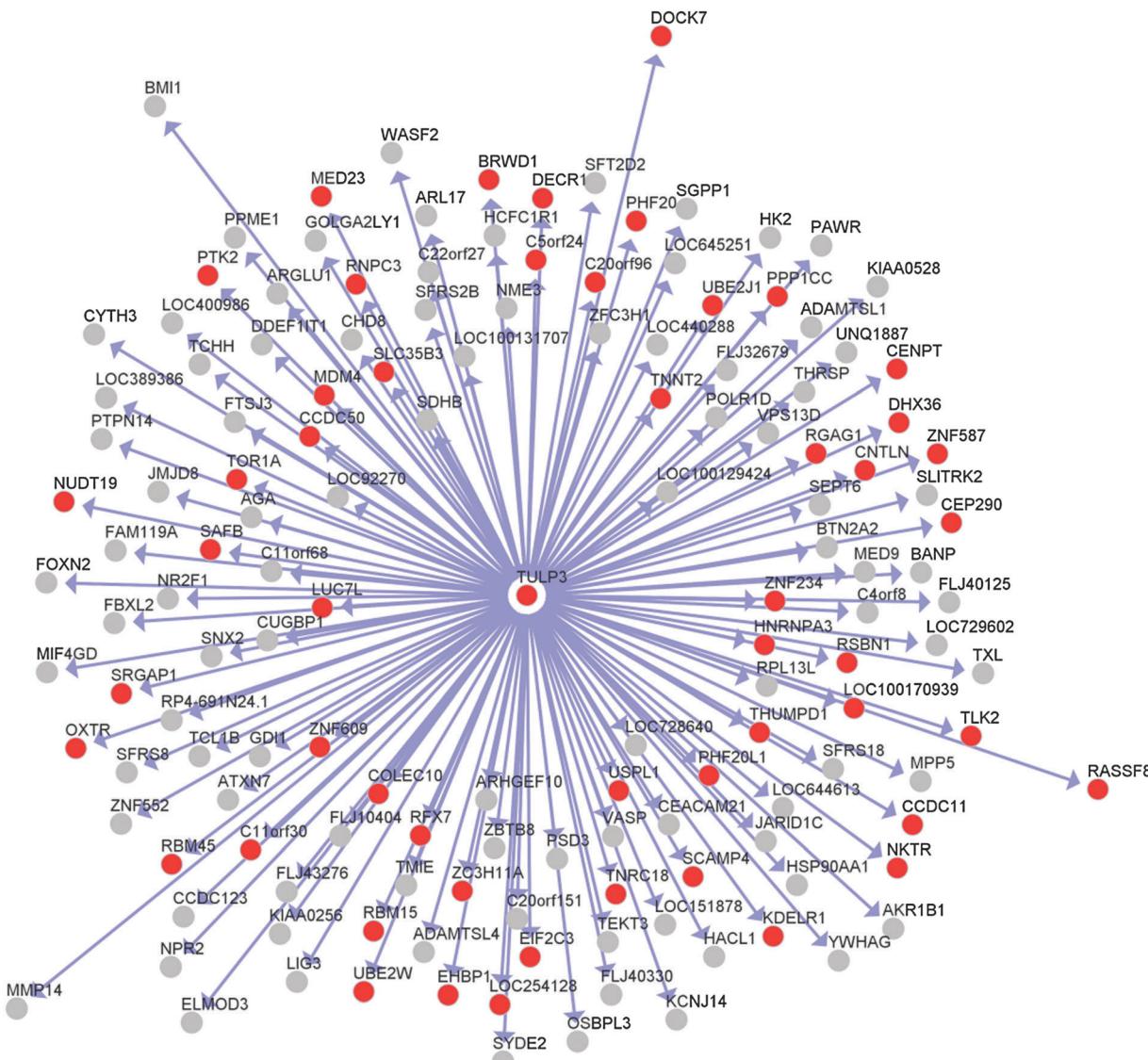
TULP3 is a member of the mammalian tubby-like proteins (TULPs), which present a carboxy-terminal tubby domain, including TUB and TULP1 to TULP4 proteins. The *TULP3* gene

Fig. 4 Kaplan–Meier curves. (A) A cohort of 1115 breast cancer patients showed no statistical difference between low- (n = 319) vs. high-expression of *TULP3* (n = 796), nor did the (B) cohort of 1436 ovarian cancer patients which were divided into low- (n = 710) and high-transcription levels of *TULP3* (n = 726). (C) The difference (p-value = 0.033) between low- (n = 700) and high-expression of *TULP3* (n = 705) in a cohort of 1405 lung cancer patients. (A), (B) and (C) were plotted with maximum overall survival. (D), (E) and (F) were plotted with 60 months of overall survival. No statistical significance was detected in (D) breast, (E) ovarian or (F) lung cancer.

plays an essential role during mammalian development, since mutations in *TULP3* exhibit embryonic lethality with defects during neural tube closure.[30–32] The tubby domain is positively charged at the carboxy-terminal region and possesses a nuclear localization conserved sequence, which enables its role as a transcription factor. This region of the TULP3 protein binds to

Fig. 5 *TULP3 regulon. TULP3* transcription factor–regulated genes were inferred by the ARACNe algorithm. Hits are shown in red; genes which presented no difference when comparing tumor to normal pancreatic tissue are shown in gray.

the plasma membrane, specifically to phosphatidylinositol-4,5-bisphosphate (PIP$_2$), a phospholipid highly enriched in the membrane.[30] TULP3 can interact with the intraflagellar transport A-complex (IFT-A) or be dislodged from the membrane, enabling nuclear translocation.[33] A conserved domain in the amino-terminus enables TULP3 to bind to IFT-A, which is a microtubule-based transport complex essential for ciliogenesis.[34] Primary cilia are a microtubule-based organelle ubiquitously expressed in epithelial cells, including the pancreatic tissue.[35] These sensory compartments receive extracellular signals and transduce the information, thereby leading to transcriptional regulation of downstream genes.[33,34]

When TULP3–IFT-A binding is impaired, TULP3 cannot exert its function in primary cilia, and it is then translocated into the nucleus. Its absence in primary cilia stimulates Hedgehog (Hh) signaling since TULP3 negatively regulates this pathway.[34,35]

PDAC arises when genetic alterations occur at the level of signal transduction proteins, which participate in normal pancreas embryonic development (*e.g.*, the Hh pathway).[30,34–36] Hh signaling proteins are commonly undetectable in normal ductal epithelia, although they are found in PanIN lesions and invasive PDAC.[36] Besides TULP3 inducing proliferation through Hh signaling, several more roles of some *TULP3*-regulated genes, which effectively contribute to the PDAC phenotype, are described below:

(i) *DOCK7*, a member of the Dock180-related superfamily of Guanine nucleotide Exchange Factors (GEFs), generates active GTPases like RAC1, CDC42, and RHOA, which are responsible for actin cytoskeleton regulation. Moreover, it has been reported that ERBB2 receptors bind and activate DOCK7, promoting activation of RHO GTPases and thus inducing migration of Schwann cells.[37] Cancer patients with an over-expression of

ERBB2 tend to have a poor clinical outcome.[38] In addition, the over-expression of ERBB2 is observed in early stages of PanIN lesion progression until the infiltrating pancreatic adeno-carcinoma.[6] This may suggest a potential role of ERBB2 in *DOCK7* activation and promotion of invasiveness.

(ii) *RASSF8*, which contains the Ras-Association (RA) domain at the N-terminal region, is involved in Ras signaling.[39] As with GTPases, the RAS family proteins are activated by the GEF proteins. When activated, RAS proteins induce proliferative signals which promote tumor initiation and progression through the stimulation of transcription factors (*e.g.*, Trans-forming Growth Factor-α, TGFα).[40]

(iii) We also found *MMP14* (Matrix Metalloproteinase-14 also known as Membrane-Type 1 Matrix Metalloproteinase – *MT1-MMP*) and *BMI1* (B-cell-specific Moloney murine leukemia virus insertion site 1) among the *TULP3*-regulated genes. Despite the non-statistical significance between PDAC *vs.* normal individuals in our study, over-expression of *MMP14*[41,42] and *BMI1*[43,44] are observed in human pancreatic adenocarci-noma, possibly playing a role in enhancing proliferation and invasiveness.

Identification of transcriptional MRs associated with the prognosis of pancreatic cancer patients may shed light on the biological mechanisms involved in pancreatic adenocarcinoma and contribute to the identification of novel molecular targets. Our results are consistent with another study reporting the deregulation of *TULP3* transcriptional levels in both PDAC samples and PanIN lesions.[45] Thus, we highlight the possible role of *TULP3* in tumor progression and maintenance of the pancreatic cancer phenotype.

Conclusions

Our results indicated that a high *TULP3* expression may play a critical role in pancreatic cancer progression since it is signifi-cantly correlated with a poor clinical outcome. To date, *TULP3* low–high expression levels have not been associated with prognostic value for any other type of cancer, such as breast, ovarian and lung cancer. Moreover, we believe that the expres-sion of *TULP3* could be explored in the future as a prognostic biomarker for PDAC patients. Nevertheless, further studies will be necessary for *TULP3* biomarker validation as well as its definition as a therapeutic target in pancreatic adenocarcinoma.

Conflict of interest statement

The authors declare no conflict of interest.

Acknowledgements

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PARTE III

DISCUSSÃO

Ao estudar a síndrome da diabetes-obesidade monogênica, Coleman e Eicher (1990) associaram o fenótipo "roliço" (*tubby*) de ratos à síndrome espontânea da obesidade de início tardio, uma vez que a progressão do fenótipo é lenta. Contudo, estudos posteriores demonstraram que estes ratos possuíam deficiências na audição e visão (Ohlemiller et al., 1995). Estas observações possibilitaram a identificação de um novo gene, denominado *Tub*[2], que, quando mutado, era responsável pelo fenótipo *tubby* em ratos (Kleyn et al., 1996).

Estudos subsequentes identificaram proteínas relacionadas à TUB[3], as quais estavam presentes em organismos multicelulares, incluindo plantas (Boggon et al., 1999). A família de proteínas *tubby-like*, em mamíferos, compreende TUB (a qual dá nome à família), e as proteínas relacionadas TULP1 a TULP4. A característica comum a todas as proteínas que constituem esta família é a presença de um domínio *tubby* na porção carboxi-terminal, o qual consiste em um β barril fechado, sendo que, no centro deste, encontra-se uma α hélice hidrofóbica. Enquanto que a região carboxi-terminal é conservada, a região amino-terminal apresenta grandes variações e funções distintas (**Figura 2**) (Mukhopadhyay & Jackson, 2011).
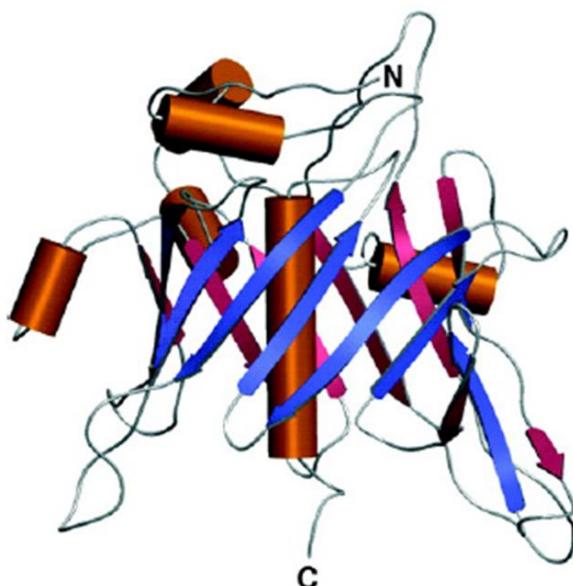
O domínio *tubby*, o qual é positivamente carregado, possui uma sequência conservada de localização nuclear, o que permite sua atuação como fator de

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[2] Genes e mRNA de *Rattus norvergicus* são apresentados com a primeira letra maiúscula e demais minúsculas, bem como formatação em itálico.
[3] Proteínas de *Homo sapiens* quanto de *Rattus norvergicus* são apresentadas da mesma forma com todas as letras maiúsculas.
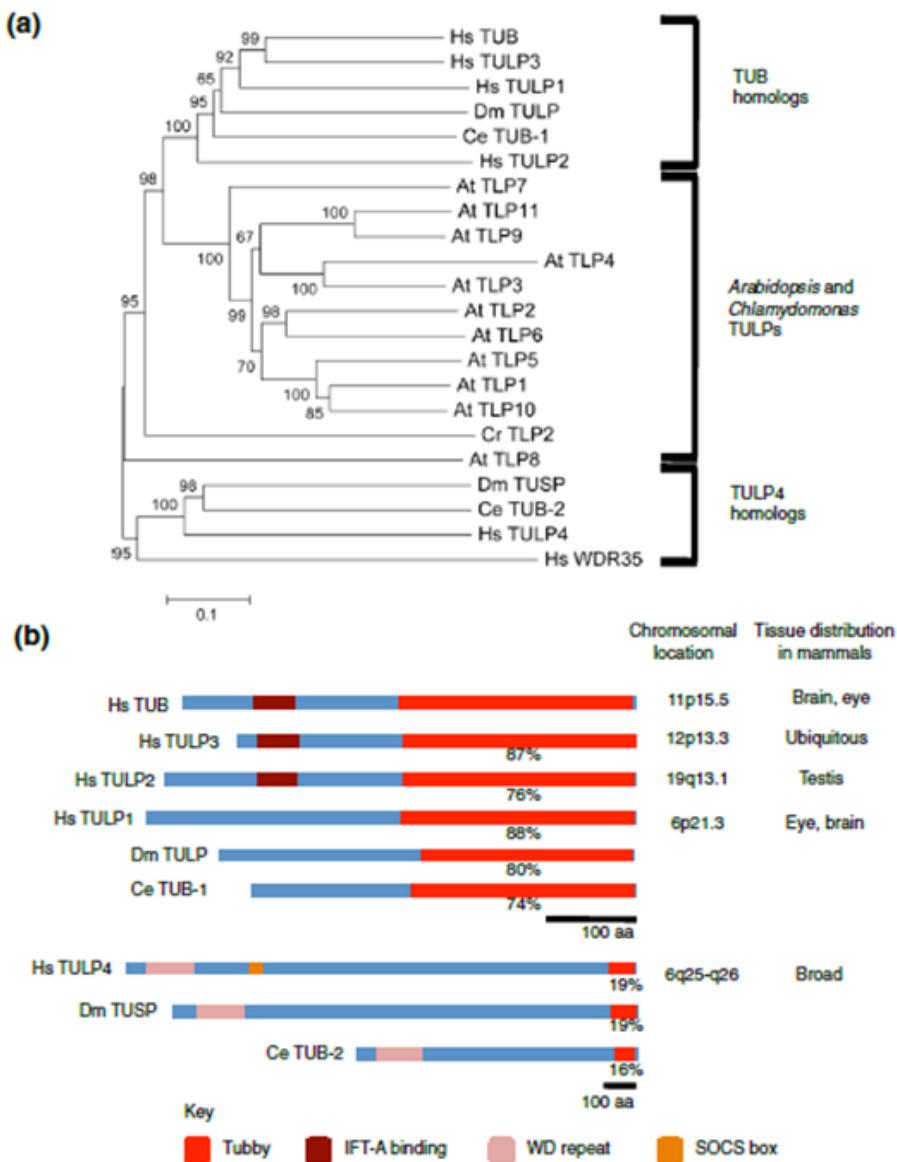
transcrição, *tubby* também é capaz de interagir com fosfoinositídeos de membrana (Boggon et al., 1999).

Figura 3. Regiões funcionais do domínio *tubby* da proteína TUB. α Hélices e folhas β pregueadas são representadas por cilindros e setas, respectivamente. *Tubby* consiste de um barril formado por 12 estruturas secundárias β pregueadas e no centro encontra-se uma α hélice hidrofóbica. C e N representam as regiões carboxi e amino terminais, respectivamente (Mukhopadhyay & Jackson, 2011).

Análises filogenéticas demonstraram que as proteínas TUB e TULP1-3 são intimamente relacionadas, enquanto TULP4 é o membro mais distante da família (**Figura 3.a** e **3.b**). A região amino-terminal destas proteínas é diversa e apresenta diferentes funções, a exemplo, um domínio conservado na porção amino-terminal permite aos membros TULP3, TULP2 e TUB, mas não TULP1 e TULP4 de ligar-se com transporte intraflagelar do complexo A (IFT-A) (Mukhopadhyay & Jackson, 2011). O cílio primário é uma estrutura

microtubular em forma de antena que age como organela sensorial a sinais extracelulares (Seeley et al., 2009).

Figura 4. Relações evolucionárias e arquitetura de domínio de proteínas da família *tubby*. **(a)** Relações evolucionárias entre proteínas da família *tubby* a partir de diferentes espécies. As análises filogenéticas basearam-se no método de neighbor-joining, o qual alinha as sequências e agrupa membros com maior similaridade. Os valores de bootstrap são demonstrados nos ramos da árvore. A barra abaixo da figura indica a proporção de diferenças entre aminoácidos. **(b)** Comparação das estruturas de domínio das proteínas da família *tubby* a partir de diferentes espécies. A porcentagem de similaridade do domínio canônico *tubby* é indicada abaixo de cada

proteína. Hs, *Homo sapiens*; Dm, *Drosophila melanogaster*; Ce, *Caenorhabditis elegans*; Cr, *Chlamydomonas reinhardtii*; At, *Arabidopsis thaliana*; IFT-A, transporte intraflagelar do complexo A; SOCS, sinal supressor de citocina (Mukhopadhyay & Jackson, 2011).
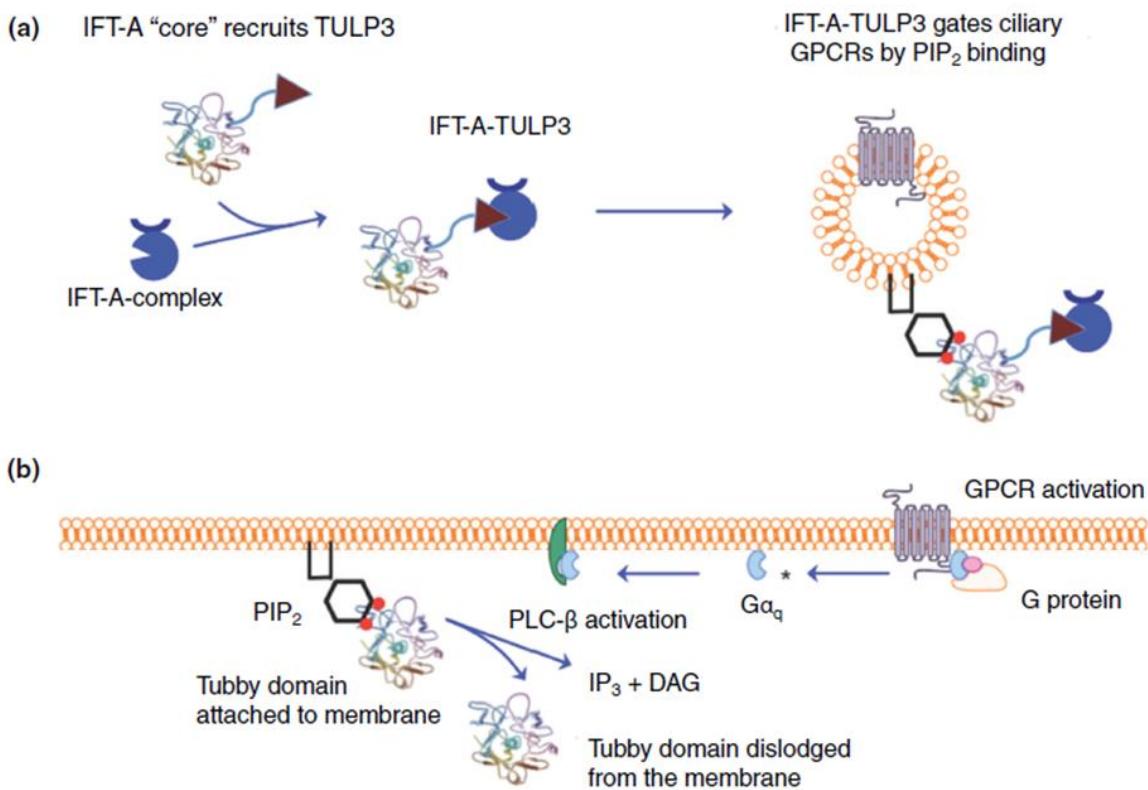
A expressão dos genes *tubby-like* é identificada em vários tecidos: *TUB* é encontrado na retina e amplamente no cérebro, incluindo hipocampo, núcleos paraventricular, ventromedial e arqueado do hipotálamo, além do tecido adiposo. A alta expressão de *TUB* no hipotálamo, o qual está implicado no controle sistêmico de regulação energética, sugere que o fenótipo obesidade pode resultar de prejuízos no controle da saciedade ou metabolismo (Carroll et al., 2004). *TULP1* é expresso seletivamente na retina enquanto que *TULP2* é encontrado amplamente nos testículos. *Tulp3* é identificado de forma ubíqua durante o desenvolvimento de ratos e sua expressão permanece no animal adulto, inclusive no sistema nervoso central. *Tulp4* é amplamente expresso no cérebro e testículos de ratos (Mukhopadhyay & Jackson, 2011).

A importância destes genes para o desenvolvimento e fisiologia dos mamíferos se torna evidente quando condições patológicas são associadas a mutações nas proteínas da família *tubby*.

O fenótipo *tubby*, verificado em ratos com mutações no gene *Tub*, caracteriza-se por apresentar, além da obesidade, degeneração da retina e da cóclea, o que causa cegueira e surdez nos mesmos. Associado ao ganho de peso, os ratos *tubby* exibem, inclusive, resistência à insulina, porém, níveis normais de glicose sanguínea (Mukhopadhyay & Jackson, 2011).

Ratos que apresentam o gene *Tulp1* nocauteado exibem, primeiramente, dendritos bipolares muito pequenos e, como consequência desta característica, defeitos nos fotorreceptores da retina que conduzem à degeneração por apoptose. Em humanos a degeneração da retina por mutações em *TULP1* é denominada retinite pigmetosa, sendo esta característica herdada de maneira autossômica recessiva (Ikeda et al., 2000).

Os fenótipos patológicos associados à mutação de *Tulp3* em ratos exibem características mais severas quando comparadas a mutações nos genes da mesma família, como defeitos no fechamento do tubo neural e letalidade embrionária. *Tulp3* é expresso de maneira ubíqua no desenvolvimento embrionário de ratos, sendo que, mutações neste gene resultam no aumento da sinalização Hedgehog (Hh) na porção dorsoventral do tubo neural (Norman et al., 2009). Da mesma maneira, fenótipos similares são verificados quando subunidades do IFT-A estão mutadas. As subunidades WDR19, IFT122 e IFT140 compõem o *core* do IFT-A cuja função é manter a estabilidade do complexo e permitir a ligação com TULP3 (Mukhopadhyay et al., 2010).

Figura 5. Regulação funcional de TULP3. **(a)** TULP3 se associa ao *core* IFT-A através da região N-terminal de ligação a IFT-A. TULP3-(IFT-A) aprisionam GPCRs ciliares à vesícula através da ligação de TULP3 com PIP$_2$. TULP3-GPCR-PIP$_2$ são transportados via IFT-A de forma retrógrada e anterógrada no cílio primário. **(b)** Domínio *tubby* de TULP3 é ancorado à PIP$_2$, na membrana. A ativação da proteína G à Gα$_q^*$ devido à ativação de GPCR causa hidrólise de PIP$_2$ a liberação de TULP3 no citoplasma. IP$_3$ - inositol triphosphate, DAG – diacylglicerol, PLC – phospholipase C (Mukhopadhyay & Jackson, 2011 modificado).

A região amino-terminal da proteína TULP3 permite que a mesma se associe com IFT-A, que, por sua vez, compromete TULP3 à ciliogênese e ao transporte retrógrado e anterógrado de TULP3 no interior do no cílio primário. TULP3 encontra-se adjunto a PIP$_2$ (phosphatidylinositol-4,5-bisphosphate) através da associação do domínio *tubby* a este fosfolipídeo de membrana. O

desligamento de TULP3 da membrana é promovido a partir da ativação de receptores acoplados à proteína G (GPCRs), o que gera a hidrólise de PIP_2 e a liberação de TULP3 no citoplasma. O fato de TULP3 não se encontrar associado a PIP_2 ou IFT-A resulta na sua translocação nuclear e ativação da transcrição. Da mesma forma, quando a ligação TULP3-(IFT-A) é prejudicada, TULP3 não entra no cílio e é translocado para o núcleo, ainda, sua ausência no cílio estimula a sinalização Hh potencialização a transcrição (Mukhopadhyay et al., 2010).

O adenocarcinoma pancreático surge quando ocorrem alterações genéticas afetando proteínas de transdução de sinal relacionadas com o desenvolvimento embrionário normal do pâncreas (por exemplo, proteínas das vias de sinalização Hh) (Boggon et al., 1999). Estas são indetectáveis no epitélio adulto e normal dos ductos pancreáticos, no entanto, a expressão de proteínas Hh está associada às lesões PanIN e ao PDAC invasivo (Thayer et al., 2003). Além de TULP3 estimular a proliferação através de sinalização Hh, o papel de alguns genes regulados por *TULP3*, que contribuem para o fenótipo tumoral, são descritos a seguir:

(i) Dedicator of Cytokinesis Protein 7 (*DOCK7*), é um membro da superfamília de proteínas Guanine Exchange Factors (GEFs) relacionadas a Dock180 que atua gerando GTPases ativas como Rac1, Cdc42 e RhoA, as quais são responsáveis pela regulação do citoesqueleto. Além disso, um estudo relatou a ligação do receptor ERBB2 a DOCK7, promovendo, assim a ativação de Rho GTPases e induzindo a migração nas células de Schwann (Yamauchi et al., 2008). A superexpressão de *ERBB2* em pacientes com

câncer está associada a um desfecho clínico desfavorável (Holbro et al., 2003). Além disso, a superexpressão de *ERBB2* é observada desde as etapas iniciais das lesões PanIN até adenocarcinoma infiltrante (Hruban et al., 2001). Estes estudos sugerem o papel potencial de ERBB2 na ativação de DOCK7 promovendo a migração.

(ii) Ras-Association Domain Family protein 8 (*RASSF8*), que contêm o domínio Ras-Association (RA) na região N-terminal, está envolvida nas vias de sinalização Ras (Richter et al., 2009). Assim como as GTPases, as proteínas da família RAS são ativadas pelas proteínas GEFs. E quando ativadas, estas induzem sinais proliferativos que promovem a iniciação e a progressão tumoral através da estimulação de fatores de transcrição (por exemplo, Transforming Growth Factor-α - *TGFα*) (Pylayeva-Gupta et al., 2011).

(iii) Dentre os genes regulados por *TULP3*, também encontramos Matrix metaloproteinase-14 (*MMP14*, conhecido como Membrane-Type 1 Matrix metaloproteinase - *MT1-MMP*) e B-cell-specific Moloney murine leukemia virus insertion site 1 (*BMI1*). Apesar da significância não estatística entre indivíduos com PDAC versus indivíduos normais em nosso estudo, a superexpressão de *MMP14* (Imamura et al., 1998; Ottaviano et al., 2006) e *BMI1* (Song et al., 2010; Proctor et al., 2013) são observadas em adenocarcinomas pancreáticos humanos, possivelmente desempenhando um papel no aumento da proliferação e invasão tumoral.

A identificação de RMs da transcrição associada ao prognóstico de pacientes com câncer pancreático pode contribuir para uma melhor compreensão dos mecanismos biológicos envolvidos no adenocarcinoma de

pâncreas, além de contribuir para a identificação de novos alvos moleculares. Nossos resultados são consistentes com outro estudo relatando a desregulação dos níveis transcricionais de *TULP3* em amostras de PDAC e lesões PanIN (Harada et al., 2009), destacando o possível papel de *TULP3* e seus genes regulados na progressão tumoral e manutenção do fenótipo PDAC.

Os resultados deste estudo indicam que a elevada expressão transcricional de *TULP3* em pacientes com PDAC pode desempenhar um papel fundamental na progressão tumoral além da significativa correlação com um desfecho clínico desfavorável. Até o momento, os níveis de expressão de *TULP3* não estão associados a qualquer valor prognóstico em cânceres como de mama, ovário e de pulmão. Possivelmente, a expressão *TULP3* poderá ser explorada no futuro como um biomarcador de prognóstico em pacientes com PDAC. No entanto, mais estudos são necessários para a validação TULP3 como um biomarcador, bem como sua definição como alvo terapêutico em adenocarcinoma pancreático.

CONCLUSÕES

Os estudos realizados nesta dissertação nos permitem concluir que:

1. *TULP3* é um dos RMs da transcrição, o qual contribui para o fenótipo tumoral de adenocarcinoma pancreático.

2. Existe uma associação entre a alta expressão transcricional de *TULP3* em pacientes com adenocarcinoma pancreático e um desfecho clínico desfavorável.

3. Não há relação entre valor prognóstico dos níveis de expressão de *TULP3* em cânceres como de mama, ovário e de pulmão.

PERSPECTIVAS

Como perspectivas à continuação deste estudo, ressaltamos:

1. A confirmação dos níveis de expressão de *TULP3* em amostras de pacientes com adenocarcinoma pancreático.

2. A confirmação através da técnica de imunohistoquímica da proteína TULP3 em amostras de pacientes com adenocarcinoma pancreático.

3. A busca de microarranjos que contenham dados de expressão de amostras de pacientes com adenocarcinoma pancreático em resposta ao tratamento e a avaliação de *TULP3* como possível biomarcador.

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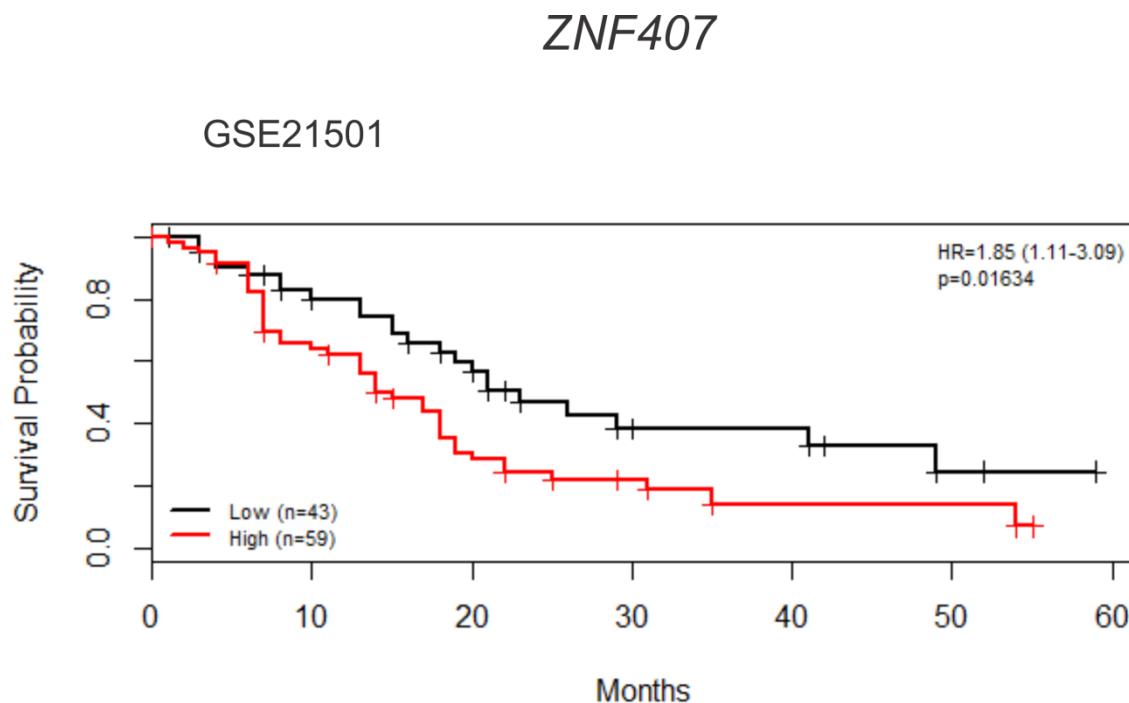
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ANEXOS

Computational Analyses Reveal a Prognostic Impact of *TULP3* as a Transcriptional Master Regulator in Pancreatic Ductal Adenocarcinoma
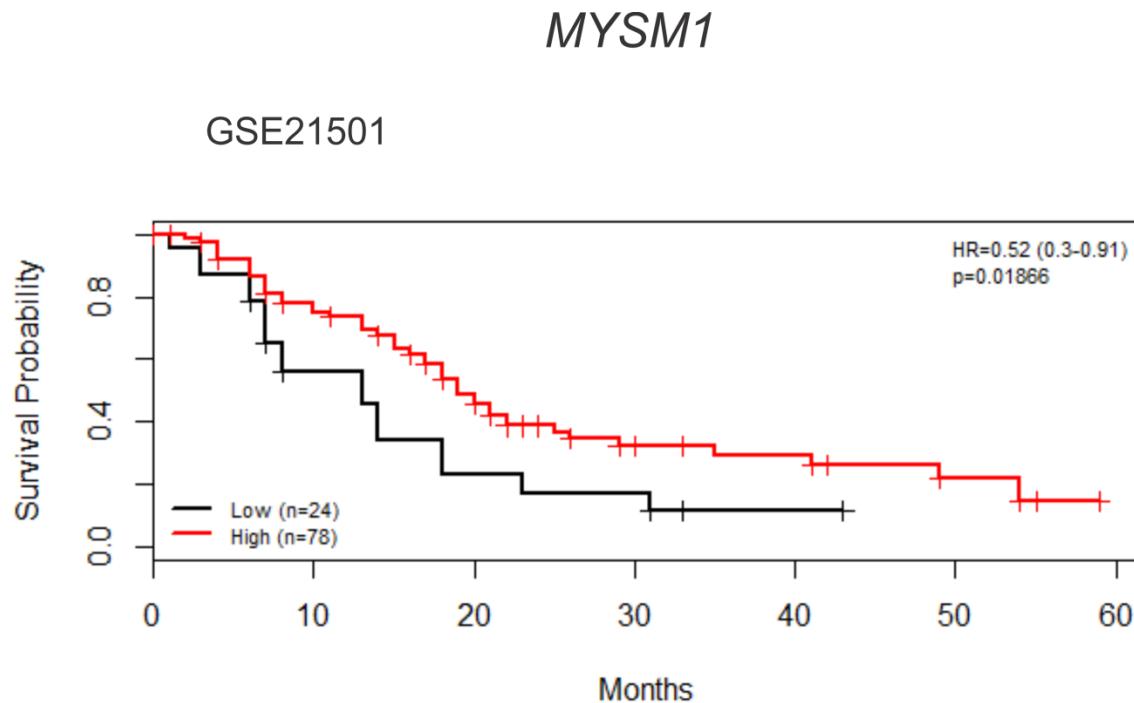
Supplementary Figures

Supplementary Table

Supplementary Figures include the survival curves of the significant MR genes which did not present the same profile curve on GSE21501, GSE28735 and MEXP2780 arrays. The selection of MRs followed these criteria: (a) they should be verified in all three arrays and also (b) they should present the same profile curve (e.g., if low gene expression was associated with greater chances of survival in one array, the same feature should be observed in the next arrays); if not, the data were considered conflicting and were then discarded. Survival curves were estimated by Kaplan-Meier method. LogRank test was used to compare the survival and Hazard Ratios with 95% confidence intervals were calculated.
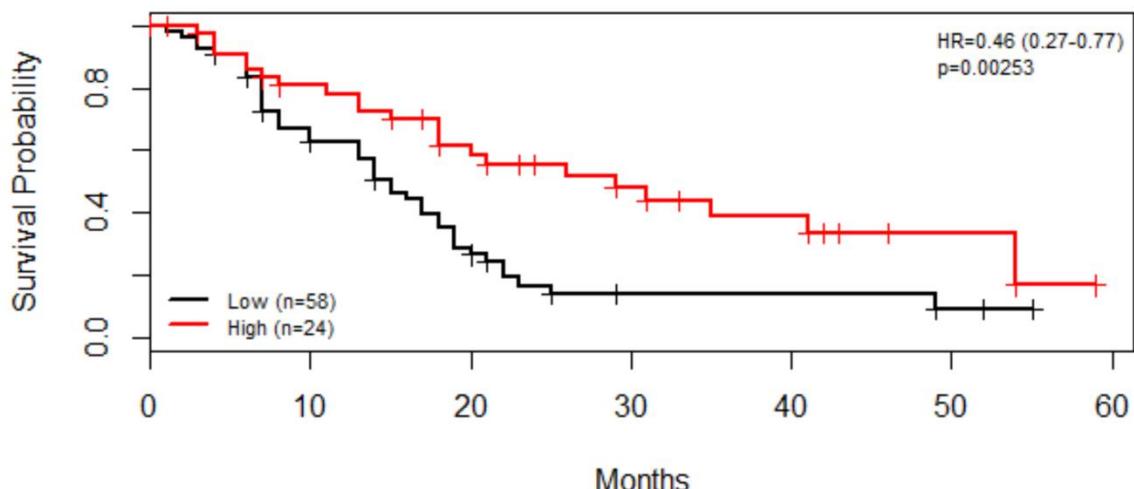
Supplementary Figure S1. Kaplan-Meier curve of *ZNF407*. GSE21501 was the only array which presented significant diference between low-high *ZNF407* expression (*p*-value=0.01634). HR have indicated 1.85 greater chances of survival for patients who had low *ZNF407* expression.
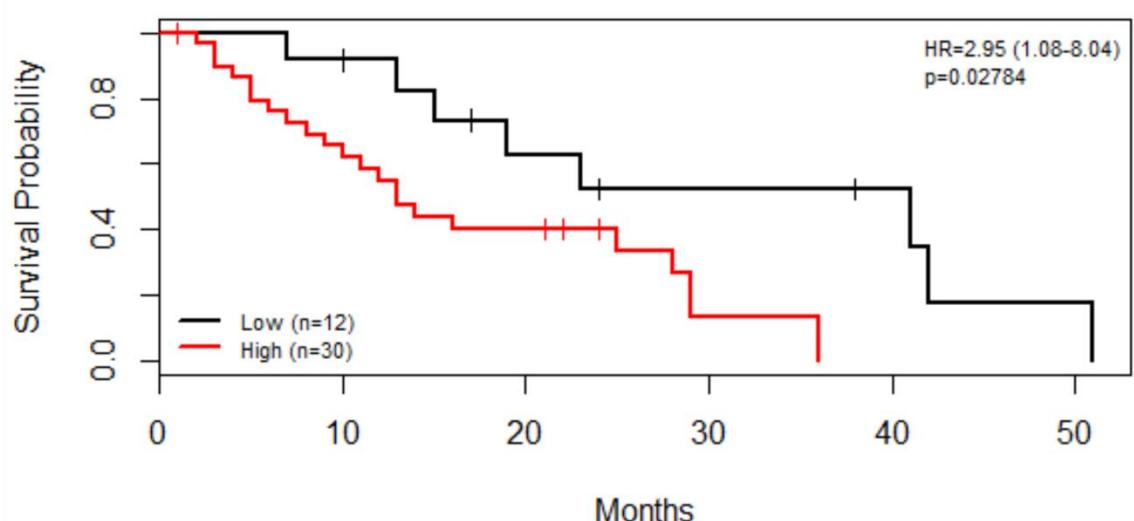
MYSM1

Supplementary Figure S2. Kaplan-Meier curve of *MYSM1*. Low-high *MYSM1* expression comparison was significant diferent on the GSE21501 array, with *p*-value=0.01866. Patients with high *MYSM1* expression had 0.34 greater chances of survival.

ZZZ3

GSE21501
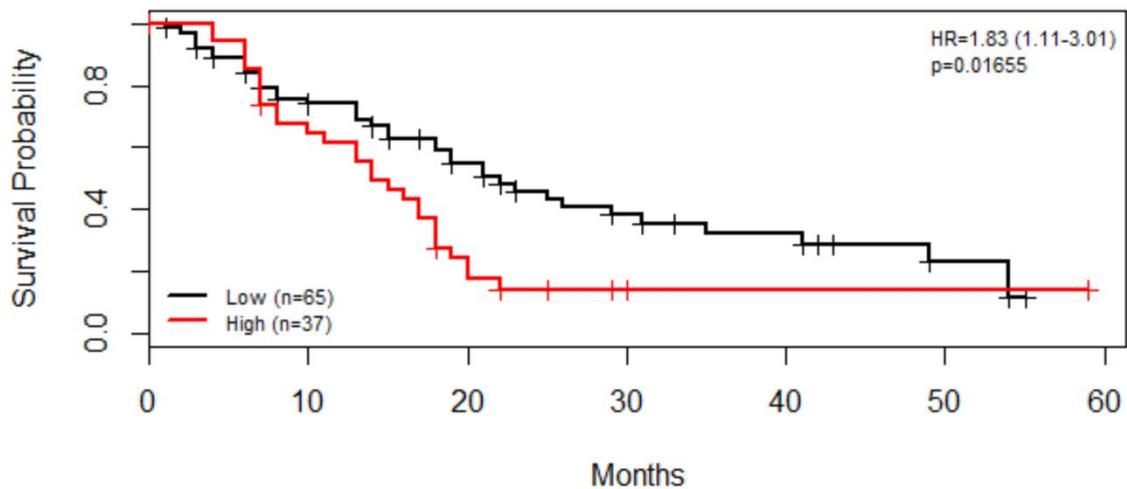
GSE28735
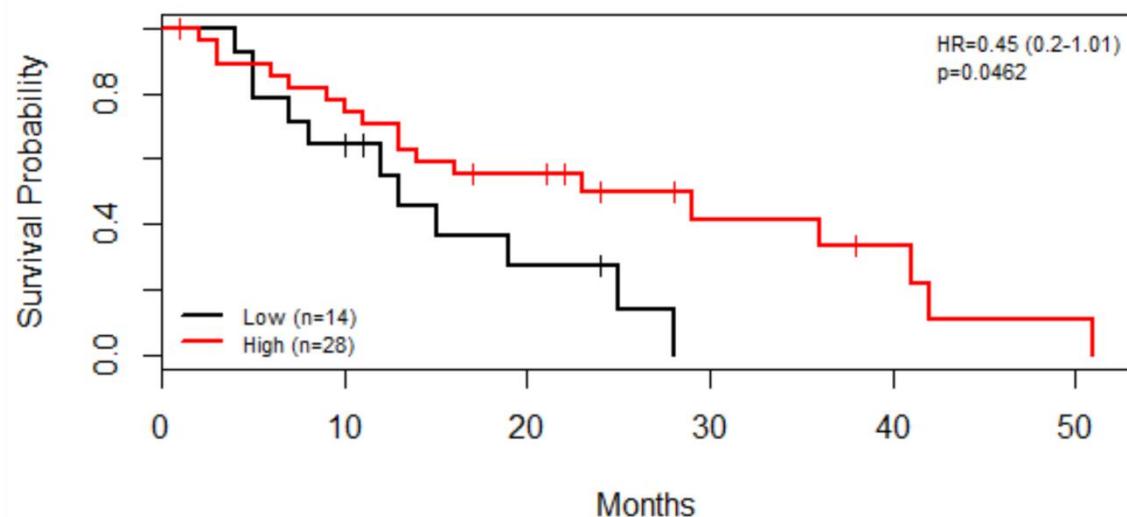
Supplementary Figure S3. Kaplan-Meier curve of *ZZZ3*. GSE21501 and GSE28935 were the only arrays which presented significant diference between low-high *ZZZ3* expression (*p*-value=0.00253 and *p*-value=0.02784, respectively). HR have indicated 0.32 greater chances of survival for patients who had high *ZZZ3* expression in GSE21501, whereas patients with low *ZZZ3* expression had 2.95 greater chances of survival in GSE28735. Both survival curves were significant, however, the data were discordant.
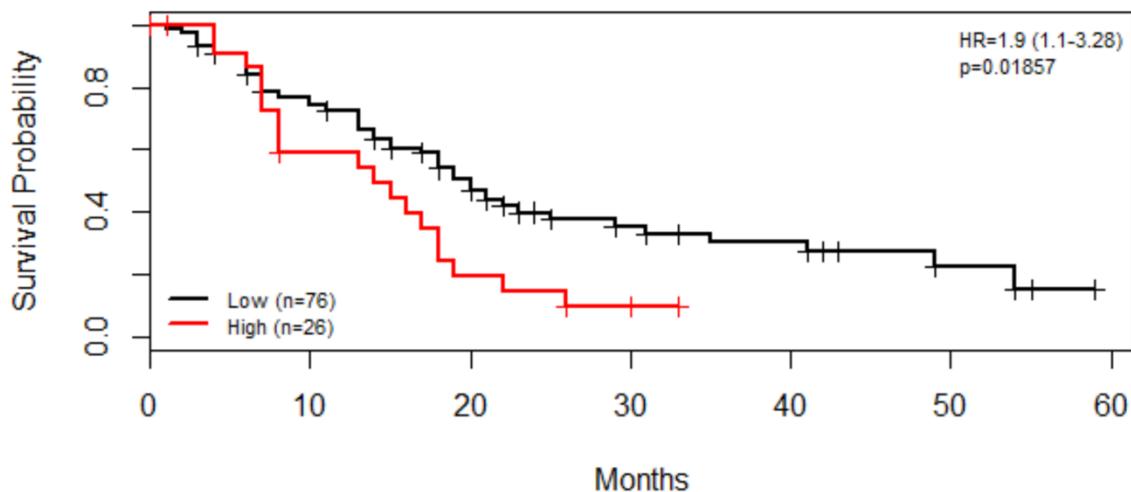
Supplementary Figure S4. Kaplan-Meier curve of *ZFP91*. Low-high *ZFP91* expression comparison was significant diferent on the GSE21501 and GSE28735 arrays, with *p*-value=0.01655 and *p*-value=0.0462, respectively. Patients with low *ZFP91* expression had 1.83 greater chances of survival in GSE21501, whereas HR have indicated 0.31 greater chances of survival for patients who had high *ZFP91* expression in GSE28735. Both survival curves were significant, however, the data were discordant.

ZNF41
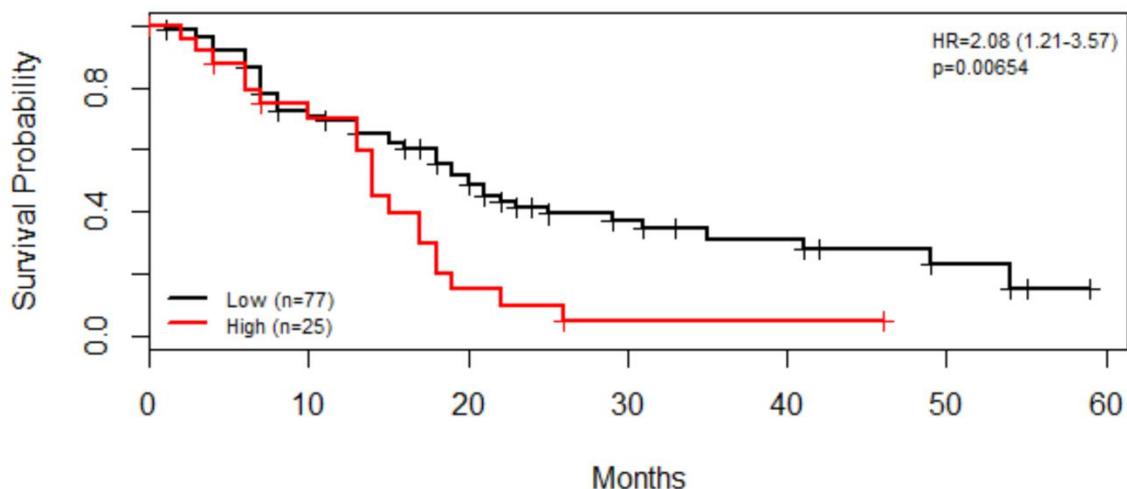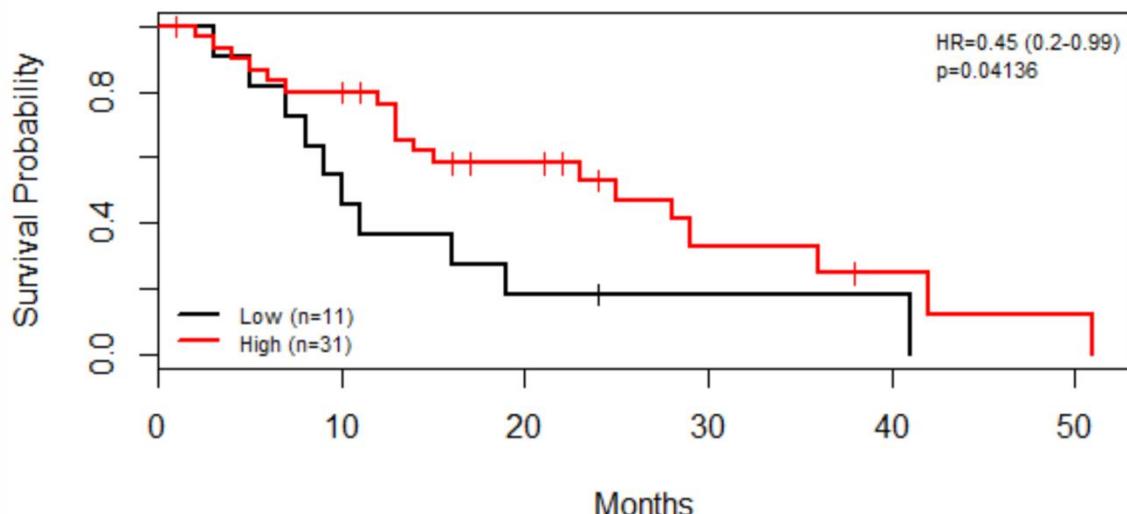
Supplementary Figure S5. Kaplan-Meier curve of *ZNF41*. Low-high *ZNF41* expression comparison was significant diferent on the GSE21501 array, with *p*-value=0.01857. Patients with low *ZNF41* expression had 1.9 greater chances of survival.

HSF4

GSE21501
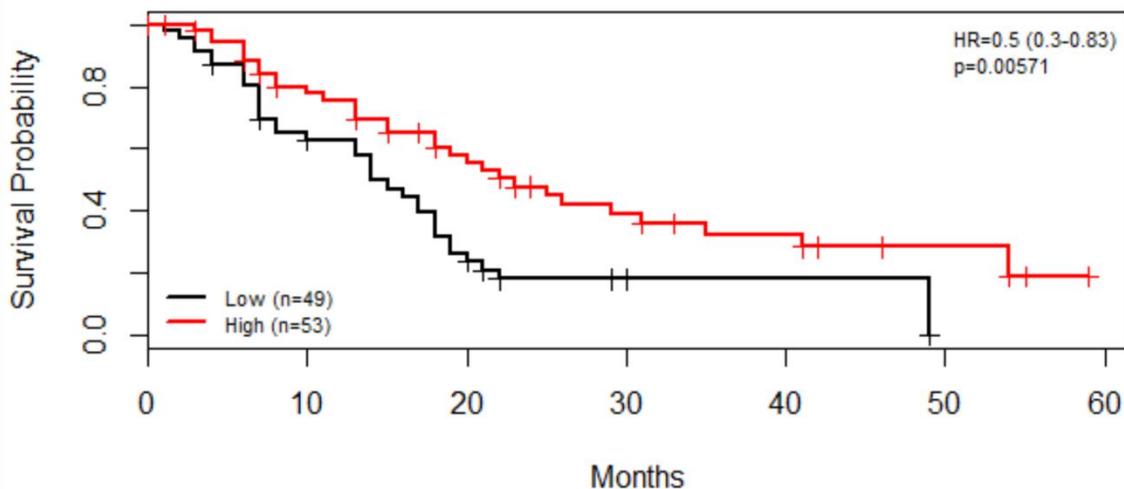
GSE28735
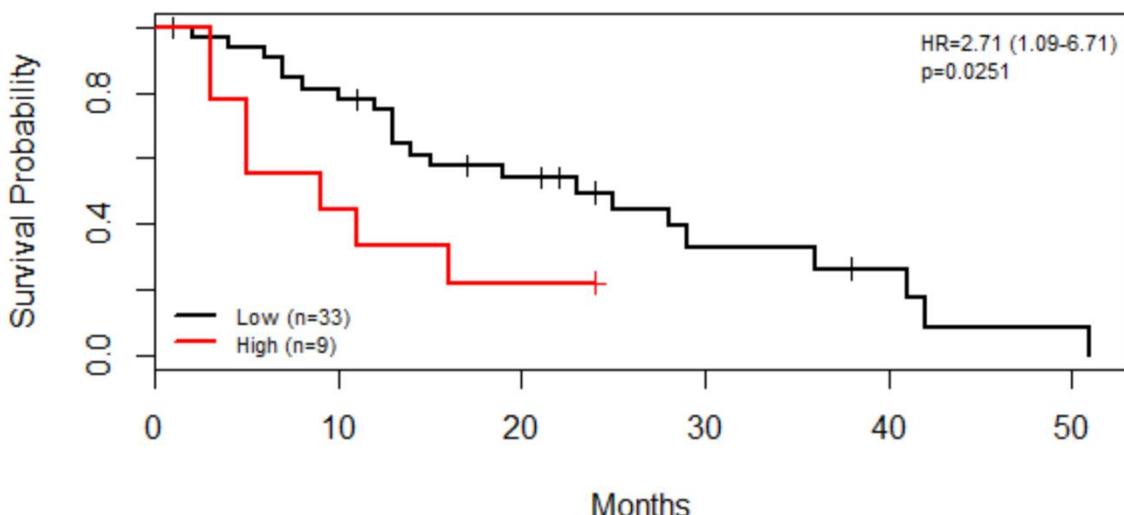
Supplementary Figure S6. Kaplan-Meier curve of *HSF4*. GSE21501 and GSE28935 were the only arrays which presented significant diference between low-high *HSF4* expression (*p*-value=0.00654 and *p*-value=0.04136, respectively). Patients with low *HSF4* expression had 2.08 greater chances of survival in GSE21501, whereas HR have indicated 0.31 greater chances of survival for patients who had high *HSF4* expression in GSE28735. Both survival curves were significant, however, the data were discordant.

ARID4B

GSE21501
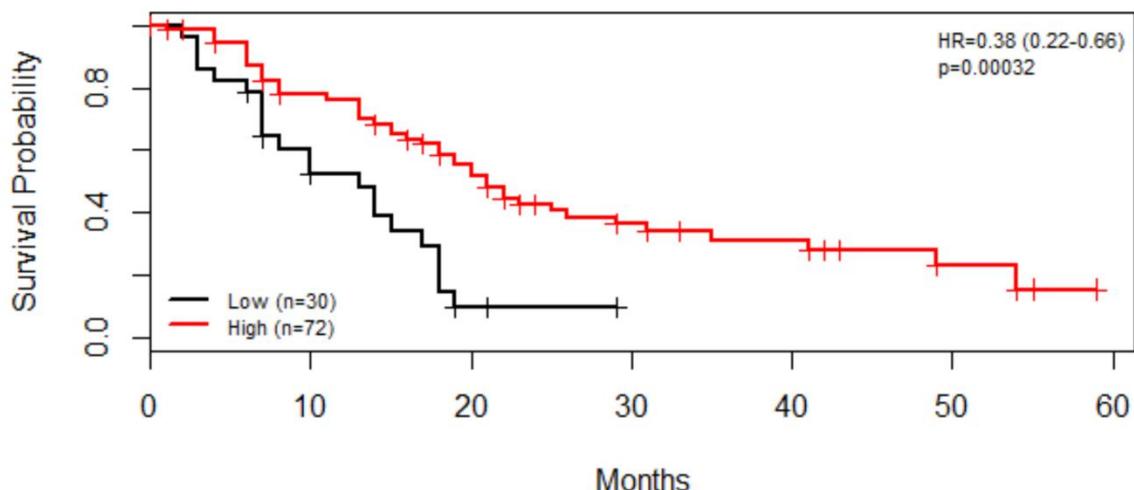
GSE28735
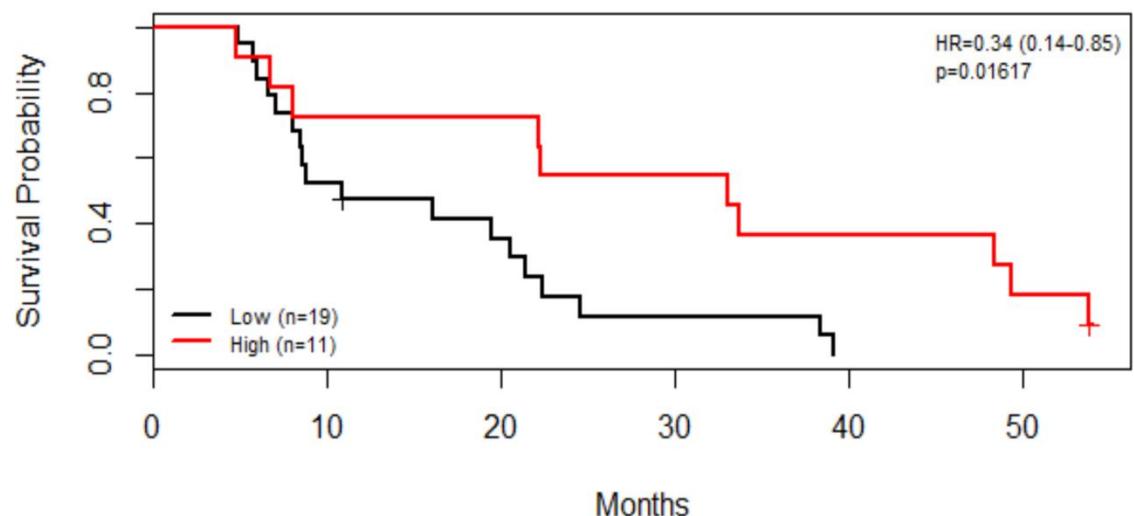
Supplementary Figure S7. Kaplan-Meier curve of *ARID4B*. GSE21501 and GSE28935 were the only arrays which presented significant diference between low-high *ARID4B* expression (*p*-value=0.00571 and *p*-value=0.0251, respectively). HR have indicated 0.33 greater chances of survival for patients who had high *ARID4B* expression in GSE21501, whereas patients with low *ARID4B* expression had 2.71 greater chances of survival in GSE28735. Both survival curves were significant, however, the data were discordant.

PRDM10

GSE21501
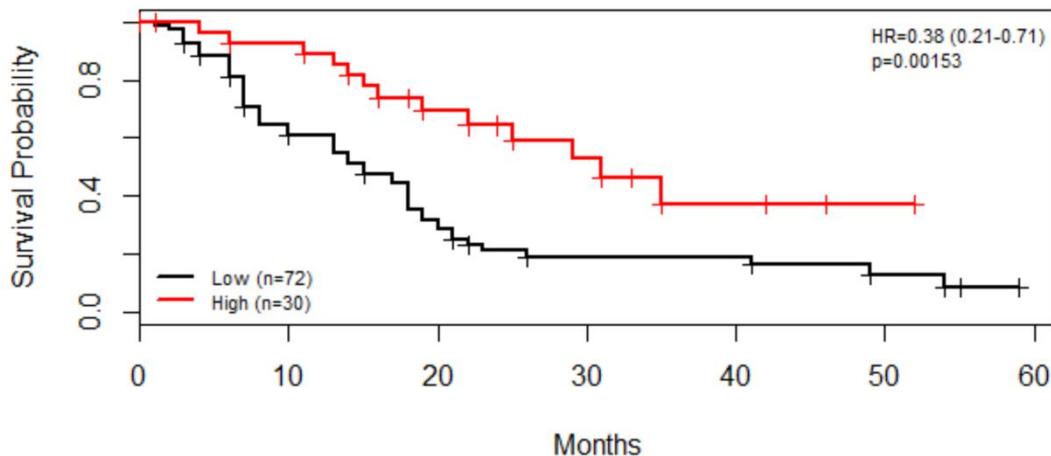
MEXP2780
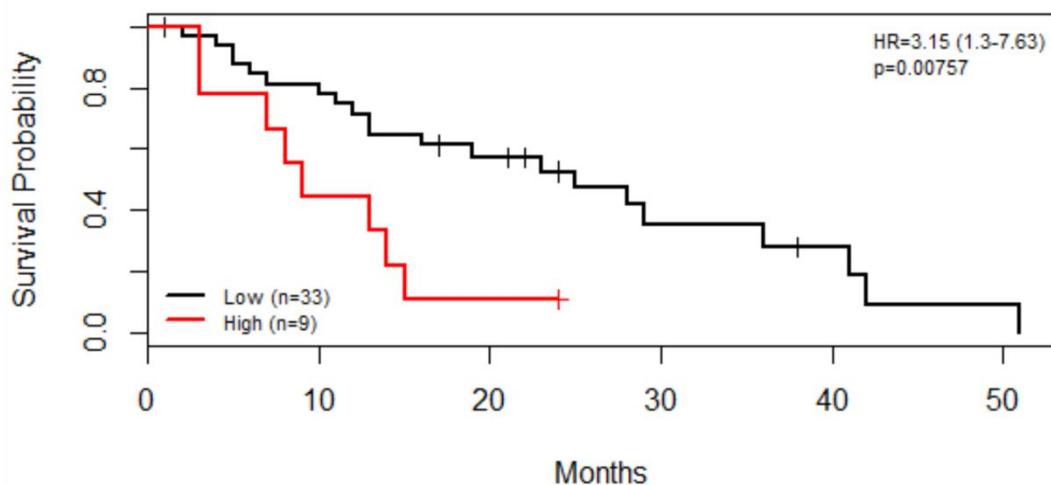
Supplementary Figure S8. Kaplan-Meier curve of *PRDM10*. GSE21501 and MEXP2780 were the only arrays which presented significant diference between low-high *PRDM10* expression (*p*-value=0.00032 and *p*-value=0.01617, respectively). Patients with high *PRDM10* expression had 0.275 and 0.25 greater chances of survival in GSE21501 and MEXP2780, respectively. Although the curves were significant on two arrays, the third array did not present significance, thus we could not include *PRDM10* as a possible pancreatic cancer biomarker in this work. However more studies are necessary to demonstrate the role of *PRDM10* on pancreatic cancer.

SMARCE1
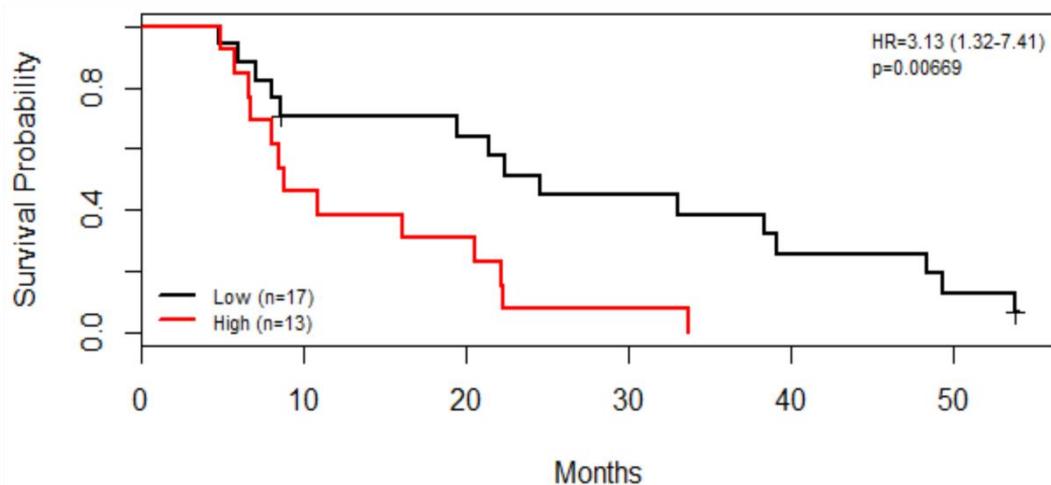
GSE21501

GSE28735
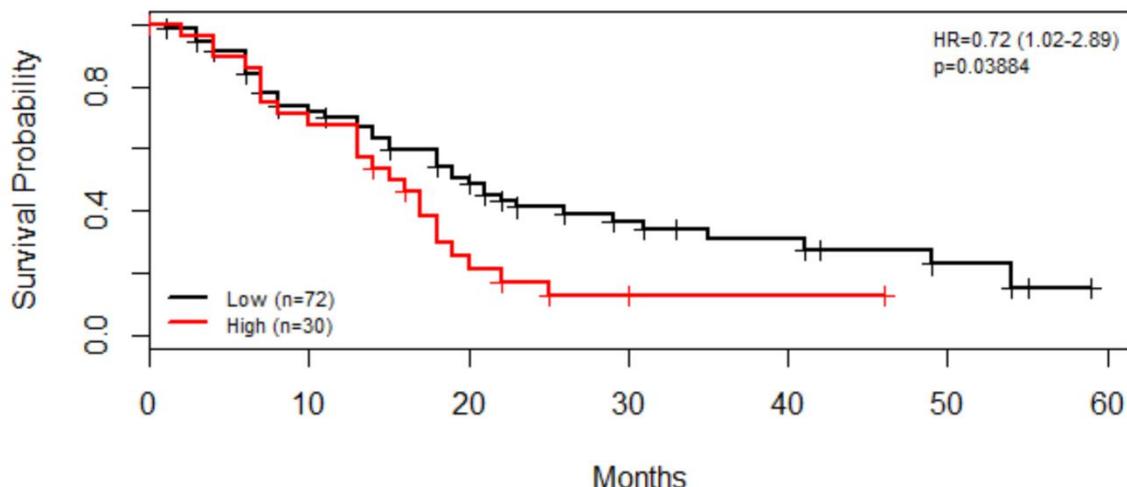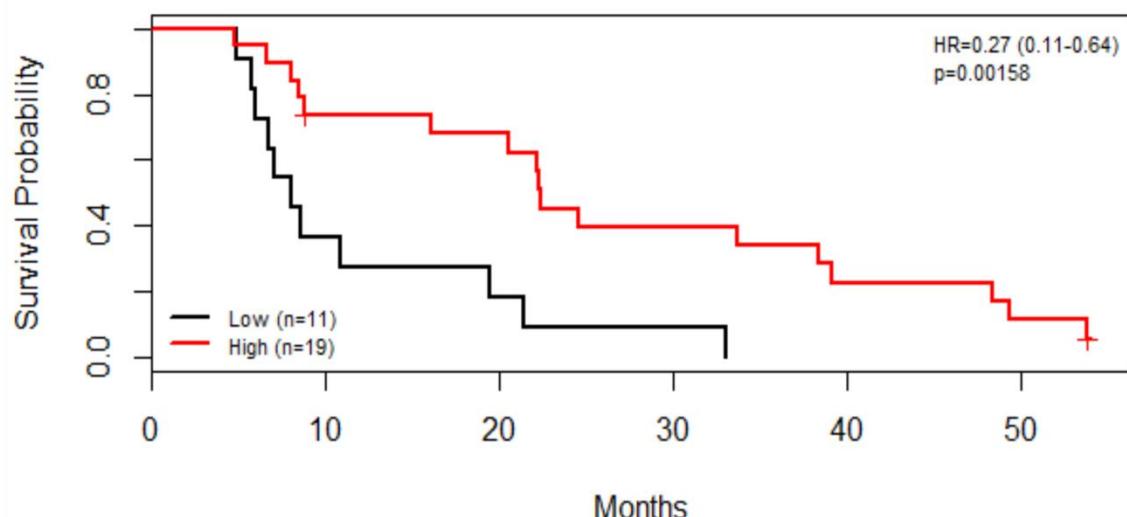
MEXP2780

Supplementary Figure S9. Kaplan-Meier curve of *SMARCE1*. Low-high *SMARCE1* expression comparison was significant diferent on the GSE21501, GSE28935 and MEXP2780 arrays, with *p*-value=0.00153, *p*-value=0.00757 and *p*-value=0.00669, respectively. HR have indicated 0.275 greater chances of survival for patients who had high *SMARCE1* expression in GSE21501, whereas in GSE28735 and MEXP2780 arrays, patients with low *SMARCE1* expression had 3.15 and 3.13 greater chances of survival, respectively. In this case, we could not assume any data, despite all curves were significant, since data were conflicting.

ZNF3

GSE21501
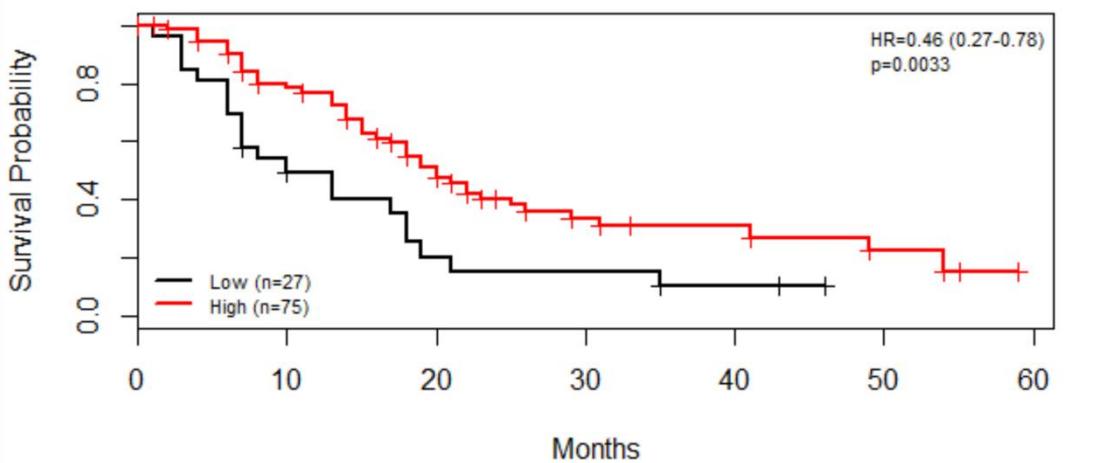
MEXP2780
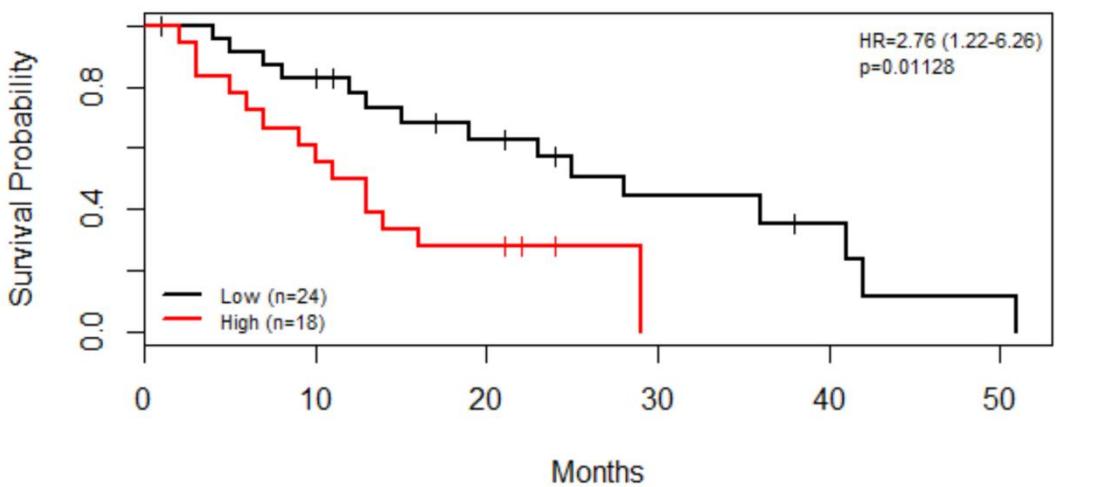
Supplementary Figure S10. Kaplan-Meier curve of *ZNF3*. Low-high *ZNF3* expression comparison was significant diferent on the GSE21501 and MEXP2780 arrays, with *p*-value=0.03884 and *p*-value=0.00158, respectively. Patients with low *ZNF3* expression had 0.42 greater chances of survival in GSE21501, whereas HR have indicated 0.21 greater chances of survival for patients who had high *ZNF3* expression in MEXP2870. Both survival curves were significant, however, the data were discordant.

ZNF280D
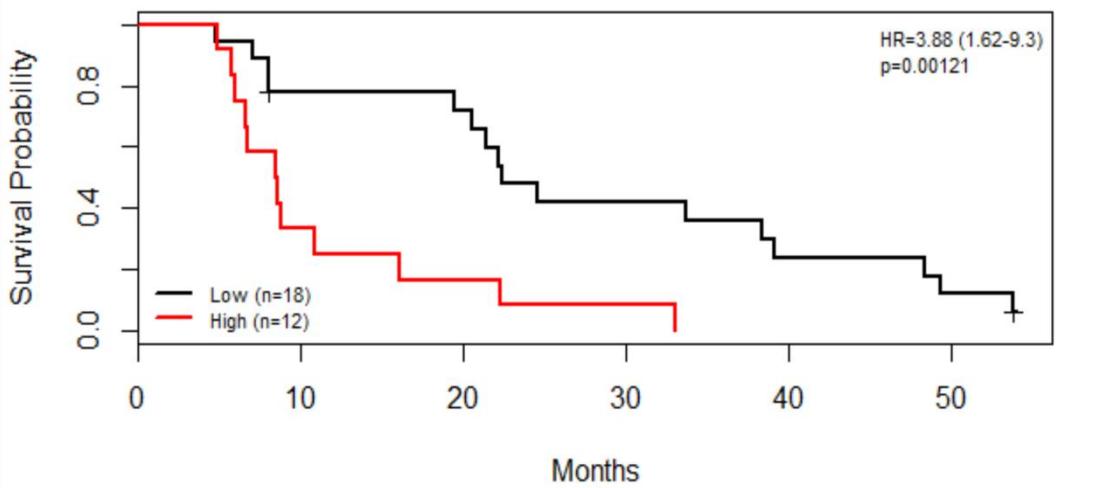
GSE21501

GSE28735
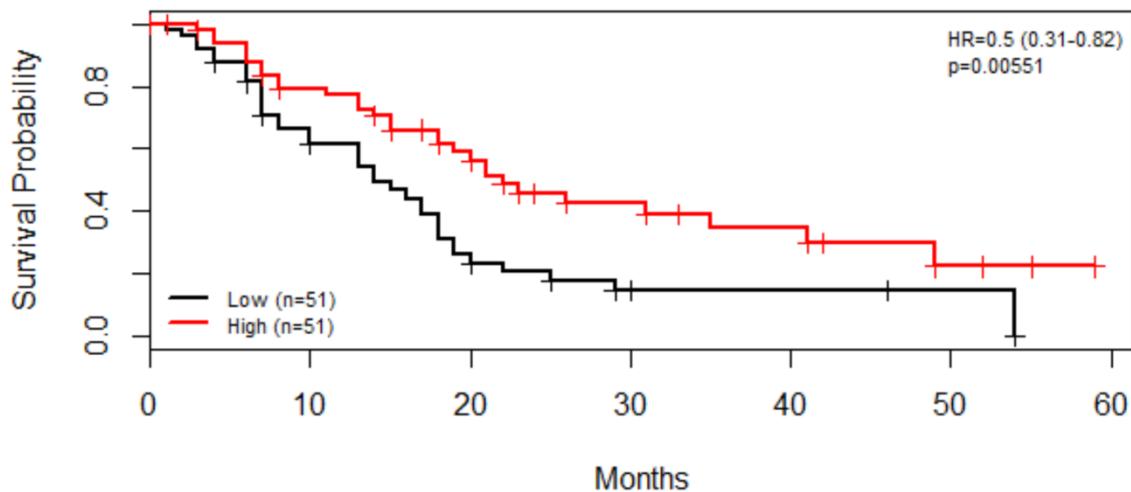
MEXP2780

Supplementary Figure S11. Kaplan-Meier curve of *ZNF280D*. Low-high *ZNF280D* expression comparison was significant diferent on the GSE21501, GSE28935 and MEXP2780 arrays, with *p*-value=0.0033, *p*-value=0.01128 and *p*-value=0.00121, respectively. HR have indicated 0.32 greater chances of survival for patients who had high *ZNF280D* expression in GSE21501, whereas in GSE28735 and MEXP2780 arrays, patients with low *ZNF280D* expression had 2.76 and 3.88 greater chances of survival, respectively. In this case, we could not assume any data, since data were conflicting.

**Supplementary Figure S12.** Kaplan-Meier curve of *NFE2L2*. GSE21501 was the only array which presented significant diference between low-high *NFE2L2* expression (*p*-value=0.00551). HR have indicated 0.33 greater chances of survival for patients who had high *NFE2L2* expression.

Supplementary Table S1. Hits of *TULP3 regulon*. The differentially expressed genes, from GSE16515 microarray data, was identified by Limma R-package and assigned to each *regulon* by Master Regulator Analysis (MRA).

Probe	Entrez	Gene Symbol	*p*-value
203774_at	4548	*MTR*	1.01e-09
74694_s_at	79874	*RABEP2*	2.08e-09
208859_s_at	546	*ATRX*	8.46e-09
214305_s_at	23451	*SF3B1*	1.83e-08
225178_at	151613	*TTC14*	2.33e-08
242352_at	25836	*NIPBL*	3.69e-08
211257_x_at	27332	*ZNF638*	5.05e-08
201996_s_at	23013	*SPEN*	5.79e-08
223139_s_at	170506	*DHX36*	6.72e-08
213775_x_at	27332	*ZNF638*	8.52e-08
203341_at	10153	*CEBPZ*	8.74e-08
213850_s_at	9169	*SCAF11*	9.10e-08
201070_x_at	23451	*SF3B1*	9.49e-08
203719_at	2067	*ERCC1*	1.16e-07
220572_at	100506282	*LOC100506282*	1.28e-07
227833_s_at	114785	*MBD6*	1.51e-07
242829_x_at	26224	*FBXL3*	1.75e-07
225173_at	93663	*ARHGAP18*	2.13e-07
232216_at	10730	*YME1L1*	2.55e-07
229342_at	55421	*C17orf85*	2.61e-07
205187_at	4090	*SMAD5*	2.64e-07
233656_s_at	51542	*VPS54*	2.87e-07
203491_s_at	9702	*CEP57*	3.02e-07
212027_at	58517	*RBM25*	3.41e-07
206555_s_at	55623	*THUMPD1*	3.76e-07
226921_at	197131	*UBR1*	4.07e-07
232179_at	158863	*LOC158863*	4.25e-07
212994_at	57187	*THOC2*	5.08e-07
238130_at	84901	*NFATC2IP*	5.17e-07
235409_at	23269	*MGA*	6.69e-07
208610_s_at	23524	*SRRM2*	6.99e-07
212388_at	23358	*USP24*	7.27e-07
220526_s_at	55052	*MRPL20*	7.33e-07
212507_at	23505	*TMEM131*	8.44e-07

237577_at	57092	*PCNP*	8.94e-07
224736_at	55749	*CCAR1*	9.22e-07
205596_s_at	64750	*SMURF2*	9.38e-07
233819_s_at	26046	*LTN1*	9.71e-07
205171_at	5775	*PTPN4*	1.00e-06
222119_s_at	80204	*FBXO11*	1.02e-06
211974_x_at	3516	*RBPJ*	1.08e-06
211185_s_at	23451	*SF3B1*	1.09e-06
236243_at	79670	*ZCCHC6*	1.10e-06
43544_at	10025	*MED16*	1.29e-06
222163_s_at	79029	*SPATA5L1*	1.31e-06
209024_s_at	10492	*SYNCRIP*	1.32e-06
201867_s_at	6907	*TBL1X*	1.33e-06
1557067_s_at	55692	*LUC7L*	1.41e-06
212754_s_at	23041	*MON2*	1.54e-06
213918_s_at	25836	*NIPBL*	1.58e-06
209376_x_at	9169	*SCAF11*	1.60e-06
222266_at	8725	*URI1*	1.66e-06
201142_at	1965	*EIF2S1*	1.75e-06
208630_at	3030	*HADHA*	1.75e-06
201371_s_at	8452	*CUL3*	1.82e-06
225089_at	55230	*USP40*	1.88e-06
213010_at	112464	*PRKCDBP*	1.93e-06
220072_at	79848	*CSPP1*	1.97e-06
226503_at	55183	*RIF1*	1.99e-06
204171_at	6198	*RPS6KB1*	2.01e-06
1568815_a_at	79009	*DDX50*	2.04e-06
222420_s_at	7328	*UBE2H*	2.05e-06
208995_s_at	9360	*PPIG*	2.08e-06
218409_s_at	64215	*DNAJC1*	2.13e-06
222679_s_at	54165	*DCUN1D1*	2.14e-06
201232_s_at	5719	*PSMD13*	2.16e-06
241955_at	25831	*HECTD1*	2.26e-06
214363_s_at	9782	*MATR3*	2.29e-06
222439_s_at	9967	*THRAP3*	2.39e-06
227205_at	6872	*TAF1*	2.45e-06
218315_s_at	51654	*CDK5RAP1*	2.46e-06
200842_s_at	2058	*EPRS*	2.48e-06
222122_s_at	57187	*THOC2*	2.55e-06
236620_at	55183	*RIF1*	2.59e-06

242439_s_at	171023	*ASXL1*	2.59e-06
215092_s_at	10725	*NFAT5*	2.60e-06
208900_s_at	7150	*TOP1*	2.66e-06
225030_at	91272	*BOD1*	2.67e-06
243648_at	100381270	*ZBED6*	2.70e-06
244519_at	171023	*ASXL1*	2.73e-06
207541_s_at	5394	*EXOSC10*	2.77e-06
223016_x_at	9406	*ZRANB2*	2.80e-06
231016_s_at	405	*ARNT*	2.82e-06
235009_at	259282	*BOD1L1*	2.89e-06
1567214_a_at	5411	*PNN*	3.03e-06
201227_s_at	4714	*NDUFB8*	3.04e-06
218423_x_at	51542	*VPS54*	3.09e-06
226562_at	146050	*ZSCAN29*	3.09e-06
212740_at	30849	*PIK3R4*	3.14e-06
214356_s_at	23392	*KIAA0368*	3.18e-06
208993_s_at	9360	*PPIG*	3.21e-06
1554342_s_at	113510	*HELQ*	3.22e-06
1557895_at	400579	*FLJ35934*	3.30e-06
204524_at	5170	*PDPK1*	3.32e-06
37254_at	7692	*ZNF133*	3.36e-06
210054_at	79441	*HAUS3*	3.37e-06
209258_s_at	9126	*SMC3*	3.39e-06
212451_at	9728	*SECISBP2L*	3.63e-06
219307_at	57107	*PDSS2*	3.64e-06
200077_s_at	4946	*OAZ1*	3.76e-06
243496_at	22931	*RAB18*	3.79e-06
217842_at	51631	*LUC7L2*	3.93e-06
214314_s_at	9669	*EIF5B*	4.07e-06
225852_at	26057	*ANKRD17*	4.46e-06
219387_at	55704	*CCDC88A*	4.47e-06
213097_s_at	27000	*DNAJC2*	4.51e-06
230180_at	10521	*DDX17*	4.68e-06
244024_at	7569	*ZNF182*	4.77e-06
209654_at	23379	*KIAA0947*	4.78e-06
202491_s_at	8518	*IKBKAP*	4.86e-06
202570_s_at	22839	*DLGAP4*	4.96e-06
222667_s_at	55870	*ASH1L*	5.11e-06
200882_s_at	5710	*PSMD4*	5.12e-06
213311_s_at	22980	*TCF25*	5.25e-06

1552330_at	92806	*CENPBD1*	5.25e-06
1557278_s_at	3842	*TNPO1*	5.27e-06
209226_s_at	3842	*TNPO1*	5.28e-06
223677_at	83734	*ATG10*	5.29e-06
229586_at	80205	*CHD9*	5.31e-06
220746_s_at	51720	*UIMC1*	5.46e-06
232648_at	5684	*PSMA3*	5.68e-06
219193_at	55100	*WDR70*	5.79e-06
202414_at	2073	*ERCC5*	5.82e-06
203318_s_at	7707	*ZNF148*	5.84e-06
213718_at	5936	*RBM4*	5.90e-06
238350_at	254048	*UBN2*	6.03e-06
219833_s_at	114327	*EFHC1*	6.13e-06
203468_at	8558	*CDK10*	6.16e-06
221514_at	10813	*UTP14A*	6.32e-06
200633_at	7314	*UBB*	6.36e-06
229398_at	22931	*RAB18*	6.61e-06
223160_s_at	55671	*SMEK1*	6.62e-06
237560_at	64969	*MRPS5*	6.63e-06
212718_at	10914	*PAPOLA*	6.67e-06
219426_at	192669	*EIF2C3*	6.69e-06
224616_at	1783	*DYNC1LI2*	6.72e-06
32091_at	9673	*SLC25A44*	6.92e-06
224854_s_at	57606	*SLAIN2*	7.01e-06
1555913_at	54856	*GON4L*	7.23e-06
209669_s_at	26135	*SERBP1*	7.38e-06
239243_at	27332	*ZNF638*	7.38e-06
1557384_at	7690	*ZNF131*	7.43e-06
219009_at	60686	*C14orf93*	7.55e-06
221683_s_at	80184	*CEP290*	7.71e-06
201024_x_at	9669	*EIF5B*	7.76e-06
207941_s_at	9584	*RBM39*	7.78e-06
1552287_s_at	172	*AFG3L1P*	7.82e-06
241832_at	25940	*FAM98A*	7.90e-06
217807_s_at	29997	*GLTSCR2*	7.94e-06
202038_at	9354	*UBE4A*	7.97e-06
201305_x_at	10541	*ANP32B*	7.99e-06
222348_at	375449	*MAST4*	8.01e-06
206500_s_at	55320	*MIS18BP1*	8.15e-06
233231_at	64087	*MCCC2*	8.23e-06

225260_s_at	64983	*MRPL32*	8.48e-06
233647_s_at	81602	*CDADC1*	8.51e-06
239385_at	10342	*TFG*	8.65e-06
212033_at	58517	*RBM25*	8.67e-06
229353_s_at	64710	*NUCKS1*	8.71e-06
235610_at	91801	*ALKBH8*	8.88e-06
225916_at	7690	*ZNF131*	8.96e-06
225386_s_at	92906	*HNRPLL*	8.97e-06
225394_s_at	85437	*ZCRB1*	9.01e-06
218428_s_at	51455	*REV1*	9.09e-06
231718_at	10569	*SLU7*	9.11e-06
201880_at	25820	*ARIH1*	9.13e-06
238538_at	29123	*ANKRD11*	9.16e-06
210290_at	7727	*ZNF174*	9.23e-06
222982_x_at	54407	*SLC38A2*	9.27e-06
202900_s_at	4927	*NUP88*	9.30e-06
202227_s_at	10902	*BRD8*	9.54e-06
1553252_a_at	254065	*BRWD3*	1.00e-05
215992_s_at	9693	*RAPGEF2*	1.02e-05
236241_at	51003	*MED31*	1.05e-05
1554522_at	54805	*CNNM2*	1.06e-05
226843_s_at	64282	*PAPD5*	1.06e-05
235645_at	114799	*ESCO1*	1.06e-05
213754_s_at	10605	*PAIP1*	1.07e-05
212036_s_at	5411	*PNN*	1.10e-05
204145_at	2483	*FRG1*	1.11e-05
233759_s_at	57223	*SMEK2*	1.11e-05
213064_at	79882	*ZC3H14*	1.11e-05
238346_s_at	96764	*TGS1*	1.11e-05
226826_at	134353	*LSM11*	1.12e-05
212106_at	23197	*FAF2*	1.13e-05
203803_at	51449	*PCYOX1*	1.13e-05
218318_s_at	51701	*NLK*	1.13e-05
216550_x_at	23253	*ANKRD12*	1.21e-05
209799_at	5562	*PRKAA1*	1.22e-05
208942_s_at	7095	*SEC62*	1.22e-05
216960_s_at	7692	*ZNF133*	1.22e-05
201224_s_at	10250	*SRRM1*	1.22e-05
226941_at	22926	*ATF6*	1.22e-05
200086_s_at	1327	*COX4I1*	1.23e-05

207983_s_at	10735	*STAG2*	1.23e-05
208003_s_at	10725	*NFAT5*	1.27e-05
214499_s_at	9774	*BCLAF1*	1.30e-05
235435_at	132949	*AASDH*	1.33e-05
230375_at	25957	*PNISR*	1.34e-05
226082_s_at	57466	*SCAF4*	1.34e-05
201519_at	9868	*TOMM70A*	1.36e-05
237426_at	6672	*SP100*	1.37e-05
207657_x_at	3842	*TNPO1*	1.41e-05
204190_at	10208	*USPL1*	1.41e-05
219317_at	11201	*POLI*	1.42e-05
224331_s_at	64979	*MRPL36*	1.42e-05
203162_s_at	10300	*KATNB1*	1.44e-05
209659_s_at	8881	*CDC16*	1.47e-05
207127_s_at	3189	*HNRNPH3*	1.48e-05
219437_s_at	29123	*ANKRD11*	1.52e-05
235729_at	84874	*ZNF514*	1.53e-05
223236_at	84081	*NSRP1*	1.54e-05
208249_s_at	23483	*TGDS*	1.55e-05
205527_s_at	50628	*GEMIN4*	1.55e-05
227351_at	730094	*C16orf52*	1.56e-05
203742_s_at	6996	*TDG*	1.57e-05
227199_at	23181	*DIP2A*	1.57e-05
219216_at	54465	*ETAA1*	1.59e-05
223254_s_at	55632	*G2E3*	1.59e-05
213128_s_at	7337	*UBE3A*	1.61e-05
227538_at	9441	*MED26*	1.65e-05
202605_at	2990	*GUSB*	1.68e-05
233101_at	66036	*MTMR9*	1.68e-05
203606_at	4726	*NDUFS6*	1.69e-05
243801_x_at	51263	*MRPL30*	1.73e-05
200875_s_at	10528	*NOP56*	1.75e-05
209088_s_at	29855	*UBN1*	1.77e-05
209268_at	11311	*VPS45*	1.81e-05
218827_s_at	55125	*CEP192*	1.81e-05
205178_s_at	5930	*RBBP6*	1.85e-05
1558924_s_at	6249	*CLIP1*	1.89e-05
213026_at	9140	*ATG12*	1.89e-05
226588_at	57703	*CWC22*	1.90e-05
202083_s_at	6397	*SEC14L1*	1.91e-05

226422_at	51290	*ERGIC2*	1.92e-05
225705_at	90799	*CEP95*	1.92e-05
212177_at	25957	*PNISR*	1.99e-05
241342_at	157378	*TMEM65*	2.01e-05
228305_at	147929	*ZNF565*	2.02e-05
222413_s_at	58508	*MLL3*	2.07e-05
201602_s_at	4659	*PPP1R12A*	2.08e-05
202858_at	7307	*U2AF1*	2.11e-05
223705_s_at	65056	*GPBP1*	2.11e-05
54632_at	63892	*THADA*	2.23e-05
227767_at	1456	*CSNK1G3*	2.27e-05
212542_s_at	55023	*PHIP*	2.30e-05
227740_at	127933	*UHMK1*	2.32e-05
200090_at	2339	*FNTA*	2.37e-05
218769_s_at	57763	*ANKRA2*	2.37e-05
219280_at	54014	*BRWD1*	2.38e-05
224703_at	8816	*DCAF5*	2.46e-05
226320_at	10189	*ALYREF*	2.50e-05
213575_at	29896	*TRA2A*	2.50e-05
242438_at	171023	*ASXL1*	2.50e-05
208022_s_at	8555	*CDC14B*	2.55e-05
1558002_at	11171	*STRAP*	2.57e-05
212629_s_at	5586	*PKN2*	2.60e-05
226091_s_at	93621	*MRFAP1*	2.62e-05
225138_at	54764	*ZRANB1*	2.65e-05
230164_at	285268	*ZNF621*	2.66e-05
228768_at	96459	*FNIP1*	2.70e-05
218751_s_at	55294	*FBXW7*	2.73e-05
201730_s_at	7175	*TPR*	2.77e-05
244801_at	5695	*PSMB7*	2.82e-05
226148_at	29068	*ZBTB44*	2.82e-05
225658_at	339745	*SPOPL*	2.82e-05
221985_at	54800	*KLHL24*	2.83e-05
212833_at	91137	*SLC25A46*	2.86e-05
209485_s_at	114876	*OSBPL1A*	2.87e-05
235132_at	254128	*LOC254128*	2.91e-05
218288_s_at	60492	*CCDC90B*	2.92e-05
224227_s_at	55814	*BDP1*	2.93e-05
211989_at	6605	*SMARCE1*	2.96e-05
226720_at	114825	*PWWP2A*	2.97e-05

231149_s_at	54986	*ULK4*	2.99e-05
218324_s_at	65244	*SPATS2*	3.01e-05
201498_at	7874	*USP7*	3.04e-05
222745_s_at	79768	*C15orf29*	3.05e-05
224309_s_at	10910	*SUGT1*	3.08e-05
204771_s_at	7270	*TTF1*	3.09e-05
209157_at	10294	*DNAJA2*	3.10e-05
202460_s_at	9663	*LPIN2*	3.11e-05
214850_at	100170939	*LOC100170939*	3.12e-05
217836_s_at	55249	*YY1AP1*	3.14e-05
219221_at	253461	*ZBTB38*	3.14e-05
203097_s_at	9693	*RAPGEF2*	3.17e-05
221007_s_at	81608	*FIP1L1*	3.17e-05
219024_at	59338	*PLEKHA1*	3.18e-05
228050_at	84135	*UTP15*	3.20e-05
212076_at	4297	*MLL*	3.21e-05
229765_at	7756	*ZNF207*	3.22e-05
205788_s_at	9877	*ZC3H11A*	3.22e-05
219100_at	79991	*OBFC1*	3.23e-05
217941_s_at	55914	*ERBB2IP*	3.24e-05
225493_at	904	*CCNT1*	3.29e-05
213080_x_at	6125	*RPL5*	3.29e-05
209340_at	6675	*UAP1*	3.31e-05
202318_s_at	26054	*SENP6*	3.33e-05
233936_s_at	79893	*GGNBP2*	3.33e-05
228775_at	55831	*EMC3*	3.35e-05
218042_at	51138	*COPS4*	3.38e-05
212603_at	10240	*MRPS31*	3.42e-05
1555058_a_at	9926	*LPGAT1*	3.45e-05
205188_s_at	4090	*SMAD5*	3.47e-05
1558173_a_at	7798	*LUZP1*	3.49e-05
208994_s_at	9360	*PPIG*	3.49e-05
218905_at	55656	*INTS8*	3.49e-05
222351_at	5519	*PPP2R1B*	3.51e-05
207186_s_at	2186	*BPTF*	3.56e-05
239635_at	10432	*RBM14*	3.56e-05
221548_s_at	80895	*ILKAP*	3.56e-05
212648_at	54505	*DHX29*	3.58e-05
225041_at	54737	*MPHOSPH8*	3.59e-05
208673_s_at	6428	*SRSF3*	3.62e-05

238706_at	167153	*PAPD4*	3.64e-05
229399_at	55088	*C10orf118*	3.69e-05
202301_s_at	65117	*RSRC2*	3.74e-05
202124_s_at	66008	*TRAK2*	3.77e-05
218356_at	29960	*FTSJ2*	3.79e-05
210110_x_at	3189	*HNRNPH3*	3.82e-05
226104_at	81790	*RNF170*	3.84e-05
223190_s_at	55904	*MLL5*	3.90e-05
203938_s_at	9013	*TAF1C*	3.91e-05
225887_at	80209	*PROSER1*	3.91e-05
203791_at	1657	*DMXL1*	3.93e-05
209240_at	8473	*OGT*	3.96e-05
219074_at	55751	*TMEM184C*	4.02e-05
219441_s_at	79705	*LRRK1*	4.02e-05
226783_at	85007	*AGXT2L2*	4.12e-05
223067_at	51503	*CWC15*	4.15e-05
218016_s_at	55718	*POLR3E*	4.15e-05
225551_at	163882	*CNST*	4.18e-05
226784_at	221830	*TWISTNB*	4.18e-05
210686_x_at	8034	*SLC25A16*	4.19e-05
201267_s_at	5702	*PSMC3*	4.30e-05
202633_at	11073	*TOPBP1*	4.31e-05
224828_at	80315	*CPEB4*	4.33e-05
241620_at	23347	*SMCHD1*	4.34e-05
210281_s_at	7750	*ZMYM2*	4.35e-05
231853_at	51174	*TUBD1*	4.40e-05
238602_at	129563	*DIS3L2*	4.45e-05
208670_s_at	23741	*EID1*	4.48e-05
214220_s_at	7840	*ALMS1*	4.52e-05
232175_at	375	*ARF1*	4.53e-05
217908_s_at	55827	*DCAF6*	4.55e-05
240168_at	23039	*XPO7*	4.65e-05
215427_s_at	23174	*ZCCHC14*	4.65e-05
205981_s_at	3622	*ING2*	4.69e-05
225183_at	29035	*C16orf72*	4.73e-05
226561_at	3267	*AGFG1*	4.76e-05
1558527_at	100132707	*LOC100132707*	4.77e-05
202882_x_at	51406	*NOL7*	4.83e-05
221829_s_at	3842	*TNPO1*	4.84e-05
230609_at	9685	*CLINT1*	4.89e-05

201253_s_at	10423	*CDIPT*	4.91e-05
225633_at	147991	*DPY19L3*	4.91e-05
203366_at	5428	*POLG*	4.92e-05
223576_at	51250	*C6orf203*	4.93e-05
227187_at	79872	*CBLL1*	4.99e-05
214016_s_at	6421	*SFPQ*	5.03e-05
1553955_at	129285	*PPP1R21*	5.04e-05
229878_at	85459	*KIAA1731*	5.06e-05
225229_at	27125	*AFF4*	5.09e-05
214743_at	1523	*CUX1*	5.13e-05
223356_s_at	219402	*MTIF3*	5.15e-05
203338_at	5529	*PPP2R5E*	5.23e-05
223051_at	29101	*SSU72*	5.23e-05
209022_at	10735	*STAG2*	5.27e-05
200941_at	3281	*HSBP1*	5.28e-05
217286_s_at	57446	*NDRG3*	5.28e-05
201879_at	25820	*ARIH1*	5.29e-05
224365_s_at	91151	*TIGD7*	5.30e-05
218244_at	55035	*NOL8*	5.31e-05
219583_s_at	55812	*SPATA7*	5.34e-05
227798_at	4086	*SMAD1*	5.35e-05
242837_at	6429	*SRSF4*	5.36e-05
201956_s_at	8443	*GNPAT*	5.36e-05
228318_s_at	285464	*CRIPAK*	5.36e-05
230528_s_at	65996	*MGC2752*	5.53e-05
227215_at	57120	*GOPC*	5.55e-05
218401_s_at	23528	*ZNF281*	5.56e-05
241425_at	9818	*NUPL1*	5.60e-05
218197_s_at	55074	*OXR1*	5.60e-05
228446_at	158358	*KIAA2026*	5.61e-05
209620_s_at	22	*ABCB7*	5.62e-05
203479_s_at	54726	*OTUD4*	5.63e-05
223011_s_at	54940	*OCIAD1*	5.66e-05
204157_s_at	23387	*SIK3*	5.74e-05
214464_at	8476	*CDC42BPA*	5.77e-05
224726_at	57534	*MIB1*	5.81e-05
213034_at	23387	*SIK3*	5.93e-05
227375_at	81573	*ANKRD13C*	6.00e-05
235461_at	54790	*TET2*	6.02e-05
217978_s_at	55585	*UBE2Q1*	6.03e-05

1552790_a_at	7095	SEC62	6.15e-05
211987_at	7155	TOP2B	6.19e-05
209658_at	8881	CDC16	6.21e-05
202600_s_at	8204	NRIP1	6.26e-05
210426_x_at	6095	RORA	6.27e-05
229514_at	55668	C14orf118	6.32e-05
223117_s_at	55031	USP47	6.33e-05
217828_at	79811	SLTM	6.35e-05
202373_s_at	25782	RAB3GAP2	6.36e-05
225761_at	167153	PAPD4	6.38e-05
240383_at	7323	UBE2D3	6.49e-05
216682_s_at	55578	FAM48A	6.53e-05
206240_s_at	7695	ZNF136	6.58e-05
201440_at	9416	DDX23	6.59e-05
242261_at	3658	IREB2	6.60e-05
226969_at	4548	MTR	6.64e-05
218452_at	50485	SMARCAL1	6.65e-05
209425_at	23600	AMACR	6.68e-05
1562836_at	1656	DDX6	6.78e-05
33148_at	51663	ZFR	6.79e-05
206652_at	9205	ZMYM5	6.82e-05
208815_x_at	3308	HSPA4	6.83e-05
201637_s_at	8087	FXR1	6.84e-05
209418_s_at	8563	THOC5	6.94e-05
202033_s_at	9821	RB1CC1	6.94e-05
227072_at	25914	RTTN	7.04e-05
223192_at	81894	SLC25A28	7.04e-05
226917_s_at	29945	ANAPC4	7.07e-05
223136_at	51390	AIG1	7.10e-05
210218_s_at	6672	SP100	7.11e-05
223096_at	51602	NOP58	7.11e-05
221705_s_at	80143	SIKE1	7.11e-05
225965_at	80821	DDHD1	7.12e-05
225507_at	25957	PNISR	7.18e-05
235791_x_at	1105	CHD1	7.21e-05
228266_s_at	50810	HDGFRP3	7.24e-05
209715_at	23468	CBX5	7.27e-05
236862_at	57120	GOPC	7.27e-05
242408_at	6815	STYX	7.31e-05
202252_at	5872	RAB13	7.36e-05

1552310_at	123207	*C15orf40*	7.37e-05
238295_at	79736	*TEFM*	7.38e-05
226453_at	84153	*RNASEH2C*	7.46e-05
218269_at	29102	*DROSHA*	7.56e-05
219460_s_at	55654	*TMEM127*	7.61e-05
227896_at	56647	*BCCIP*	7.63e-05
200593_s_at	3192	*HNRNPU*	7.66e-05
218334_at	80145	*THOC7*	7.70e-05
216199_s_at	4216	*MAP3K4*	7.74e-05
205967_at	8364	*HIST1H4C*	7.74e-05
1555920_at	11335	*CBX3*	7.80e-05
1565823_at	989	*SEPT7*	7.81e-05
217759_at	54765	*TRIM44*	7.81e-05
228046_at	152485	*ZNF827*	7.81e-05
232386_at	54832	*VPS13C*	7.83e-05
222628_s_at	51455	*REV1*	7.86e-05
200893_at	6434	*TRA2B*	7.93e-05
228992_at	80306	*MED28*	7.96e-05
216221_s_at	23369	*PUM2*	8.00e-05
225194_at	5356	*PLRG1*	8.05e-05
212885_at	10199	*MPHOSPH10*	8.06e-05
211993_at	65125	*WNK1*	8.06e-05
205210_at	9392	*TGFBRAP1*	8.09e-05
213398_s_at	56948	*SDR39U1*	8.15e-05
208887_at	8666	*EIF3G*	8.17e-05
222691_at	51000	*SLC35B3*	8.20e-05
240449_at	84905	*ZNF341*	8.26e-05
218004_at	55108	*BSDC1*	8.30e-05
226385_s_at	115416	*MALSU1*	8.34e-05
209896_s_at	5781	*PTPN11*	8.36e-05
37433_at	9063	*PIAS2*	8.37e-05
228763_at	145553	*MDP1*	8.38e-05
203353_s_at	4152	*MBD1*	8.43e-05
201687_s_at	8539	*API5*	8.43e-05
204786_s_at	3455	*IFNAR2*	8.49e-05
206583_at	55634	*ZNF673*	8.51e-05
203957_at	1876	*E2F6*	8.54e-05
209838_at	9318	*COPS2*	8.57e-05
227990_at	10569	*SLU7*	8.62e-05
203039_s_at	4719	*NDUFS1*	8.65e-05

37577_at	84986	*ARHGAP19*	8.67e-05
1553103_at	4799	*NFX1*	8.74e-05
203200_s_at	4552	*MTRR*	8.82e-05
218100_s_at	55081	*IFT57*	8.85e-05
204093_at	902	*CCNH*	8.94e-05
212219_at	23198	*PSME4*	9.03e-05
1557965_at	130916	*MTERFD2*	9.03e-05
222912_at	408	*ARRB1*	9.06e-05
201699_at	5706	*PSMC6*	9.06e-05
228250_at	96459	*FNIP1*	9.06e-05
201027_s_at	9669	*EIF5B*	9.11e-05
226277_at	10087	*COL4A3BP*	9.13e-05
222806_s_at	56946	*C11orf30*	9.15e-05
214055_x_at	23215	*PRRC2C*	9.22e-05
235180_at	6815	*STYX*	9.42e-05
201513_at	7247	*TSN*	9.42e-05
225825_at	25943	*C20orf194*	9.43e-05
213616_at	25941	*TPGS2*	9.45e-05
226888_at	53944	*CSNK1G1*	9.45e-05
213934_s_at	7571	*ZNF23*	9.65e-05
224308_s_at	57508	*INTS2*	9.70e-05
35436_at	2801	*GOLGA2*	9.75e-05
225055_at	100499466	*LINC00674*	9.76e-05
218572_at	29082	*CHMP4A*	9.82e-05
201384_s_at	4077	*NBR1*	9.84e-05
222270_at	57223	*SMEK2*	9.88e-05
222540_s_at	51773	*RSF1*	9.94e-05
219237_s_at	79982	*DNAJB14*	9.98e-05
201084_s_at	9774	*BCLAF1*	1.01e-04
219636_s_at	80210	*ARMC9*	1.01e-04
213578_at	657	*BMPR1A*	1.02e-04
210282_at	7750	*ZMYM2*	1.02e-04
213073_at	23503	*ZFYVE26*	1.02e-04
208710_s_at	8943	*AP3D1*	1.03e-04
1558953_s_at	22897	*CEP164*	1.03e-04
221532_s_at	80349	*WDR61*	1.03e-04
202333_s_at	7320	*UBE2B*	1.05e-04
212690_at	23259	*DDHD2*	1.05e-04
214212_x_at	10979	*FERMT2*	1.06e-04
208835_s_at	51747	*LUC7L3*	1.06e-04

243759_at	57466	SCAF4	1.06e-04
1554021_a_at	7559	ZNF12	1.07e-04
1555945_s_at	23196	FAM120A	1.07e-04
214766_s_at	25909	AHCTF1	1.07e-04
224844_at	57606	SLAIN2	1.07e-04
239648_at	123879	DCUN1D3	1.07e-04
228264_at	84680	ACCS	1.08e-04
235653_s_at	152815	THAP6	1.08e-04
1559044_at	51013	EXOSC1	1.09e-04
204863_s_at	3572	IL6ST	1.10e-04
230058_at	10807	SDCCAG3	1.12e-04
219384_s_at	23536	ADAT1	1.12e-04
224318_s_at	55683	KANSL3	1.12e-04
225264_at	57038	RARS2	1.12e-04
223138_s_at	170506	DHX36	1.12e-04
214150_x_at	8992	ATP6V0E1	1.13e-04
232515_at	51130	ASB3	1.13e-04
1557966_x_at	130916	MTERFD2	1.13e-04
1554447_at	554203	JPX	1.14e-04
202640_s_at	8498	RANBP3	1.16e-04
239742_at	56995	TULP4	1.17e-04
222850_s_at	79982	DNAJB14	1.17e-04
226999_at	55599	RNPC3	1.18e-04
202568_s_at	4140	MARK3	1.19e-04
226981_at	4297	MLL	1.19e-04
221718_s_at	11214	AKAP13	1.20e-04
219598_s_at	51389	RWDD1	1.20e-04
219366_at	57099	AVEN	1.20e-04
240452_at	2935	GSPT1	1.21e-04
213593_s_at	29896	TRA2A	1.21e-04
227670_at	7627	ZNF75A	1.22e-04
200951_s_at	894	CCND2	1.23e-04
209674_at	1407	CRY1	1.24e-04
239392_s_at	57645	POGK	1.24e-04
225968_at	166336	PRICKLE2	1.24e-04
222040_at	3178	HNRNPA1	1.25e-04
212579_at	23347	SMCHD1	1.25e-04
1552302_at	113277	TMEM106A	1.25e-04
243664_at	9352	TXNL1	1.26e-04
203215_s_at	4646	MYO6	1.27e-04

204710_s_at	26100	*WIPI2*	1.28e-04
238807_at	100128961	*GAPDHP62*	1.30e-04
225881_at	84912	*SLC35B4*	1.31e-04
224771_at	89796	*NAV1*	1.31e-04
223546_x_at	55692	*LUC7L*	1.32e-04
213853_at	120526	*DNAJC24*	1.32e-04
220768_s_at	1456	*CSNK1G3*	1.34e-04
200968_s_at	5479	*PPIB*	1.34e-04
213682_at	10762	*NUP50*	1.34e-04
224973_at	55603	*FAM46A*	1.34e-04
226441_at	10746	*MAP3K2*	1.35e-04
1557553_at	4660	*PPP1R12B*	1.36e-04
200667_at	7323	*UBE2D3*	1.36e-04
222024_s_at	11214	*AKAP13*	1.36e-04
203321_s_at	22850	*ADNP2*	1.36e-04
1555495_a_at	10283	*CWC27*	1.37e-04
219155_at	26207	*PITPNC1*	1.37e-04
225997_at	92597	*MOB1B*	1.37e-04
211784_s_at	6426	*SRSF1*	1.38e-04
210057_at	23049	*SMG1*	1.38e-04
212108_at	23197	*FAF2*	1.40e-04
203624_at	8227	*AKAP17A*	1.41e-04
206055_s_at	6627	*SNRPA1*	1.42e-04
238848_at	54726	*OTUD4*	1.42e-04
226178_at	122809	*SOCS4*	1.42e-04
223351_at	55028	*C17orf80*	1.43e-04
225101_s_at	57231	*SNX14*	1.43e-04
231403_at	7204	*TRIO*	1.44e-04
210368_at	9708	*PCDHGA8*	1.44e-04
223916_s_at	54880	*BCOR*	1.44e-04
211711_s_at	5728	*PTEN*	1.45e-04
230408_at	10336	*PCGF3*	1.46e-04
203513_at	80208	*SPG11*	1.46e-04
214280_x_at	3178	*HNRNPA1*	1.47e-04
235041_at	9570	*GOSR2*	1.47e-04
226284_at	57621	*ZBTB2*	1.48e-04
225331_at	152137	*CCDC50*	1.48e-04
230588_s_at	285074	*LOC285074*	1.48e-04
226604_at	160418	*TMTC3*	1.49e-04
217829_s_at	10713	*USP39*	1.50e-04

224842_at	23049	*SMG1*	1.50e-04
209943_at	26235	*FBXL4*	1.50e-04
227444_at	100131755	*ARMCX4*	1.50e-04
238534_at	9208	*LRRFIP1*	1.51e-04
218348_s_at	29066	*ZC3H7A*	1.51e-04
211921_x_at	5757	*PTMA*	1.52e-04
239442_at	23177	*CEP68*	1.52e-04
232323_s_at	55761	*TTC17*	1.52e-04
225890_at	92667	*C20orf72*	1.53e-04
213110_s_at	1287	*COL4A5*	1.54e-04
229043_at	64282	*PAPD5*	1.54e-04
1553106_at	134553	*C5orf24*	1.54e-04
200085_s_at	6923	*TCEB2*	1.55e-04
213699_s_at	10971	*YWHAQ*	1.55e-04
208726_s_at	8894	*EIF2S2*	1.58e-04
221570_s_at	29081	*METTL5*	1.58e-04
224696_s_at	8816	*DCAF5*	1.59e-04
213956_at	9857	*CEP350*	1.60e-04
227454_at	57551	*TAOK1*	1.60e-04
201100_s_at	8239	*USP9X*	1.61e-04
200596_s_at	8661	*EIF3A*	1.61e-04
224974_at	64426	*SUDS3*	1.61e-04
200959_at	2521	*FUS*	1.63e-04
218946_at	27247	*NFU1*	1.64e-04
1569594_a_at	9147	*NEMF*	1.66e-04
222209_s_at	65084	*TMEM135*	1.66e-04
214723_x_at	375248	*ANKRD36*	1.66e-04
1554415_at	27097	*TAF5L*	1.67e-04
218859_s_at	51575	*ESF1*	1.67e-04
229563_s_at	4736	*RPL10A*	1.68e-04
213984_at	23244	*PDS5A*	1.68e-04
1552482_at	65059	*RAPH1*	1.68e-04
201917_s_at	55186	*SLC25A36*	1.69e-04
205415_s_at	4287	*ATXN3*	1.70e-04
200967_at	5479	*PPIB*	1.70e-04
202386_s_at	9665	*KIAA0430*	1.70e-04
202602_s_at	27336	*HTATSF1*	1.71e-04
243874_at	4026	*LPP*	1.72e-04
217834_s_at	10492	*SYNCRIP*	1.72e-04
218801_at	55757	*UGGT2*	1.72e-04

229422_at	4898	*NRD1*	1.73e-04
210701_at	10428	*CFDP1*	1.75e-04
208672_s_at	6428	*SRSF3*	1.76e-04
228373_at	29035	*C16orf72*	1.76e-04
213327_s_at	219333	*USP12*	1.76e-04
209797_at	10330	*CNPY2*	1.77e-04
226076_s_at	114785	*MBD6*	1.77e-04
236831_at	152137	*CCDC50*	1.77e-04
235451_at	4090	*SMAD5*	1.78e-04
244597_at	26010	*SPATS2L*	1.78e-04
208158_s_at	114876	*OSBPL1A*	1.78e-04
205603_s_at	1730	*DIAPH2*	1.79e-04
202334_s_at	7320	*UBE2B*	1.79e-04
217722_s_at	51335	*NGRN*	1.79e-04
235436_at	64794	*DDX31*	1.79e-04
226087_at	84328	*LZIC*	1.79e-04
223606_x_at	55425	*KIAA1704*	1.80e-04
236155_at	79670	*ZCCHC6*	1.81e-04
221475_s_at	6138	*RPL15*	1.82e-04
206138_s_at	5298	*PI4KB*	1.83e-04
205335_s_at	6728	*SRP19*	1.83e-04
225595_at	58487	*CREBZF*	1.83e-04
201129_at	6432	*SRSF7*	1.84e-04
221536_s_at	55341	*LSG1*	1.84e-04
227601_at	57721	*METTL14*	1.84e-04
204053_x_at	5728	*PTEN*	1.85e-04
219123_at	7775	*ZNF232*	1.85e-04
228793_at	221037	*JMJD1C*	1.85e-04
226319_s_at	10189	*ALYREF*	1.87e-04
232064_at	2241	*FER*	1.88e-04
241376_at	100130097	*LOC100130097*	1.88e-04
225640_at	100506710	*LOC100506710*	1.88e-04
203269_at	8439	*NSMAF*	1.89e-04
1558747_at	23347	*SMCHD1*	1.89e-04
213671_s_at	4141	*MARS*	1.90e-04
221621_at	654434	*LINC00338*	1.90e-04
224922_at	1459	*CSNK2A2*	1.91e-04
203640_at	10150	*MBNL2*	1.91e-04
222544_s_at	54904	*WHSC1L1*	1.91e-04
203522_at	9973	*CCS*	1.92e-04

225925_s_at	84196	*USP48*	1.92e-04
32099_at	9667	*SAFB2*	1.93e-04
213998_s_at	10521	*DDX17*	1.93e-04
225490_at	196528	*ARID2*	1.93e-04
205370_x_at	1629	*DBT*	1.94e-04
238635_at	64417	*C5orf28*	1.94e-04
222593_s_at	65244	*SPATS2*	1.94e-04
232660_at	572	*BAD*	1.95e-04
239163_at	7320	*UBE2B*	1.96e-04
213483_at	23398	*PPWD1*	1.96e-04
230148_at	130872	*AHSA2*	1.96e-04
239336_at	7057	*THBS1*	1.97e-04
230885_at	6687	*SPG7*	1.98e-04
1559946_s_at	10856	*RUVBL2*	1.98e-04
208549_x_at	5757	*PTMA*	1.99e-04
236254_at	157680	*VPS13B*	1.99e-04
209798_at	4863	*NPAT*	2.00e-04
226035_at	57478	*USP31*	2.00e-04
213581_at	5134	*PDCD2*	2.01e-04
202682_s_at	7375	*USP4*	2.02e-04
215281_x_at	23126	*POGZ*	2.02e-04
218263_s_at	58486	*ZBED5*	2.02e-04
233564_s_at	81602	*CDADC1*	2.02e-04
213596_at	837	*CASP4*	2.03e-04
203459_s_at	64601	*VPS16*	2.03e-04
225863_s_at	83636	*C19orf12*	2.05e-04
221935_s_at	285203	*EOGT*	2.05e-04
209534_x_at	11214	*AKAP13*	2.07e-04
213243_at	157680	*VPS13B*	2.07e-04
228582_x_at	378938	*MALAT1*	2.07e-04
218710_at	55622	*TTC27*	2.08e-04
225384_at	85440	*DOCK7*	2.09e-04
219266_at	59348	*ZNF350*	2.10e-04
44111_at	26276	*VPS33B*	2.11e-04
218538_s_at	57380	*MRS2*	2.11e-04
242539_at	129563	*DIS3L2*	2.12e-04
230893_at	134218	*DNAJC21*	2.13e-04
209702_at	79068	*FTO*	2.16e-04
212643_at	93487	*MAPK1IP1L*	2.20e-04
1553186_x_at	158158	*RASEF*	2.20e-04

232975_at	414777	*HCG18*	2.21e-04
201053_s_at	9491	*PSMF1*	2.22e-04
201788_at	11325	*DDX42*	2.22e-04
224827_at	92181	*UBTD2*	2.22e-04
219571_s_at	7559	*ZNF12*	2.23e-04
203113_s_at	1936	*EEF1D*	2.24e-04
215338_s_at	4820	*NKTR*	2.27e-04
236649_at	56986	*DTWD1*	2.28e-04
222616_s_at	10600	*USP16*	2.29e-04
221878_at	388969	*C2orf68*	2.29e-04
222770_s_at	60558	*GUF1*	2.31e-04
234733_s_at	57697	*FANCM*	2.32e-04
201586_s_at	6421	*SFPQ*	2.33e-04
202601_s_at	27336	*HTATSF1*	2.33e-04
200840_at	3735	*KARS*	2.34e-04
236368_at	23392	*KIAA0368*	2.35e-04
227148_at	130271	*PLEKHH2*	2.35e-04
228839_s_at	642361	*LOC642361*	2.35e-04
230618_s_at	23215	*PRRC2C*	2.37e-04
222999_s_at	81669	*CCNL2*	2.37e-04
210111_s_at	23008	*KLHDC10*	2.38e-04
212034_s_at	23265	*EXOC7*	2.38e-04
212232_at	23360	*FNBP4*	2.39e-04
1554628_at	126295	*ZNF57*	2.39e-04
227406_at	100129387	*GABPB1-AS1*	2.39e-04
217988_at	57820	*CCNB1IP1*	2.40e-04
244435_at	642938	*FAM196A*	2.40e-04
229153_at	84138	*SLC7A6OS*	2.41e-04
1564093_at	4750	*NEK1*	2.42e-04
201071_x_at	23451	*SF3B1*	2.42e-04
208943_s_at	7095	*SEC62*	2.43e-04
212709_at	23279	*NUP160*	2.43e-04
202745_at	9101	*USP8*	2.45e-04
203322_at	22850	*ADNP2*	2.45e-04
235226_at	23097	*CDK19*	2.46e-04
239014_at	55749	*CCAR1*	2.46e-04
224781_s_at	84991	*RBM17*	2.46e-04
229509_at	256471	*MFSD8*	2.46e-04
209609_s_at	65005	*MRPL9*	2.47e-04
219818_s_at	55094	*GPATCH1*	2.50e-04

223413_s_at	55646	*LYAR*	2.50e-04
226419_s_at	645460	*FLJ44342*	2.50e-04
209102_s_at	26959	*HBP1*	2.51e-04
221257_x_at	81545	*FBXO38*	2.51e-04
220525_s_at	550	*AUP1*	2.52e-04
213941_x_at	6201	*RPS7*	2.52e-04
225159_s_at	2005	*ELK4*	2.54e-04
207855_s_at	23155	*CLCC1*	2.54e-04
242429_at	163081	*ZNF567*	2.55e-04
230808_at	2339	*FNTA*	2.56e-04
223329_x_at	10910	*SUGT1*	2.57e-04
224446_at	84298	*LLPH*	2.59e-04
232301_at	89910	*UBE3B*	2.60e-04
238841_at	138639	*PTPDC1*	2.60e-04
214911_s_at	6046	*BRD2*	2.61e-04
201099_at	8239	*USP9X*	2.61e-04
208765_s_at	10236	*HNRNPR*	2.61e-04
202268_s_at	8883	*NAE1*	2.62e-04
200019_s_at	2197	*FAU*	2.63e-04
203602_s_at	7709	*ZBTB17*	2.64e-04
218577_at	55631	*LRRC40*	2.64e-04
203079_s_at	8453	*CUL2*	2.65e-04
203569_s_at	8481	*OFD1*	2.65e-04
226045_at	10818	*FRS2*	2.65e-04
204479_at	26578	*OSTF1*	2.65e-04
227279_at	85012	*TCEAL3*	2.65e-04
220925_at	60560	*NAA35*	2.66e-04
223882_at	83989	*FAM172A*	2.66e-04
40465_at	9416	*DDX23*	2.67e-04
226763_at	91404	*SESTD1*	2.71e-04
232524_x_at	29945	*ANAPC4*	2.72e-04
1558041_a_at	653319	*KIAA0895L*	2.72e-04
238412_at	100131998	*RRN3P3*	2.73e-04
222794_x_at	55149	*MTPAP*	2.74e-04
224567_x_at	378938	*MALAT1*	2.74e-04
236700_at	8663	*EIF3C*	2.75e-04
202093_s_at	54623	*PAF1*	2.75e-04
227869_at	90736	*FAM104B*	2.75e-04
201593_s_at	55854	*ZC3H15*	2.77e-04
226006_at	100131801	*PET100*	2.77e-04

214288_s_at	5689	*PSMB1*	2.78e-04
1562848_at	9798	*IST1*	2.79e-04
222792_s_at	29080	*CCDC59*	2.79e-04
224648_at	65056	*GPBP1*	2.79e-04
213735_s_at	1329	*COX5B*	2.83e-04
208956_x_at	1854	*DUT*	2.83e-04
224477_s_at	84309	*NUDT16L1*	2.83e-04
226608_at	388272	*C16orf87*	2.83e-04
212367_at	10116	*FEM1B*	2.84e-04
211000_s_at	3572	*IL6ST*	2.85e-04
213743_at	905	*CCNT2*	2.86e-04
224634_at	54865	*GPATCH4*	2.86e-04
232033_at	57695	*USP37*	2.86e-04
1554473_at	57522	*SRGAP1*	2.87e-04
1554178_a_at	285172	*FAM126B*	2.87e-04
231793_s_at	817	*CAMK2D*	2.89e-04
221486_at	2029	*ENSA*	2.89e-04
218682_s_at	22950	*SLC4A1AP*	2.89e-04
200098_s_at	51433	*ANAPC5*	2.89e-04
218945_at	79091	*METTL22*	2.89e-04
215606_s_at	23085	*ERC1*	2.90e-04
204732_s_at	373	*TRIM23*	2.91e-04
224906_at	196527	*ANO6*	2.91e-04
209503_s_at	5705	*PSMC5*	2.92e-04
240990_at	5868	*RAB5A*	2.92e-04
216109_at	23389	*MED13L*	2.92e-04
203291_at	4850	*CNOT4*	2.93e-04
228822_s_at	10600	*USP16*	2.93e-04
228578_at	129831	*RBM45*	2.94e-04
208720_s_at	9584	*RBM39*	2.95e-04
221495_s_at	22980	*TCF25*	2.95e-04
222613_at	57102	*C12orf4*	2.97e-04
225180_at	151613	*TTC14*	2.99e-04
214274_s_at	30	*ACAA1*	3.00e-04
201724_s_at	2589	*GALNT1*	3.01e-04
202408_s_at	26121	*PRPF31*	3.01e-04
227484_at	57522	*SRGAP1*	3.01e-04
224614_at	1783	*DYNC1LI2*	3.02e-04
212642_s_at	3097	*HIVEP2*	3.03e-04
244396_at	10146	*G3BP1*	3.06e-04

203346_s_at	22823	*MTF2*	3.07e-04
205583_s_at	79868	*ALG13*	3.07e-04
221506_s_at	30000	*TNPO2*	3.08e-04
200843_s_at	2058	*EPRS*	3.10e-04
203944_x_at	11120	*BTN2A1*	3.11e-04
202116_at	5977	*DPF2*	3.13e-04
202220_at	22889	*KIAA0907*	3.13e-04
225552_x_at	54998	*AURKAIP1*	3.13e-04
213077_at	64848	*YTHDC2*	3.14e-04
222414_at	58508	*MLL3*	3.15e-04
213588_x_at	9045	*RPL14*	3.16e-04
230151_at	57213	*SPRYD7*	3.16e-04
232075_at	80349	*WDR61*	3.17e-04
224903_at	84916	*CIRH1A*	3.18e-04
225958_at	1911	*PHC1*	3.20e-04
207614_s_at	8454	*CUL1*	3.20e-04
205329_s_at	8723	*SNX4*	3.20e-04
201391_at	10131	*TRAP1*	3.20e-04
223086_x_at	51258	*MRPL51*	3.20e-04
238584_at	79781	*IQCA1*	3.20e-04
235767_x_at	51808	*PHAX*	3.22e-04
219757_s_at	54916	*C14orf101*	3.22e-04
222600_s_at	55236	*UBA6*	3.23e-04
214086_s_at	10038	*PARP2*	3.24e-04
228556_at	91746	*YTHDC1*	3.24e-04
225409_at	493753	*COA5*	3.24e-04
206592_s_at	8943	*AP3D1*	3.25e-04
212469_at	25836	*NIPBL*	3.25e-04
227796_at	643836	*ZFP62*	3.26e-04
242953_at	10780	*ZNF234*	3.27e-04
222811_at	55783	*FTSJD1*	3.27e-04
212852_s_at	6738	*TROVE2*	3.28e-04
202762_at	9475	*ROCK2*	3.29e-04
212318_at	23534	*TNPO3*	3.29e-04
212982_at	23390	*ZDHHC17*	3.32e-04
212644_s_at	93487	*MAPK1IP1L*	3.32e-04
240072_at	55252	*ASXL2*	3.33e-04
202546_at	8673	*VAMP8*	3.34e-04
221518_s_at	55031	*USP47*	3.34e-04
238220_at	7403	*KDM6A*	3.35e-04

225100_at	200933	*FBXO45*	3.35e-04
228686_at	644873	*FLJ33630*	3.35e-04
1555579_s_at	5797	*PTPRM*	3.36e-04
218139_s_at	55745	*AP5M1*	3.36e-04
230185_at	79725	*THAP9*	3.36e-04
208930_s_at	3609	*ILF3*	3.38e-04
226510_at	25938	*HEATR5A*	3.39e-04
220946_s_at	29072	*SETD2*	3.40e-04
238418_at	84912	*SLC35B4*	3.40e-04
212153_at	23126	*POGZ*	3.41e-04
219212_at	51182	*HSPA14*	3.41e-04
225265_at	5937	*RBMS1*	3.45e-04
218438_s_at	80306	*MED28*	3.45e-04
204297_at	5289	*PIK3C3*	3.46e-04
202251_at	9129	*PRPF3*	3.46e-04
201854_s_at	23300	*ATMIN*	3.46e-04
217550_at	22926	*ATF6*	3.47e-04
212189_s_at	25839	*COG4*	3.47e-04
217987_at	54529	*ASNSD1*	3.47e-04
212483_at	25836	*NIPBL*	3.48e-04
224558_s_at	378938	*MALAT1*	3.48e-04
1569503_at	54497	*HEATR5B*	3.49e-04
205510_s_at	55056	*FLJ10038*	3.49e-04
212716_s_at	27335	*EIF3K*	3.50e-04
223177_at	221294	*NT5DC1*	3.51e-04
227208_at	338657	*CCDC84*	3.51e-04
223815_at	90799	*CEP95*	3.52e-04
200016_x_at	3178	*HNRNPA1*	3.54e-04
202416_at	7266	*DNAJC7*	3.54e-04
202651_at	9926	*LPGAT1*	3.54e-04
223058_at	83641	*FAM107B*	3.55e-04
226154_at	10059	*DNM1L*	3.57e-04
228569_at	10914	*PAPOLA*	3.58e-04
244786_at	283596	*SNHG10*	3.58e-04
49485_at	11108	*PRDM4*	3.59e-04
225528_at	10526	*IPO8*	3.60e-04
227018_at	54878	*DPP8*	3.61e-04
212266_s_at	6430	*SRSF5*	3.62e-04
66053_at	221092	*HNRNPUL2*	3.62e-04
219644_at	51134	*CCDC41*	3.66e-04

224366_s_at	85021	*REPS1*	3.67e-04
212725_s_at	55000	*TUG1*	3.69e-04
1555439_at	9330	*GTF3C3*	3.70e-04
209814_at	27309	*ZNF330*	3.70e-04
218108_at	55148	*UBR7*	3.70e-04
231059_x_at	51282	*SCAND1*	3.71e-04
219033_at	79668	*PARP8*	3.72e-04
222021_x_at	255812	*SDHAP1*	3.72e-04
226979_at	10746	*MAP3K2*	3.74e-04
237502_at	54675	*CRLS1*	3.74e-04
203830_at	64149	*C17orf75*	3.74e-04
223578_x_at	378938	*MALAT1*	3.75e-04
213357_at	404672	*GTF2H5*	3.77e-04
231714_s_at	10717	*AP4B1*	3.78e-04
201575_at	22938	*SNW1*	3.78e-04
202231_at	10480	*EIF3M*	3.79e-04
230629_s_at	57634	*EP400*	3.79e-04
201351_s_at	10730	*YME1L1*	3.80e-04
218055_s_at	55255	*WDR41*	3.80e-04
225893_at	149041	*RC3H1*	3.80e-04
221213_s_at	54816	*ZNF280D*	3.83e-04
211678_s_at	55905	*RNF114*	3.84e-04
1568594_s_at	84851	*TRIM52*	3.85e-04
221229_s_at	55006	*TRMT61B*	3.90e-04
233642_s_at	54497	*HEATR5B*	3.91e-04
202097_at	9972	*NUP153*	3.92e-04
227039_at	11214	*AKAP13*	3.92e-04
212723_at	23210	*JMJD6*	3.92e-04
227605_at	9255	*AIMP1*	3.93e-04
239413_at	22995	*CEP152*	3.94e-04
200915_x_at	3895	*KTN1*	3.95e-04
212651_at	9886	*RHOBTB1*	3.95e-04
201773_at	23394	*ADNP*	3.95e-04
213627_at	10916	*MAGED2*	3.96e-04
226290_at	55814	*BDP1*	3.97e-04
210947_s_at	4437	*MSH3*	4.01e-04
218351_at	54951	*COMMD8*	4.01e-04
206854_s_at	6885	*MAP3K7*	4.06e-04
241757_x_at	51626	*DYNC2LI1*	4.06e-04
226785_at	286410	*ATP11C*	4.06e-04

210097_s_at	51406	NOL7	4.08e-04
229194_at	84333	PCGF5	4.08e-04
228571_at	57786	RBAK	4.09e-04
221473_x_at	10955	SERINC3	4.11e-04
221743_at	10658	CELF1	4.12e-04
204982_at	9815	GIT2	4.13e-04
217965_s_at	29115	SAP30BP	4.13e-04
238444_at	114991	ZNF618	4.15e-04
241642_x_at	9874	TLK1	4.16e-04
210386_s_at	4580	MTX1	4.18e-04
202171_at	7716	VEZF1	4.19e-04
218873_at	54856	GON4L	4.19e-04
201983_s_at	1956	EGFR	4.20e-04
210479_s_at	6095	RORA	4.21e-04
202631_s_at	10513	APPBP2	4.22e-04
212487_at	23131	GPATCH8	4.22e-04
202868_s_at	10775	POP4	4.23e-04
207966_s_at	2734	GLG1	4.24e-04
214494_s_at	6687	SPG7	4.24e-04
212345_s_at	64764	CREB3L2	4.25e-04
209050_s_at	5900	RALGDS	4.27e-04
214431_at	8833	GMPS	4.28e-04
207305_s_at	22878	TRAPPC8	4.28e-04
221763_at	221037	JMJD1C	4.28e-04
203257_s_at	79096	C11orf49	4.29e-04
225892_at	3658	IREB2	4.30e-04
202225_at	1398	CRK	4.32e-04
211285_s_at	7337	UBE3A	4.32e-04
221897_at	84851	TRIM52	4.32e-04
202864_s_at	6672	SP100	4.33e-04
214144_at	5433	POLR2D	4.34e-04
228301_x_at	4716	NDUFB10	4.36e-04
229467_at	5094	PCBP2	4.36e-04
214550_s_at	23534	TNPO3	4.37e-04
222673_x_at	159090	FAM122B	4.37e-04
203211_s_at	8898	MTMR2	4.39e-04
227047_x_at	57659	ZBTB4	4.39e-04
227577_at	149371	EXOC8	4.39e-04
202484_s_at	8932	MBD2	4.41e-04
217538_at	9905	SGSM2	4.41e-04

224892_at	26258	BLOC1S6	4.42e-04
214422_at	5887	RAD23B	4.43e-04
222997_s_at	54460	MRPS21	4.43e-04
221986_s_at	54800	KLHL24	4.43e-04
222527_s_at	55696	RBM22	4.43e-04
218147_s_at	55830	GLT8D1	4.44e-04
1561079_at	23243	ANKRD28	4.45e-04
219972_s_at	64430	PCNXL4	4.48e-04
235339_at	83852	SETDB2	4.49e-04
212440_at	11017	SNRNP27	4.50e-04
208843_s_at	26003	GORASP2	4.51e-04
218277_s_at	79665	DHX40	4.52e-04
203095_at	4528	MTIF2	4.53e-04
208946_s_at	8678	BECN1	4.54e-04
226666_at	23002	DAAM1	4.54e-04
204048_s_at	9749	PHACTR2	4.55e-04
225932_s_at	3181	HNRNPA2B1	4.57e-04
201448_at	7072	TIA1	4.57e-04
212787_at	56252	YLPM1	4.57e-04
212794_s_at	23325	KIAA1033	4.59e-04
211609_x_at	5710	PSMD4	4.61e-04
209265_s_at	56339	METTL3	4.61e-04
201737_s_at	10299	MARCH6	4.62e-04
212406_s_at	55251	PCMTD2	4.63e-04
207700_s_at	8202	NCOA3	4.68e-04
227639_at	10026	PIGK	4.72e-04
211724_x_at	54468	MIOS	4.73e-04
220349_s_at	64772	ENGASE	4.73e-04
212411_at	92856	IMP4	4.73e-04
204690_at	9482	STX8	4.74e-04
212030_at	58517	RBM25	4.77e-04
219080_s_at	56474	CTPS2	4.79e-04
209382_at	10623	POLR3C	4.81e-04
37943_at	23503	ZFYVE26	4.82e-04
91617_at	54487	DGCR8	4.84e-04
203285_s_at	9653	HS2ST1	4.85e-04
222624_s_at	51193	ZNF639	4.87e-04
202698_x_at	1327	COX4I1	4.88e-04
219688_at	55212	BBS7	4.88e-04
238497_at	219902	TMEM136	4.88e-04

236561_at	7046	*TGFBR1*	4.89e-04
208822_s_at	7818	*DAP3*	4.89e-04
212010_s_at	55573	*CDV3*	4.90e-04
229322_at	5529	*PPP2R5E*	4.93e-04
223701_s_at	55031	*USP47*	4.95e-04
213505_s_at	10147	*SUGP2*	4.96e-04
1560013_at	23042	*PDXDC1*	4.97e-04
214790_at	26054	*SENP6*	4.98e-04
226326_at	84333	*PCGF5*	5.00e-04
37549_g_at	27241	*BBS9*	5.01e-04
219861_at	55192	*DNAJC17*	5.01e-04
220935_s_at	55755	*CDK5RAP2*	5.02e-04
206052_s_at	7884	*SLBP*	5.03e-04
223227_at	583	*BBS2*	5.04e-04
205006_s_at	9397	*NMT2*	5.05e-04
201813_s_at	9779	*TBC1D5*	5.06e-04
215188_at	8428	*STK24*	5.14e-04
202776_at	30836	*DNTTIP2*	5.15e-04
224764_at	57584	*ARHGAP21*	5.15e-04
202347_s_at	3093	*UBE2K*	5.16e-04
201392_s_at	3482	*IGF2R*	5.16e-04
229027_at	5494	*PPM1A*	5.16e-04
202584_at	4799	*NFX1*	5.17e-04
241938_at	9444	*QKI*	5.17e-04
204106_at	7016	*TESK1*	5.18e-04
238176_at	9693	*RAPGEF2*	5.18e-04
219158_s_at	80155	*NAA15*	5.18e-04
1553750_a_at	143684	*FAM76B*	5.18e-04
234701_at	29123	*ANKRD11*	5.19e-04
209023_s_at	10735	*STAG2*	5.20e-04
220547_s_at	54537	*FAM35A*	5.20e-04
225607_at	124808	*CCDC43*	5.20e-04
242669_at	51569	*UFM1*	5.23e-04
222681_at	56983	*POGLUT1*	5.23e-04
243589_at	284058	*KANSL1*	5.23e-04
212600_s_at	7385	*UQCRC2*	5.24e-04
221556_at	8555	*CDC14B*	5.29e-04
238886_at	10972	*TMED10*	5.33e-04
221264_s_at	23435	*TARDBP*	5.34e-04
202916_s_at	9917	*FAM20B*	5.37e-04

222269_at	139322	*APOOL*	5.37e-04
202040_s_at	5927	*KDM5A*	5.38e-04
218343_s_at	9330	*GTF3C3*	5.38e-04
210453_x_at	10632	*ATP5L*	5.39e-04
219156_at	55333	*SYNJ2BP*	5.39e-04
218397_at	55120	*FANCL*	5.40e-04
222048_at	1416	*CRYBB2P1*	5.41e-04
201340_s_at	8507	*ENC1*	5.41e-04
233637_at	50717	*DCAF8*	5.41e-04
200048_s_at	10899	*JTB*	5.42e-04
238076_at	57459	*GATAD2B*	5.43e-04
219242_at	80254	*CEP63*	5.43e-04
224933_s_at	221037	*JMJD1C*	5.43e-04
239660_at	57186	*RALGAPA2*	5.46e-04
226345_at	221079	*ARL5B*	5.47e-04
200772_x_at	5757	*PTMA*	5.48e-04
219062_s_at	54877	*ZCCHC2*	5.48e-04
228590_at	55037	*PTCD3*	5.50e-04
220046_s_at	57018	*CCNL1*	5.51e-04
227918_s_at	79699	*ZYG11B*	5.51e-04
202909_at	9852	*EPM2AIP1*	5.53e-04
209422_at	51230	*PHF20*	5.54e-04
212840_at	26043	*UBXN7*	5.56e-04
227772_at	9113	*LATS1*	5.57e-04
233078_at	8539	*API5*	5.58e-04
219348_at	55850	*USE1*	5.58e-04
219200_at	79072	*FASTKD3*	5.60e-04
217427_s_at	7290	*HIRA*	5.62e-04
213480_at	8674	*VAMP4*	5.62e-04
213390_at	23211	*ZC3H4*	5.62e-04
214141_x_at	6432	*SRSF7*	5.63e-04
226214_at	51573	*GDE1*	5.65e-04
225668_at	134145	*FAM173B*	5.66e-04
218102_at	51071	*DERA*	5.67e-04
218846_at	9439	*MED23*	5.69e-04
1569107_s_at	339559	*ZNF642*	5.69e-04
207338_s_at	7752	*ZNF200*	5.72e-04
203319_s_at	7707	*ZNF148*	5.78e-04
222757_s_at	51776	*ZAK*	5.80e-04
218057_x_at	10328	*EMC8*	5.81e-04

230712_at	55672	*NBPF1*	5.83e-04
235216_at	114799	*ESCO1*	5.84e-04
201505_at	3912	*LAMB1*	5.85e-04
206551_x_at	54800	*KLHL24*	5.89e-04
243198_at	374618	*TEX9*	5.90e-04
239695_at	3716	*JAK1*	5.92e-04
224926_at	60412	*EXOC4*	5.92e-04
235689_at	123263	*MTFMT*	5.92e-04
221580_s_at	79101	*TAF1D*	5.93e-04
228385_at	83479	*DDX59*	5.93e-04
1565703_at	4089	*SMAD4*	5.94e-04
222056_s_at	51011	*FAHD2A*	5.95e-04
204617_s_at	65057	*ACD*	5.96e-04
223040_at	51126	*NAA20*	5.97e-04
234950_s_at	64326	*RFWD2*	5.97e-04
206874_s_at	9748	*SLK*	5.99e-04
233866_at	51088	*KLHL5*	6.01e-04
202774_s_at	6433	*SFSWAP*	6.03e-04
200947_s_at	2746	*GLUD1*	6.04e-04
225472_at	7918	*GPANK1*	6.04e-04
226033_at	57478	*USP31*	6.08e-04
213571_s_at	9470	*EIF4E2*	6.10e-04
228397_at	55000	*TUG1*	6.10e-04
1553185_at	158158	*RASEF*	6.11e-04
224667_x_at	119504	*ANAPC16*	6.12e-04
227859_at	51277	*DNAJC27*	6.17e-04
221492_s_at	64422	*ATG3*	6.19e-04
225082_at	51692	*CPSF3*	6.20e-04
235241_at	153129	*SLC38A9*	6.20e-04
227433_at	205717	*KIAA2018*	6.20e-04
200849_s_at	10768	*AHCYL1*	6.21e-04
225622_at	55824	*PAG1*	6.21e-04
227567_at	100499466	*LINC00674*	6.22e-04
243887_at	51263	*MRPL30*	6.23e-04
224414_s_at	84674	*CARD6*	6.23e-04
227520_at	55787	*TXLNG*	6.28e-04
200094_s_at	1938	*EEF2*	6.30e-04
227157_at	201973	*CCDC111*	6.30e-04
226180_at	134430	*WDR36*	6.32e-04
203598_s_at	11193	*WBP4*	6.36e-04

214263_x_at	5432	*POLR2C*	6.37e-04
218430_s_at	64864	*RFX7*	6.39e-04
217797_at	51506	*UFC1*	6.45e-04
219037_at	51018	*RRP15*	6.46e-04
1558678_s_at	378938	*MALAT1*	6.46e-04
217858_s_at	51566	*ARMCX3*	6.48e-04
219477_s_at	55901	*THSD1*	6.48e-04
223033_s_at	57410	*SCYL1*	6.48e-04
226968_at	23095	*KIF1B*	6.50e-04
230072_at	64786	*TBC1D15*	6.50e-04
202544_at	2764	*GMFB*	6.51e-04
201713_s_at	5903	*RANBP2*	6.51e-04
235021_at	158358	*KIAA2026*	6.51e-04
212557_at	26036	*ZNF451*	6.53e-04
212888_at	23405	*DICER1*	6.54e-04
221654_s_at	9960	*USP3*	6.55e-04
244165_at	54906	*FAM208B*	6.55e-04
209012_at	7204	*TRIO*	6.57e-04
216305_s_at	6936	*GCFC2*	6.60e-04
209127_s_at	9733	*SART3*	6.61e-04
224280_s_at	56181	*FAM54B*	6.61e-04
241370_at	286052	*LOC286052*	6.61e-04
220305_at	57506	*MAVS*	6.62e-04
218047_at	114883	*OSBPL9*	6.63e-04
212622_at	440026	*TMEM41B*	6.64e-04
212620_at	23060	*ZNF609*	6.65e-04
226758_at	51631	*LUC7L2*	6.65e-04
235615_at	5229	*PGGT1B*	6.67e-04
215529_x_at	23181	*DIP2A*	6.69e-04
218957_s_at	80227	*PAAF1*	6.69e-04
228549_at	9725	*TMEM63A*	6.70e-04
57703_at	205564	*SENP5*	6.70e-04
223247_at	84246	*MED10*	6.72e-04
225951_s_at	100507217	*LOC100507217*	6.74e-04
216563_at	23253	*ANKRD12*	6.75e-04
201057_s_at	2804	*GOLGB1*	6.78e-04
201528_at	6117	*RPA1*	6.81e-04
229272_at	23360	*FNBP4*	6.83e-04
238845_at	7782	*SLC30A4*	6.89e-04
203544_s_at	8027	*STAM*	6.89e-04

235195_at	26190	*FBXW2*	6.90e-04
212894_at	6832	*SUPV3L1*	6.92e-04
1568805_at	135112	*NCOA7*	6.92e-04
201200_at	8804	*CREG1*	6.93e-04
213930_at	9140	*ATG12*	6.93e-04
232597_x_at	9169	*SCAF11*	6.93e-04
220512_at	10395	*DLC1*	6.93e-04
201178_at	25793	*FBXO7*	6.93e-04
211947_s_at	23215	*PRRC2C*	6.96e-04
212522_at	5151	*PDE8A*	6.97e-04
207624_s_at	6103	*RPGR*	6.98e-04
218329_at	11108	*PRDM4*	6.98e-04
212785_s_at	51574	*LARP7*	6.98e-04
228225_at	5828	*PEX2*	6.99e-04
226986_at	26100	*WIPI2*	6.99e-04
224858_at	25921	*ZDHHC5*	7.01e-04
225244_at	116841	*SNAP47*	7.02e-04
200058_s_at	23020	*SNRNP200*	7.04e-04
225730_s_at	25917	*THUMPD3*	7.07e-04
200789_at	1891	*ECH1*	7.11e-04
218616_at	57117	*INTS12*	7.12e-04
203694_s_at	8449	*DHX16*	7.13e-04
223320_s_at	23456	*ABCB10*	7.14e-04
204226_at	27067	*STAU2*	7.14e-04
226293_at	219541	*MED19*	7.15e-04
241843_at	677811	*SNORA28*	7.18e-04
222737_s_at	29117	*BRD7*	7.20e-04
215952_s_at	4946	*OAZ1*	7.21e-04
225132_at	26224	*FBXL3*	7.21e-04
1561274_at	1416	*CRYBB2P1*	7.24e-04
203978_at	4682	*NUBP1*	7.24e-04
221555_x_at	8555	*CDC14B*	7.27e-04
236231_at	10778	*ZNF271*	7.29e-04
212780_at	6654	*SOS1*	7.31e-04
212467_at	23317	*DNAJC13*	7.31e-04
220094_s_at	63933	*CCDC90A*	7.33e-04
226660_at	6198	*RPS6KB1*	7.35e-04
36552_at	26005	*C2CD3*	7.37e-04
212066_s_at	9736	*USP34*	7.38e-04
228177_at	1387	*CREBBP*	7.42e-04

218830_at	51121	*RPL26L1*	7.43e-04
203449_s_at	7013	*TERF1*	7.44e-04
223133_at	81853	*TMEM14B*	7.44e-04
227565_at	51088	*KLHL5*	7.46e-04
203247_s_at	7572	*ZNF24*	7.47e-04
226749_at	64965	*MRPS9*	7.48e-04
224984_at	10725	*NFAT5*	7.49e-04
208746_x_at	10632	*ATP5L*	7.51e-04
223295_s_at	55692	*LUC7L*	7.52e-04
202906_s_at	4683	*NBN*	7.55e-04
208922_s_at	10482	*NXF1*	7.55e-04
229436_x_at	79184	*BRCC3*	7.55e-04
219625_s_at	10087	*COL4A3BP*	7.61e-04
242918_at	4678	*NASP*	7.64e-04
212867_at	10499	*NCOA2*	7.66e-04
202266_at	51567	*TDP2*	7.69e-04
201184_s_at	1108	*CHD4*	7.70e-04
227964_at	83786	*FRMD8*	7.70e-04
219981_x_at	84914	*ZNF587*	7.77e-04
221481_x_at	3184	*HNRNPD*	7.81e-04
229429_x_at	728855	*LINC00623*	7.81e-04
228435_at	55527	*FEM1A*	7.83e-04
1557071_s_at	51667	*NUB1*	7.87e-04
1568865_at	2342	*FNTB*	7.88e-04
229706_at	10915	*TCERG1*	7.88e-04
222488_s_at	51164	*DCTN4*	7.88e-04
223526_at	83608	*C18orf21*	7.88e-04
222380_s_at	10016	*PDCD6*	7.89e-04
202636_at	7844	*RNF103*	7.91e-04
209388_at	10914	*PAPOLA*	7.91e-04
208616_s_at	8073	*PTP4A2*	7.92e-04
212655_at	23174	*ZCCHC14*	7.93e-04
228095_at	9678	*PHF14*	7.96e-04
209063_x_at	10605	*PAIP1*	7.96e-04
228316_at	130162	*CLHC1*	7.96e-04
1556283_s_at	26127	*FGFR1OP2*	8.02e-04
226696_at	10741	*RBBP9*	8.03e-04
224692_at	84919	*PPP1R15B*	8.03e-04
201924_at	4299	*AFF1*	8.04e-04
216060_s_at	23002	*DAAM1*	8.08e-04

217906_at	23588	*KLHDC2*	8.10e-04
220764_at	151987	*PPP4R2*	8.12e-04
222400_s_at	55256	*ADI1*	8.14e-04
223161_at	57189	*KIAA1147*	8.15e-04
200028_s_at	56910	*STARD7*	8.17e-04
226300_at	219541	*MED19*	8.17e-04
209920_at	659	*BMPR2*	8.19e-04
230183_at	2131	*EXT1*	8.20e-04
34858_at	23510	*KCTD2*	8.20e-04
1554250_s_at	375593	*TRIM73*	8.20e-04
229010_at	867	*CBL*	8.22e-04
223983_s_at	83636	*C19orf12*	8.24e-04
222239_s_at	26512	*INTS6*	8.25e-04
228986_at	114882	*OSBPL8*	8.26e-04
201038_s_at	8125	*ANP32A*	8.27e-04
229520_s_at	55668	*C14orf118*	8.27e-04
1553274_a_at	154007	*SNRNP48*	8.27e-04
225992_at	8028	*MLLT10*	8.28e-04
224024_at	57222	*ERGIC1*	8.31e-04
223763_at	84062	*DTNBP1*	8.31e-04
201993_x_at	9987	*HNRPDL*	8.32e-04
202144_s_at	158	*ADSL*	8.33e-04
240282_at	9948	*WDR1*	8.33e-04
233775_x_at	100289333	*LOC100289333*	8.33e-04
213465_s_at	5510	*PPP1R7*	8.34e-04
218386_x_at	10600	*USP16*	8.36e-04
226901_at	284018	*C17orf58*	8.38e-04
213123_at	4238	*MFAP3*	8.39e-04
238041_at	6938	*TCF12*	8.39e-04
215773_x_at	10038	*PARP2*	8.41e-04
221267_s_at	81926	*FAM108A1*	8.41e-04
213032_at	4781	*NFIB*	8.42e-04
202163_s_at	9337	*CNOT8*	8.43e-04
201152_s_at	4154	*MBNL1*	8.44e-04
214162_at	284244	*LOC284244*	8.44e-04
203494_s_at	9702	*CEP57*	8.45e-04
236431_at	23350	*U2SURP*	8.46e-04
233654_at	54872	*PIGG*	8.47e-04
235253_at	5810	*RAD1*	8.48e-04
204097_s_at	51634	*RBMX2*	8.49e-04

239005_at	388685	*FLJ39739*	8.52e-04
214787_at	10260	*DENND4A*	8.57e-04
211948_x_at	23215	*PRRC2C*	8.57e-04
224729_s_at	64756	*ATPAF1*	8.57e-04
235949_at	79989	*TTC26*	8.58e-04
226945_at	84236	*RHBDD1*	8.58e-04
213025_at	55623	*THUMPD1*	8.59e-04
225838_at	26122	*EPC2*	8.60e-04
225866_at	84154	*RPF2*	8.62e-04
212855_at	23142	*DCUN1D4*	8.63e-04
219192_at	55833	*UBAP2*	8.64e-04
209759_s_at	1632	*ECI1*	8.66e-04
201912_s_at	2935	*GSPT1*	8.67e-04
218996_at	29844	*TFPT*	8.67e-04
212881_at	51588	*PIAS4*	8.67e-04
219754_at	55285	*RBM41*	8.68e-04
218987_at	55729	*ATF7IP*	8.68e-04
228012_at	9782	*MATR3*	8.69e-04
201488_x_at	10657	*KHDRBS1*	8.69e-04
218841_at	140461	*ASB8*	8.69e-04
233461_x_at	7769	*ZNF226*	8.70e-04
222975_s_at	7812	*CSDE1*	8.70e-04
225821_s_at	259282	*BOD1L1*	8.73e-04
203625_x_at	6502	*SKP2*	8.75e-04
214113_s_at	9939	*RBM8A*	8.76e-04
218947_s_at	55149	*MTPAP*	8.76e-04
241384_x_at	256356	*GK5*	8.76e-04
213286_at	51663	*ZFR*	8.79e-04
221712_s_at	54663	*WDR74*	8.80e-04
223168_at	58480	*RHOU*	8.80e-04
203290_at	3117	*HLA-DQA1*	8.84e-04
226760_at	51360	*MBTPS2*	8.84e-04
226164_x_at	57494	*RIMKLB*	8.85e-04
209025_s_at	10492	*SYNCRIP*	8.86e-04
225880_at	163590	*TOR1AIP2*	8.86e-04
200072_s_at	4670	*HNRNPM*	8.87e-04
205511_at	55056	*FLJ10038*	8.89e-04
242665_at	114793	*FMNL2*	8.89e-04
200067_x_at	8724	*SNX3*	8.91e-04
221749_at	253943	*YTHDF3*	8.93e-04

213517_at	5094	*PCBP2*	8.94e-04
220212_s_at	63892	*THADA*	8.94e-04
225985_at	5562	*PRKAA1*	8.95e-04
213455_at	92689	*FAM114A1*	8.96e-04
1559739_at	56994	*CHPT1*	8.97e-04
1564520_s_at	10419	*PRMT5*	8.98e-04
1568618_a_at	2589	*GALNT1*	8.99e-04
204080_at	114034	*TOE1*	9.00e-04
212783_at	5930	*RBBP6*	9.01e-04
204373_s_at	9857	*CEP350*	9.03e-04
219069_at	54851	*ANKRD49*	9.03e-04
202060_at	9646	*CTR9*	9.04e-04
218231_at	55577	*NAGK*	9.09e-04
1555844_s_at	4670	*HNRNPM*	9.11e-04
203762_s_at	51626	*DYNC2LI1*	9.14e-04
201146_at	4780	*NFE2L2*	9.16e-04
200711_s_at	6500	*SKP1*	9.16e-04
218593_at	55131	*RBM28*	9.23e-04
212981_s_at	9747	*FAM115A*	9.24e-04
243618_s_at	152485	*ZNF827*	9.24e-04
228856_at	65988	*ZNF747*	9.25e-04
225213_at	160760	*PPTC7*	9.26e-04
201745_at	5756	*TWF1*	9.28e-04
225461_at	79813	*EHMT1*	9.28e-04
223212_at	84287	*ZDHHC16*	9.30e-04
202332_at	1454	*CSNK1E*	9.31e-04
217760_at	54765	*TRIM44*	9.31e-04
242761_s_at	147923	*ZNF420*	9.39e-04
201683_x_at	9878	*TOX4*	9.44e-04
238510_at	124411	*ZNF720*	9.45e-04
202862_at	2184	*FAH*	9.46e-04
203966_s_at	5494	*PPM1A*	9.47e-04
209430_at	9044	*BTAF1*	9.47e-04
220171_x_at	55425	*KIAA1704*	9.47e-04
226447_at	55870	*ASH1L*	9.48e-04
212341_at	286451	*YIPF6*	9.48e-04
224983_at	950	*SCARB2*	9.49e-04
200899_s_at	10724	*MGEA5*	9.51e-04
225073_at	51535	*PPHLN1*	9.51e-04
218003_s_at	2287	*FKBP3*	9.52e-04

206005_s_at	22832	*KIAA1009*	9.52e-04
213086_s_at	1452	*CSNK1A1*	9.53e-04
235164_at	219749	*ZNF25*	9.57e-04
200050_at	7705	*ZNF146*	9.59e-04
235547_at	10443	*N4BP2L2*	9.59e-04
243316_x_at	9559	*VPS26A*	9.60e-04
229466_at	9866	*TRIM66*	9.60e-04
215424_s_at	22938	*SNW1*	9.60e-04
212984_at	1386	*ATF2*	9.62e-04
228851_s_at	2029	*ENSA*	9.62e-04
224568_x_at	378938	*MALAT1*	9.62e-04
218449_at	55325	*UFSP2*	9.64e-04
209216_at	11152	*WDR45*	9.70e-04
1558028_x_at	647979	*LINC00657*	9.72e-04
243463_s_at	6016	*RIT1*	9.76e-04
202001_s_at	4700	*NDUFA6*	9.77e-04
202577_s_at	55308	*DDX19A*	9.77e-04
204091_at	5147	*PDE6D*	9.80e-04
222244_s_at	55000	*TUG1*	9.80e-04
209090_s_at	51100	*SH3GLB1*	9.82e-04
242550_at	8662	*EIF3B*	9.83e-04
205077_s_at	5281	*PIGF*	9.85e-04
222668_at	79047	*KCTD15*	9.85e-04
223059_s_at	83641	*FAM107B*	9.86e-04
231730_at	51091	*SEPSECS*	9.87e-04
1553167_a_at	51091	*SEPSECS*	9.90e-04
208975_s_at	3837	*KPNB1*	9.91e-04
207078_at	10001	*MED6*	9.92e-04
225338_at	79699	*ZYG11B*	9.92e-04
225969_at	84964	*ALKBH6*	9.93e-04
57516_at	92595	*ZNF764*	9.95e-04
211059_s_at	2801	*GOLGA2*	9.96e-04
205809_s_at	8976	*WASL*	9.96e-04
218447_at	56942	*CMC2*	9.96e-04
201682_at	9512	*PMPCB*	9.98e-04
226732_at	155435	*RBM33*	9.98e-04
202717_s_at	8881	*CDC16*	1.00e-03
233056_x_at	22839	*DLGAP4*	1.00e-03
241985_at	133746	*JMY*	1.00e-03
213546_at	222161	*DKFZP586I1420*	1.00e-03

202405_at	7073	*TIAL1*	1.01e-03
200042_at	51493	*C22orf28*	1.01e-03
228341_at	131870	*NUDT16*	1.01e-03
228961_at	166968	*MIER3*	1.01e-03
215600_x_at	285231	*FBXW12*	1.01e-03
236007_at	11216	*AKAP10*	1.02e-03
201855_s_at	23300	*ATMIN*	1.02e-03
201857_at	51663	*ZFR*	1.02e-03
223380_s_at	26524	*LATS2*	1.03e-03
218135_at	51290	*ERGIC2*	1.03e-03
218134_s_at	55696	*RBM22*	1.03e-03
1556064_at	284926	*LOC284926*	1.03e-03
239106_at	340591	*CA5BP1*	1.03e-03
1557736_at	4820	*NKTR*	1.04e-03
216983_s_at	7767	*ZNF224*	1.04e-03
228374_at	27291	*R3HCC1L*	1.04e-03
218571_s_at	29082	*CHMP4A*	1.04e-03
232652_x_at	51282	*SCAND1*	1.04e-03
219119_at	51691	*NAA38*	1.04e-03
227062_at	283131	*NEAT1*	1.04e-03
226808_at	643641	*ZNF862*	1.04e-03
223424_s_at	7589	*ZSCAN21*	1.05e-03
231809_x_at	10081	*PDCD7*	1.05e-03
214662_at	23160	*WDR43*	1.05e-03
212693_at	23195	*MDN1*	1.05e-03
224160_s_at	28976	*ACAD9*	1.05e-03
238465_at	133383	*SETD9*	1.05e-03
213896_x_at	317662	*FAM149B1*	1.05e-03
202678_at	2958	*GTF2A2*	1.06e-03
202379_s_at	4820	*NKTR*	1.06e-03
239750_x_at	9218	*VAPA*	1.06e-03
201987_at	9969	*MED13*	1.06e-03
231770_x_at	51057	*WDPCP*	1.06e-03
218166_s_at	51773	*RSF1*	1.06e-03
1552323_s_at	159091	*FAM122C*	1.06e-03
201520_s_at	2926	*GRSF1*	1.07e-03
201587_s_at	3654	*IRAK1*	1.07e-03
218160_at	4702	*NDUFA8*	1.07e-03
217846_at	5859	*QARS*	1.07e-03
221830_at	5911	*RAP2A*	1.07e-03

228711_at	7587	*ZNF37A*	1.07e-03
212468_at	9043	*SPAG9*	1.07e-03
209137_s_at	9100	*USP10*	1.07e-03
202462_s_at	9879	*DDX46*	1.07e-03
213019_at	26953	*RANBP6*	1.07e-03
239083_at	136051	*ZNF786*	1.07e-03
226502_at	255520	*ELMOD2*	1.07e-03
224963_at	1836	*SLC26A2*	1.08e-03
203465_at	9801	*MRPL19*	1.08e-03
214672_at	23093	*TTLL5*	1.08e-03
239487_at	25940	*FAM98A*	1.08e-03
219515_at	56980	*PRDM10*	1.08e-03
232013_at	375748	*ERCC6L2*	1.08e-03
226137_at	463	*ZFHX3*	1.09e-03
213136_at	5771	*PTPN2*	1.09e-03
203732_at	9325	*TRIP4*	1.09e-03
212802_s_at	26130	*GAPVD1*	1.09e-03
228145_s_at	57541	*ZNF398*	1.09e-03
205964_at	79088	*ZNF426*	1.09e-03
226265_at	79832	*QSER1*	1.09e-03
220301_at	79839	*CCDC102B*	1.09e-03
207618_s_at	617	*BCS1L*	1.10e-03
217618_x_at	3364	*HUS1*	1.10e-03
235927_at	7514	*XPO1*	1.10e-03
201592_at	8667	*EIF3H*	1.10e-03
1554171_at	9203	*ZMYM3*	1.10e-03
226801_s_at	64853	*AIDA*	1.10e-03
214714_at	84124	*ZNF394*	1.10e-03
226779_at	92255	*LMBRD2*	1.10e-03
226126_at	93627	*TBCK*	1.10e-03
228764_s_at	145553	*MDP1*	1.10e-03
225550_at	163882	*CNST*	1.10e-03
228866_at	100507918	*LOC100507918*	1.10e-03
209225_x_at	3842	*TNPO1*	1.11e-03
202582_s_at	10048	*RANBP9*	1.11e-03
215017_s_at	54874	*FNBP1L*	1.11e-03
221820_s_at	84148	*KAT8*	1.11e-03
215978_x_at	170960	*ZNF721*	1.11e-03
1560201_at	349075	*ZNF713*	1.11e-03
206853_s_at	6885	*MAP3K7*	1.12e-03

203690_at	10426	*TUBGCP3*	1.12e-03
223416_at	51639	*SF3B14*	1.12e-03
221780_s_at	55661	*DDX27*	1.12e-03
222516_at	26985	*AP3M1*	1.13e-03
229885_at	51773	*RSF1*	1.13e-03
1554132_a_at	54462	*FAM190B*	1.13e-03
218862_at	79754	*ASB13*	1.13e-03
225565_at	1385	*CREB1*	1.14e-03
200880_at	3301	*DNAJA1*	1.14e-03
219822_at	9617	*MTRF1*	1.14e-03
202496_at	23644	*EDC4*	1.14e-03
218194_at	25996	*REXO2*	1.14e-03
232489_at	54482	*TRMT13*	1.14e-03
213526_s_at	55957	*LIN37*	1.14e-03
219136_s_at	64788	*LMF1*	1.14e-03
218940_at	79609	*METTL21D*	1.14e-03
201445_at	1266	*CNN3*	1.15e-03
212980_at	9736	*USP34*	1.15e-03
226934_at	11052	*CPSF6*	1.15e-03
225281_at	25871	*C3orf17*	1.15e-03
231825_x_at	55729	*ATF7IP*	1.15e-03
202412_s_at	7398	*USP1*	1.16e-03
243608_at	22796	*COG2*	1.16e-03
210268_at	4799	*NFX1*	1.17e-03
218583_s_at	54165	*DCUN1D1*	1.17e-03
232902_s_at	57038	*RARS2*	1.17e-03
226153_s_at	246175	*CNOT6L*	1.17e-03
202056_at	3836	*KPNA1*	1.18e-03
214056_at	4170	*MCL1*	1.18e-03
210694_s_at	4281	*MID1*	1.18e-03
226015_at	7559	*ZNF12*	1.18e-03
32062_at	9684	*LRRC14*	1.18e-03
232063_x_at	10056	*FARSB*	1.18e-03
217883_at	27249	*MMADHC*	1.18e-03
220761_s_at	51347	*TAOK3*	1.18e-03
209486_at	57050	*UTP3*	1.18e-03
204525_at	9678	*PHF14*	1.19e-03
205573_s_at	51375	*SNX7*	1.19e-03
228345_at	53344	*CHIC1*	1.19e-03
219286_s_at	64783	*RBM15*	1.19e-03

202353_s_at	5718	*PSMD12*	1.20e-03
213400_s_at	6907	*TBL1X*	1.20e-03
210251_s_at	22902	*RUFY3*	1.20e-03
243927_x_at	25962	*KIAA1429*	1.20e-03
227813_at	152815	*THAP6*	1.20e-03
208778_s_at	6950	*TCP1*	1.21e-03
212604_at	10240	*MRPS31*	1.21e-03
213940_s_at	23048	*FNBP1*	1.21e-03
237180_at	23198	*PSME4*	1.21e-03
202121_s_at	27243	*CHMP2A*	1.21e-03
222906_at	28982	*FLVCR1*	1.21e-03
218518_at	51306	*FAM13B*	1.21e-03
212529_at	124801	*LSM12*	1.21e-03
231234_at	1075	*CTSC*	1.22e-03
200066_at	3550	*IK*	1.22e-03
214047_s_at	8930	*MBD4*	1.22e-03
203738_at	55322	*C5orf22*	1.22e-03
218535_s_at	55781	*RIOK2*	1.22e-03
228953_at	123720	*WHAMM*	1.22e-03
200779_at	468	*ATF4*	1.23e-03
201183_s_at	1108	*CHD4*	1.23e-03
212753_at	10336	*PCGF3*	1.23e-03
203255_at	80204	*FBXO11*	1.23e-03
203138_at	8520	*HAT1*	1.24e-03
201098_at	9276	*COPB2*	1.24e-03
217990_at	51292	*GMPR2*	1.24e-03
222230_s_at	55860	*ACTR10*	1.24e-03
225296_at	57693	*ZNF317*	1.24e-03
212129_at	81614	*NIPA2*	1.24e-03
226011_at	151903	*CCDC12*	1.24e-03
226194_at	283489	*CHAMP1*	1.24e-03
222182_s_at	4848	*CNOT2*	1.25e-03
36545_s_at	9814	*SFI1*	1.25e-03
218716_x_at	25821	*MTO1*	1.25e-03
207483_s_at	55832	*CAND1*	1.25e-03
222837_s_at	80155	*NAA15*	1.25e-03
235879_at	4154	*MBNL1*	1.26e-03
235374_at	4190	*MDH1*	1.26e-03
234762_x_at	57486	*NLN*	1.26e-03
230000_at	57674	*RNF213*	1.26e-03

236022_at	80179	*MYO19*	1.26e-03
225920_at	148413	*LOC148413*	1.26e-03
238303_at	201595	*STT3B*	1.26e-03
1565651_at	375	*ARF1*	1.27e-03
221503_s_at	3839	*KPNA3*	1.27e-03
217864_s_at	8554	*PIAS1*	1.27e-03
226259_at	54536	*EXOC6*	1.27e-03
1553909_x_at	55719	*FAM178A*	1.27e-03
235133_at	79683	*ZDHHC14*	1.27e-03
1561676_at	100874243	*PRICKLE2-AS3*	1.27e-03
235213_at	3707	*ITPKB*	1.28e-03
209748_at	6683	*SPAST*	1.28e-03
224129_s_at	84661	*DPY30*	1.28e-03
213031_s_at	84942	*WDR73*	1.28e-03
243963_at	10806	*SDCCAG8*	1.29e-03
213554_s_at	55573	*CDV3*	1.29e-03
229433_at	64062	*RBM26*	1.29e-03
238436_s_at	390980	*ZNF805*	1.29e-03
203447_at	5711	*PSMD5*	1.30e-03
209106_at	8648	*NCOA1*	1.30e-03
222158_s_at	51029	*DESI2*	1.30e-03
217868_s_at	51108	*METTL9*	1.30e-03
232209_x_at	81502	*HM13*	1.30e-03
219292_at	55145	*THAP1*	1.31e-03
225534_at	114926	*C8orf40*	1.31e-03
204219_s_at	5700	*PSMC1*	1.32e-03
214375_at	8496	*PPFIBP1*	1.32e-03
218603_at	51696	*HECA*	1.32e-03
55093_at	54480	*CHPF2*	1.32e-03
1555411_a_at	57018	*CCNL1*	1.32e-03
225068_at	59349	*KLHL12*	1.32e-03
226449_at	153241	*CEP120*	1.32e-03
201824_at	9604	*RNF14*	1.33e-03
208970_s_at	7389	*UROD*	1.34e-03
213165_at	9857	*CEP350*	1.34e-03
220368_s_at	55671	*SMEK1*	1.34e-03
223480_s_at	57129	*MRPL47*	1.34e-03
213067_at	4628	*MYH10*	1.35e-03
226151_x_at	9946	*CRYZL1*	1.35e-03
214052_x_at	23215	*PRRC2C*	1.35e-03

233559_s_at	57590	WDFY1	1.35e-03
218740_s_at	80279	CDK5RAP3	1.35e-03
222264_at	221092	HNRNPUL2	1.35e-03
200692_s_at	3313	HSPA9	1.36e-03
200829_x_at	7756	ZNF207	1.36e-03
218503_at	54914	FOCAD	1.36e-03
222200_s_at	55108	BSDC1	1.36e-03
225110_at	55239	OGFOD1	1.36e-03
239771_at	55832	CAND1	1.36e-03
226922_at	5903	RANBP2	1.37e-03
203181_x_at	6733	SRPK2	1.37e-03
212652_s_at	8723	SNX4	1.37e-03
224654_at	9188	DDX21	1.37e-03
232864_s_at	27125	AFF4	1.37e-03
221774_x_at	55578	FAM48A	1.37e-03
218204_s_at	79443	FYCO1	1.37e-03
244443_at	1106	CHD2	1.38e-03
244515_at	5713	PSMD7	1.38e-03
201344_at	7322	UBE2D2	1.38e-03
38703_at	23549	DNPEP	1.38e-03
201856_s_at	51663	ZFR	1.38e-03
213015_at	56987	BBX	1.38e-03
200089_s_at	6124	RPL4	1.39e-03
201447_at	7072	TIA1	1.39e-03
204391_x_at	8805	TRIM24	1.39e-03
224971_at	51263	MRPL30	1.39e-03
41329_at	57147	SCYL3	1.39e-03
222311_s_at	57466	SCAF4	1.39e-03
213728_at	3916	LAMP1	1.40e-03
213511_s_at	8776	MTMR1	1.40e-03
209579_s_at	8930	MBD4	1.40e-03
1557759_at	55101	ATP5SL	1.40e-03
220840_s_at	55732	C1orf112	1.40e-03
242887_at	56888	KCMF1	1.40e-03
226352_at	133746	JMY	1.40e-03
242294_at	200933	FBXO45	1.40e-03
242903_at	3459	IFNGR1	1.41e-03
228284_at	7088	TLE1	1.41e-03
222585_x_at	51315	KRCC1	1.41e-03
213366_x_at	509	ATP5C1	1.42e-03

226084_at	4131	*MAP1B*	1.42e-03
242297_at	6239	*RREB1*	1.43e-03
209724_s_at	7541	*ZFP161*	1.43e-03
219297_at	54521	*WDR44*	1.43e-03
225643_at	93487	*MAPK1IP1L*	1.43e-03
226642_s_at	134492	*NUDCD2*	1.43e-03
243709_at	153129	*SLC38A9*	1.43e-03
202132_at	25937	*WWTR1*	1.44e-03
211930_at	220988	*HNRNPA3*	1.44e-03
228970_at	339487	*ZBTB8OS*	1.44e-03
236754_at	5504	*PPP1R2*	1.45e-03
229220_x_at	64434	*NOM1*	1.45e-03
224934_at	81555	*YIPF5*	1.45e-03
1566509_s_at	26268	*FBXO9*	1.46e-03
228713_s_at	51171	*HSD17B14*	1.46e-03
233893_s_at	57654	*UVSSA*	1.46e-03
1559893_at	253635	*CCDC75*	1.46e-03
225430_at	283459	*GATC*	1.46e-03
200073_s_at	3184	*HNRNPD*	1.47e-03
225120_at	5814	*PURB*	1.47e-03
202829_s_at	6845	*VAMP7*	1.47e-03
205526_s_at	11104	*KATNA1*	1.47e-03
220183_s_at	11162	*NUDT6*	1.47e-03
243985_at	2958	*GTF2A2*	1.48e-03
33760_at	5195	*PEX14*	1.48e-03
212301_at	23168	*RTF1*	1.48e-03
223287_s_at	27086	*FOXP1*	1.48e-03
223908_at	55869	*HDAC8*	1.48e-03
226321_at	116068	*LYSMD3*	1.48e-03
201345_s_at	7322	*UBE2D2*	1.49e-03
219177_at	55299	*BRIX1*	1.49e-03
217917_s_at	83658	*DYNLRB1*	1.49e-03
213049_at	253959	*RALGAPA1*	1.49e-03
244168_s_at	54986	*ULK4*	1.50e-03
218093_s_at	55608	*ANKRD10*	1.50e-03
209095_at	1738	*DLD*	1.51e-03
202082_s_at	6397	*SEC14L1*	1.51e-03
242477_at	158219	*TTC39B*	1.51e-03
218645_at	11179	*ZNF277*	1.52e-03
201948_at	29889	*GNL2*	1.52e-03

226343_at	54878	DPP8	1.52e-03
227049_at	284273	ZADH2	1.52e-03
209061_at	8202	NCOA3	1.53e-03
224494_x_at	51171	HSD17B14	1.53e-03
213734_at	55884	WSB2	1.53e-03
227485_at	203522	DDX26B	1.53e-03
210407_at	5494	PPM1A	1.54e-03
201499_s_at	7874	USP7	1.54e-03
212131_at	26065	LSM14A	1.54e-03
202978_s_at	58487	CREBZF	1.54e-03
226196_s_at	112752	IFT43	1.54e-03
204797_s_at	2009	EML1	1.55e-03
207573_x_at	10632	ATP5L	1.55e-03
201153_s_at	4154	MBNL1	1.56e-03
200032_s_at	6133	RPL9	1.56e-03
224718_at	7528	YY1	1.56e-03
215482_s_at	8890	EIF2B4	1.56e-03
214104_at	23432	GPR161	1.56e-03
1566191_at	23512	SUZ12	1.56e-03
222133_s_at	51105	PHF20L1	1.56e-03
231930_at	55531	ELMOD1	1.56e-03
223182_s_at	56894	AGPAT3	1.56e-03
244189_at	284900	TTC28-AS1	1.56e-03
211755_s_at	515	ATP5F1	1.57e-03
201134_x_at	1350	COX7C	1.57e-03
205340_at	9841	ZBTB24	1.57e-03
222788_s_at	54665	RSBN1	1.57e-03
218271_s_at	55486	PARL	1.57e-03
200051_at	9092	SART1	1.58e-03
204929_s_at	10791	VAMP5	1.58e-03
221791_s_at	51372	TMA7	1.58e-03
218877_s_at	60487	TRMT11	1.58e-03
211953_s_at	3843	IPO5	1.59e-03
209337_at	11168	PSIP1	1.59e-03
207728_at	55729	ATF7IP	1.59e-03
225626_at	55824	PAG1	1.59e-03
1552628_a_at	64224	HERPUD2	1.59e-03
223370_at	65977	PLEKHA3	1.59e-03
212596_s_at	10042	HMGXB4	1.60e-03
243051_at	29097	CNIH4	1.60e-03

226887_at	51182	HSPA14	1.60e-03
238831_at	55161	TMEM33	1.60e-03
213061_s_at	123803	NTAN1	1.60e-03
213062_at	123803	NTAN1	1.60e-03
203714_s_at	6905	TBCE	1.61e-03
213238_at	57205	ATP10D	1.61e-03
227101_at	168850	ZNF800	1.61e-03
1558458_at	401320	LOC401320	1.61e-03
236402_at	673	BRAF	1.62e-03
204349_at	9443	MED7	1.62e-03
215171_s_at	10440	TIMM17A	1.62e-03
200619_at	10992	SF3B2	1.62e-03
217894_at	51133	KCTD3	1.62e-03
242427_at	51322	WAC	1.62e-03
224782_at	153527	ZMAT2	1.62e-03
205062_x_at	5926	ARID4A	1.63e-03
203600_s_at	8603	FAM193A	1.63e-03
243649_at	25793	FBXO7	1.63e-03
217843_s_at	29079	MED4	1.63e-03
225215_s_at	54516	MTRF1L	1.63e-03
234929_s_at	55812	SPATA7	1.63e-03
226877_at	132241	RPL32P3	1.63e-03
226333_at	3570	IL6R	1.64e-03
225537_at	122553	TRAPPC6B	1.64e-03
226127_at	221120	ALKBH3	1.64e-03
225563_at	255967	PAN3	1.64e-03
200735_x_at	4666	NACA	1.65e-03
204937_s_at	10782	ZNF274	1.65e-03
228785_at	23528	ZNF281	1.65e-03
224513_s_at	56893	UBQLN4	1.65e-03
235812_at	255919	CNEP1R1	1.65e-03
213491_x_at	6185	RPN2	1.66e-03
229980_s_at	27131	SNX5	1.66e-03
232087_at	256643	CXorf23	1.66e-03
227689_at	7770	ZNF227	1.67e-03
203250_at	22828	SCAF8	1.67e-03
209285_s_at	23272	FAM208A	1.67e-03
222684_s_at	79954	NOL10	1.67e-03
223248_at	83693	HSDL1	1.67e-03
230972_at	122416	ANKRD9	1.67e-03

209056_s_at	988	*CDC5L*	1.68e-03
242248_at	5257	*PHKB*	1.68e-03
204453_at	7637	*ZNF84*	1.68e-03
213983_s_at	23244	*PDS5A*	1.68e-03
218803_at	55743	*CHFR*	1.68e-03
226230_at	57223	*SMEK2*	1.68e-03
225222_at	64645	*HIAT1*	1.68e-03
242021_at	7494	*XBP1*	1.69e-03
201960_s_at	23077	*MYCBP2*	1.69e-03
209020_at	51526	*C20orf111*	1.69e-03
225814_at	54464	*XRN1*	1.69e-03
215057_at	100272228	*LOC100272228*	1.69e-03
218563_at	4696	*NDUFA3*	1.70e-03
223358_s_at	5150	*PDE7A*	1.70e-03
211769_x_at	10955	*SERINC3*	1.70e-03
236696_at	23350	*U2SURP*	1.70e-03
218483_s_at	56912	*IFT46*	1.70e-03
213365_at	112479	*ERI2*	1.70e-03
202758_s_at	8625	*RFXANK*	1.71e-03
202798_at	10427	*SEC24B*	1.71e-03
214009_at	10943	*MSL3*	1.71e-03
227418_at	84437	*MSANTD4*	1.71e-03
237291_at	344405	*PRORSD1P*	1.71e-03
223940_x_at	378938	*MALAT1*	1.71e-03
201007_at	3032	*HADHB*	1.72e-03
219350_s_at	56616	*DIABLO*	1.72e-03
238787_at	163486	*DENND1B*	1.72e-03
225463_x_at	653519	*GPR89A*	1.72e-03
210093_s_at	4116	*MAGOH*	1.73e-03
218659_at	55252	*ASXL2*	1.73e-03
227852_at	6100	*RP9*	1.74e-03
215611_at	6938	*TCF12*	1.74e-03
213659_at	7626	*ZNF75D*	1.74e-03
219244_s_at	26589	*MRPL46*	1.74e-03
217737_x_at	51507	*C20orf43*	1.74e-03
227471_at	57531	*HACE1*	1.74e-03
202051_s_at	9202	*ZMYM4*	1.75e-03
204176_at	27252	*KLHL20*	1.75e-03
222310_at	57466	*SCAF4*	1.75e-03
230747_s_at	125488	*TTC39C*	1.75e-03

202451_at	2965	*GTF2H1*	1.76e-03
200771_at	3915	*LAMC1*	1.76e-03
202413_s_at	7398	*USP1*	1.76e-03
203916_at	8509	*NDST2*	1.76e-03
203650_at	10544	*PROCR*	1.76e-03
213623_at	11127	*KIF3A*	1.76e-03
210028_s_at	23595	*ORC3*	1.76e-03
226581_at	64145	*ZFYVE20*	1.76e-03
226273_at	1184	*CLCN5*	1.77e-03
212683_at	9673	*SLC25A44*	1.77e-03
210616_s_at	22872	*SEC31A*	1.77e-03
221776_s_at	29117	*BRD7*	1.77e-03
1554981_at	54586	*C9orf11*	1.77e-03
218459_at	64222	*TOR3A*	1.77e-03
1557176_a_at	145407	*C14orf37*	1.77e-03
238077_at	200845	*KCTD6*	1.77e-03
208635_x_at	4666	*NACA*	1.78e-03
1557227_s_at	7175	*TPR*	1.78e-03
204000_at	10681	*GNB5*	1.78e-03
233665_x_at	25821	*MTO1*	1.78e-03
224914_s_at	84324	*SARNP*	1.78e-03
215203_at	2803	*GOLGA4*	1.79e-03
203327_at	3416	*IDE*	1.79e-03
1552329_at	5930	*RBBP6*	1.79e-03
202372_at	25782	*RAB3GAP2*	1.79e-03
242389_at	51747	*LUC7L3*	1.79e-03
223015_at	83939	*EIF2A*	1.79e-03
218497_s_at	246243	*RNASEH1*	1.79e-03
202420_s_at	1660	*DHX9*	1.80e-03
241905_at	5286	*PIK3C2A*	1.80e-03
227188_at	59271	*FAM176C*	1.80e-03
223662_x_at	83479	*DDX59*	1.80e-03
225649_s_at	140901	*STK35*	1.80e-03
212097_at	857	*CAV1*	1.81e-03
204840_s_at	8411	*EEA1*	1.81e-03
231939_s_at	55814	*BDP1*	1.81e-03
232065_x_at	91687	*CENPL*	1.81e-03
226939_at	132864	*CPEB2*	1.81e-03
1558620_at	285268	*ZNF621*	1.81e-03
201553_s_at	3916	*LAMP1*	1.82e-03

203263_s_at	23229	*ARHGEF9*	1.82e-03
201846_s_at	23429	*RYBP*	1.82e-03
243519_at	9690	*UBE3C*	1.83e-03
223650_s_at	29982	*NRBF2*	1.83e-03
221706_s_at	55850	*USE1*	1.83e-03
217970_s_at	57472	*CNOT6*	1.83e-03
202920_at	287	*ANK2*	1.84e-03
213845_at	2898	*GRIK2*	1.84e-03
219451_at	22921	*MSRB2*	1.84e-03
222589_at	51701	*NLK*	1.84e-03
230270_at	55119	*PRPF38B*	1.84e-03
232551_at	65010	*SLC26A6*	1.84e-03
215210_s_at	1743	*DLST*	1.85e-03
200015_s_at	4735	*SEPT2*	1.85e-03
201454_s_at	9520	*NPEPPS*	1.85e-03
239283_at	50999	*TMED5*	1.85e-03
223294_at	51260	*CXorf26*	1.85e-03
222629_at	51455	*REV1*	1.85e-03
225022_at	57120	*GOPC*	1.85e-03
219029_at	64417	*C5orf28*	1.85e-03
242864_at	115196	*ZNF554*	1.85e-03
209330_s_at	3184	*HNRNPD*	1.86e-03
214306_at	4976	*OPA1*	1.86e-03
201997_s_at	23013	*SPEN*	1.86e-03
217953_at	23469	*PHF3*	1.86e-03
1552644_a_at	80012	*PHC3*	1.86e-03
200691_s_at	3313	*HSPA9*	1.87e-03
224621_at	5594	*MAPK1*	1.87e-03
203909_at	10479	*SLC9A6*	1.87e-03
231899_at	85463	*ZC3H12C*	1.87e-03
242562_at	120526	*DNAJC24*	1.87e-03
236487_at	132320	*SCLT1*	1.87e-03
235810_at	7569	*ZNF182*	1.88e-03
243361_at	140890	*SREK1*	1.88e-03
222390_at	51322	*WAC*	1.89e-03
229632_s_at	55174	*INTS10*	1.89e-03
1553928_at	255520	*ELMOD2*	1.89e-03
208152_s_at	9188	*DDX21*	1.90e-03
209175_at	11196	*SEC23IP*	1.90e-03
238599_at	134728	*IRAK1BP1*	1.90e-03

211042_x_at	4162	*MCAM*	1.91e-03
215684_s_at	84164	*ASCC2*	1.91e-03
201972_at	523	*ATP6V1A*	1.92e-03
200873_s_at	10694	*CCT8*	1.92e-03
224873_s_at	64432	*MRPS25*	1.92e-03
228183_s_at	84268	*RPAIN*	1.92e-03
207877_s_at	4931	*NVL*	1.93e-03
209849_s_at	5889	*RAD51C*	1.93e-03
218562_s_at	55219	*TMEM57*	1.93e-03
226975_at	55599	*RNPC3*	1.93e-03
222701_s_at	79145	*CHCHD7*	1.93e-03
227960_s_at	81889	*FAHD1*	1.93e-03
1569110_x_at	728613	*LOC728613*	1.93e-03
211944_at	23215	*PRRC2C*	1.94e-03
217878_s_at	996	*CDC27*	1.95e-03
212078_s_at	4297	*MLL*	1.95e-03
204788_s_at	5498	*PPOX*	1.95e-03
202244_at	5692	*PSMB4*	1.95e-03
1560029_a_at	55216	*C11orf57*	1.95e-03
217853_at	64759	*TNS3*	1.95e-03
225971_at	80821	*DDHD1*	1.95e-03
244110_at	4297	*MLL*	1.96e-03
222479_s_at	51143	*DYNC1LI1*	1.96e-03
217898_at	56851	*EMC7*	1.96e-03
230243_at	93587	*TRMT10A*	1.96e-03
237725_x_at	23137	*SMC5*	1.97e-03
242433_at	27107	*ZBTB11*	1.97e-03
228502_at	27330	*RPS6KA6*	1.97e-03
239355_at	64395	*GMCL1*	1.97e-03
55662_at	79591	*C10orf76*	1.97e-03
218457_s_at	1788	*DNMT3A*	1.98e-03
213507_s_at	3837	*KPNB1*	1.98e-03
218070_s_at	29926	*GMPPA*	1.98e-03
224768_at	55677	*IWS1*	1.98e-03
218270_at	79590	*MRPL24*	1.98e-03
211316_x_at	8837	*CFLAR*	1.99e-03
222427_s_at	51520	*LARS*	1.99e-03
235787_at	55664	*CDC37L1*	1.99e-03
228515_at	90784	*LOC90784*	1.99e-03
223808_s_at	114971	*PTPMT1*	1.99e-03

1558794_at	728190	*LOC728190*	1.99e-03
1558501_at	26052	*DNM3*	2.00e-03
223068_at	27436	*EML4*	2.00e-03
222708_s_at	55014	*STX17*	2.00e-03
219166_at	55172	*DNAAF2*	2.00e-03
213501_at	51	*ACOX1*	2.01e-03
217951_s_at	23469	*PHF3*	2.01e-03
214496_x_at	23522	*KAT6B*	2.01e-03
219504_s_at	79871	*RPAP2*	2.01e-03
226323_at	91603	*ZNF830*	2.01e-03
203531_at	8065	*CUL5*	2.02e-03
218090_s_at	55717	*WDR11*	2.02e-03
221559_s_at	79003	*MIS12*	2.02e-03
217913_at	27183	*VPS4A*	2.03e-03
227980_at	79692	*ZNF322*	2.03e-03
204523_at	7699	*ZNF140*	2.04e-03
231896_s_at	8562	*DENR*	2.04e-03
204894_s_at	8639	*AOC3*	2.04e-03
201965_s_at	23064	*SETX*	2.04e-03
212310_at	375056	*MIA3*	2.04e-03
222104_x_at	2967	*GTF2H3*	2.05e-03
233025_at	23037	*PDZD2*	2.05e-03
212926_at	23137	*SMC5*	2.05e-03
228332_s_at	280636	*C11orf31*	2.05e-03
219288_at	57415	*C3orf14*	2.06e-03
224683_at	84893	*FBXO18*	2.06e-03
231844_at	157247	*MGC27345*	2.06e-03
204295_at	6834	*SURF1*	2.07e-03
65472_at	388969	*C2orf68*	2.07e-03
213419_at	323	*APBB2*	2.08e-03
212540_at	997	*CDC34*	2.08e-03
222623_s_at	51193	*ZNF639*	2.08e-03
209219_at	7936	*RDBP*	2.09e-03
229344_x_at	57494	*RIMKLB*	2.09e-03
219163_at	54811	*ZNF562*	2.10e-03
223189_x_at	55904	*MLL5*	2.10e-03
223439_at	79576	*NKAP*	2.10e-03
223267_at	54931	*TRMT10C*	2.11e-03
203590_at	1783	*DYNC1LI2*	2.12e-03
227510_x_at	378938	*MALAT1*	2.12e-03

213993_at	10418	*SPON1*	2.13e-03
201608_s_at	11137	*PWP1*	2.13e-03
228184_at	84976	*DISP1*	2.13e-03
201441_at	1340	*COX6B1*	2.14e-03
209433_s_at	5471	*PPAT*	2.14e-03
213027_at	6738	*TROVE2*	2.14e-03
201449_at	7072	*TIA1*	2.14e-03
229642_at	8874	*ARHGEF7*	2.14e-03
225455_at	117143	*TADA1*	2.14e-03
212918_at	5965	*RECQL*	2.15e-03
210379_s_at	9874	*TLK1*	2.15e-03
203301_s_at	9988	*DMTF1*	2.15e-03
243295_at	54439	*RBM27*	2.15e-03
227931_at	54891	*INO80D*	2.15e-03
232371_at	64844	*MARCH7*	2.15e-03
220933_s_at	79670	*ZCCHC6*	2.15e-03
1565717_s_at	2521	*FUS*	2.16e-03
202077_at	4706	*NDUFAB1*	2.16e-03
226209_at	4731	*NDUFV3*	2.16e-03
212513_s_at	23032	*USP33*	2.16e-03
225724_at	379025	*FLJ31306*	2.16e-03
238432_at	649446	*DLGAP1-AS1*	2.16e-03
231370_at	5494	*PPM1A*	2.17e-03
210460_s_at	5710	*PSMD4*	2.17e-03
203594_at	8634	*RTCA*	2.17e-03
204324_s_at	27333	*GOLIM4*	2.17e-03
208424_s_at	57019	*CIAPIN1*	2.17e-03
224908_s_at	150465	*TTL*	2.17e-03
214224_s_at	5303	*PIN4*	2.18e-03
209296_at	5495	*PPM1B*	2.18e-03
203981_s_at	5826	*ABCD4*	2.18e-03
214988_s_at	6651	*SON*	2.18e-03
229307_at	23243	*ANKRD28*	2.18e-03
202184_s_at	55746	*NUP133*	2.18e-03
218713_at	79664	*NARG2*	2.18e-03
227111_at	403341	*ZBTB34*	2.18e-03
202055_at	3836	*KPNA1*	2.19e-03
213328_at	4750	*NEK1*	2.19e-03
228545_at	7707	*ZNF148*	2.19e-03
204809_at	10845	*CLPX*	2.19e-03

219296_at	54503	*ZDHHC13*	2.19e-03
1555384_a_at	113251	*LARP4*	2.19e-03
200726_at	5501	*PPP1CC*	2.20e-03
224900_at	51479	*ANKFY1*	2.20e-03
225819_at	84897	*TBRG1*	2.20e-03
229640_x_at	100996930	*LINC00621*	2.20e-03
214170_x_at	2271	*FH*	2.21e-03
205427_at	6940	*ZNF354A*	2.21e-03
210149_s_at	10476	*ATP5H*	2.21e-03
224761_at	10672	*GNA13*	2.21e-03
209524_at	50810	*HDGFRP3*	2.21e-03
225748_at	84946	*LTV1*	2.21e-03
210664_s_at	7035	*TFPI*	2.22e-03
203656_at	9896	*FIG4*	2.22e-03
209796_s_at	10330	*CNPY2*	2.22e-03
204700_x_at	27042	*DIEXF*	2.22e-03
221046_s_at	29083	*GTPBP8*	2.22e-03
221766_s_at	55603	*FAM46A*	2.22e-03
221277_s_at	83480	*PUS3*	2.22e-03
213315_x_at	91966	*CXorf40A*	2.22e-03
224861_at	2776	*GNAQ*	2.23e-03
201477_s_at	6240	*RRM1*	2.23e-03
203515_s_at	10654	*PMVK*	2.23e-03
215136_s_at	11340	*EXOSC8*	2.23e-03
244546_at	54205	*CYCS*	2.23e-03
224721_at	84128	*WDR75*	2.23e-03
203376_at	51362	*CDC40*	2.24e-03
226496_at	84186	*ZCCHC7*	2.24e-03
210180_s_at	6434	*TRA2B*	2.25e-03
223592_s_at	84282	*RNF135*	2.25e-03
215268_at	643314	*KIAA0754*	2.25e-03
209107_x_at	8648	*NCOA1*	2.26e-03
227595_at	9204	*ZMYM6*	2.26e-03
1560014_s_at	23042	*PDXDC1*	2.26e-03
212204_at	25963	*TMEM87A*	2.26e-03
223387_at	53349	*ZFYVE1*	2.26e-03
214659_x_at	56252	*YLPM1*	2.26e-03
229872_s_at	100132999	*LOC100132999*	2.26e-03
204640_s_at	8405	*SPOP*	2.27e-03
1554154_at	54834	*GDAP2*	2.27e-03

244761_at	401207	*C5orf63*	2.27e-03
232909_s_at	2186	*BPTF*	2.28e-03
60815_at	84820	*POLR2J4*	2.28e-03
200910_at	7203	*CCT3*	2.29e-03
206095_s_at	10772	*SRSF10*	2.29e-03
201214_s_at	5510	*PPP1R7*	2.30e-03
209358_at	6882	*TAF11*	2.30e-03
202090_s_at	10975	*UQCR11*	2.30e-03
218314_s_at	55216	*C11orf57*	2.30e-03
224938_at	57532	*NUFIP2*	2.30e-03
1553978_at	729991	*MEF2BNB*	2.30e-03
217768_at	51637	*C14orf166*	2.31e-03
227407_at	202018	*TAPT1*	2.31e-03
209442_x_at	288	*ANK3*	2.32e-03
200621_at	1465	*CSRP1*	2.32e-03
204177_s_at	27252	*KLHL20*	2.32e-03
219715_s_at	55775	*TDP1*	2.32e-03
232272_at	57547	*ZNF624*	2.32e-03
225611_at	375449	*MAST4*	2.32e-03
226430_at	768211	*RELL1*	2.32e-03
214778_at	1954	*MEGF8*	2.33e-03
225164_s_at	440275	*EIF2AK4*	2.33e-03
223213_s_at	11244	*ZHX1*	2.34e-03
232297_at	51088	*KLHL5*	2.34e-03
213392_at	124152	*IQCK*	2.34e-03
231866_at	4012	*LNPEP*	2.35e-03
226115_at	25909	*AHCTF1*	2.36e-03
207098_s_at	55669	*MFN1*	2.36e-03
223134_at	56987	*BBX*	2.36e-03
223288_at	84640	*USP38*	2.36e-03
202573_at	1455	*CSNK1G2*	2.37e-03
202126_at	8899	*PRPF4B*	2.37e-03
1555199_at	9527	*GOSR1*	2.37e-03
210944_s_at	825	*CAPN3*	2.38e-03
229115_at	1778	*DYNC1H1*	2.38e-03
200690_at	3313	*HSPA9*	2.38e-03
227542_at	9306	*SOCS6*	2.38e-03
201845_s_at	23429	*RYBP*	2.38e-03
1553957_at	163050	*ZNF564*	2.38e-03
211988_at	6605	*SMARCE1*	2.39e-03

214527_s_at	10084	*PQBP1*	2.39e-03
201707_at	5824	*PEX19*	2.40e-03
218111_s_at	55907	*CMAS*	2.40e-03
210528_at	3140	*MR1*	2.41e-03
239895_at	9716	*AQR*	2.41e-03
221021_s_at	56259	*CTNNBL1*	2.41e-03
221692_s_at	64981	*MRPL34*	2.41e-03
217902_s_at	8924	*HERC2*	2.42e-03
223527_s_at	81602	*CDADC1*	2.42e-03
1553693_s_at	84869	*CBR4*	2.42e-03
50374_at	339229	*OXLD1*	2.42e-03
226203_at	4649	*MYO9A*	2.43e-03
223598_at	5887	*RAD23B*	2.43e-03
202034_x_at	9821	*RB1CC1*	2.43e-03
214512_s_at	10923	*SUB1*	2.43e-03
223002_s_at	22803	*XRN2*	2.43e-03
201186_at	4043	*LRPAP1*	2.44e-03
228613_at	9727	*RAB11FIP3*	2.44e-03
202948_at	3554	*IL1R1*	2.45e-03
200844_s_at	9588	*PRDX6*	2.45e-03
202811_at	10617	*STAMBP*	2.45e-03
214843_s_at	23032	*USP33*	2.45e-03
227191_at	81533	*ITFG1*	2.45e-03
225171_at	93663	*ARHGAP18*	2.45e-03
226195_at	112752	*IFT43*	2.45e-03
213292_s_at	23161	*SNX13*	2.46e-03
213729_at	55660	*PRPF40A*	2.46e-03
203532_x_at	8065	*CUL5*	2.47e-03
220367_s_at	79595	*SAP130*	2.48e-03
1566558_x_at	440465	*BAIAP2-AS1*	2.48e-03
205105_at	4124	*MAN2A1*	2.49e-03
208724_s_at	5861	*RAB1A*	2.49e-03
202406_s_at	7073	*TIAL1*	2.49e-03
203651_at	9765	*ZFYVE16*	2.49e-03
224591_at	50809	*HP1BP3*	2.49e-03
224369_s_at	81545	*FBXO38*	2.49e-03
227699_at	112849	*L3HYPDH*	2.49e-03
212584_at	9716	*AQR*	2.50e-03
209704_at	22823	*MTF2*	2.50e-03
213761_at	56890	*MDM1*	2.50e-03

231987_at	728264	MIR143HG	2.50e-03
220553_s_at	55015	PRPF39	2.51e-03
218478_s_at	55596	ZCCHC8	2.51e-03
227698_s_at	57799	RAB40C	2.51e-03
230679_at	79269	DCAF10	2.51e-03
201786_s_at	103	ADAR	2.52e-03
215016_x_at	667	DST	2.52e-03
201748_s_at	6294	SAFB	2.52e-03
225824_at	8812	CCNK	2.52e-03
239185_at	10350	ABCA9	2.52e-03
219345_at	51027	BOLA1	2.53e-03
223382_s_at	84937	ZNRF1	2.54e-03
228211_at	375748	ERCC6L2	2.54e-03
219553_at	29922	NME7	2.55e-03
203897_at	57149	LYRM1	2.55e-03
235940_at	84267	C9orf64	2.55e-03
235347_at	84859	LRCH3	2.55e-03
227200_at	2117	ETV3	2.56e-03
242290_at	6867	TACC1	2.56e-03
213794_s_at	25983	NGDN	2.56e-03
227160_s_at	79133	NDUFAF5	2.56e-03
227426_at	6654	SOS1	2.57e-03
213229_at	23405	DICER1	2.57e-03
203487_s_at	25852	ARMC8	2.57e-03
224569_s_at	359948	IRF2BP2	2.57e-03
227056_at	9812	KIAA0141	2.58e-03
212572_at	23012	STK38L	2.58e-03
215693_x_at	55661	DDX27	2.58e-03
201569_s_at	25813	SAMM50	2.59e-03
221741_s_at	54915	YTHDF1	2.59e-03
219335_at	64860	ARMCX5	2.59e-03
213320_at	10196	PRMT3	2.60e-03
212207_at	23389	MED13L	2.60e-03
202170_s_at	60496	AASDHPPT	2.60e-03
226689_at	493856	CISD2	2.60e-03
224822_at	10395	DLC1	2.61e-03
209492_x_at	521	ATP5I	2.62e-03
211951_at	9221	NOLC1	2.62e-03
227575_s_at	55051	C14orf102	2.62e-03
218248_at	63901	FAM111A	2.62e-03

1559848_at	387338	*NSUN4*	2.62e-03
201164_s_at	9698	*PUM1*	2.63e-03
201518_at	10951	*CBX1*	2.63e-03
230129_at	118672	*PSTK*	2.63e-03
213860_x_at	1452	*CSNK1A1*	2.64e-03
213926_s_at	3267	*AGFG1*	2.64e-03
203893_at	6880	*TAF9*	2.64e-03
239948_at	9972	*NUP153*	2.64e-03
218431_at	63894	*VIPAS39*	2.64e-03
225498_at	128866	*CHMP4B*	2.64e-03
242512_at	4649	*MYO9A*	2.65e-03
200023_s_at	8665	*EIF3F*	2.65e-03
215123_at	23117	*NPIPL3*	2.65e-03
201054_at	10949	*HNRNPA0*	2.66e-03
212997_s_at	11011	*TLK2*	2.66e-03
222826_at	26258	*BLOC1S6*	2.66e-03
229419_at	55294	*FBXW7*	2.66e-03
204571_x_at	5303	*PIN4*	2.67e-03
214221_at	7840	*ALMS1*	2.67e-03
220044_x_at	51747	LUC7L3	2.67e-03
211563_s_at	8725	*URI1*	2.68e-03
227751_at	9141	*PDCD5*	2.68e-03
1559822_s_at	92140	*MTDH*	2.68e-03
225166_at	93663	*ARHGAP18*	2.68e-03
223028_s_at	51429	*SNX9*	2.69e-03
32541_at	5533	*PPP3CC*	2.70e-03
208794_s_at	6597	*SMARCA4*	2.70e-03
205726_at	1730	*DIAPH2*	2.71e-03
214853_s_at	6464	*SHC1*	2.71e-03
205089_at	7553	*ZNF7*	2.71e-03
209922_at	8315	*BRAP*	2.71e-03
222890_at	29070	*CCDC113*	2.71e-03
215088_s_at	6391	*SDHC*	2.72e-03
213922_at	146057	*TTBK2*	2.72e-03
205435_s_at	22848	*AAK1*	2.73e-03
235346_at	139341	*FUNDC1*	2.73e-03
1554448_at	554203	*JPX*	2.73e-03
201424_s_at	8451	*CUL4A*	2.74e-03
209286_at	10602	*CDC42EP3*	2.74e-03
1555571_at	83943	*IMMP2L*	2.74e-03

232127_at	1184	*CLCN5*	2.75e-03
218304_s_at	114885	*OSBPL11*	2.75e-03
232441_at	11103	*KRR1*	2.76e-03
218669_at	57826	*RAP2C*	2.76e-03
216697_at	7204	*TRIO*	2.77e-03
202466_at	11044	*PAPD7*	2.77e-03
212765_at	23271	*CAMSAP2*	2.77e-03
223270_at	51496	*CTDSPL2*	2.77e-03
223217_s_at	64332	*NFKBIZ*	2.77e-03
238693_at	80012	*PHC3*	2.77e-03
218775_s_at	80014	*WWC2*	2.77e-03
227871_at	1121	*CHM*	2.78e-03
204791_at	7181	*NR2C1*	2.78e-03
232180_at	7360	*UGP2*	2.78e-03
213239_at	10464	*PIBF1*	2.78e-03
209254_at	23008	*KLHDC10*	2.78e-03
237444_at	63971	*KIF13A*	2.78e-03
225380_at	91461	*PKDCC*	2.78e-03
235955_at	153562	*MARVELD2*	2.78e-03
224497_x_at	51171	*HSD17B14*	2.79e-03
222808_at	79868	*ALG13*	2.79e-03
212530_at	140609	*NEK7*	2.79e-03
203566_s_at	178	*AGL*	2.80e-03
223297_at	83607	*AMMECR1L*	2.80e-03
1569126_at	892	*CCNC*	2.81e-03
202003_s_at	10449	*ACAA2*	2.81e-03
203567_s_at	10475	*TRIM38*	2.82e-03
209510_at	11236	*RNF139*	2.82e-03
212503_s_at	22982	*DIP2C*	2.82e-03
212961_x_at	541578	*CXorf40B*	2.82e-03
200977_s_at	8887	*TAX1BP1*	2.83e-03
212650_at	23301	*EHBP1*	2.83e-03
225702_at	84933	*C8orf76*	2.83e-03
238783_at	153396	*TMEM161B*	2.83e-03
200837_at	10134	*BCAP31*	2.84e-03
201022_s_at	11034	*DSTN*	2.84e-03
208706_s_at	1983	*EIF5*	2.85e-03
214917_at	5562	*PRKAA1*	2.85e-03
200025_s_at	6155	*RPL27*	2.85e-03
222787_s_at	54664	*TMEM106B*	2.85e-03

221736_at	57148	*RALGAPB*	2.85e-03
201114_x_at	5688	*PSMA7*	2.86e-03
212470_at	9043	*SPAG9*	2.86e-03
219906_at	55096	*EBLN2*	2.86e-03
213430_at	22902	*RUFY3*	2.87e-03
218977_s_at	54952	*TRNAU1AP*	2.87e-03
211015_s_at	3308	*HSPA4*	2.88e-03
210145_at	5321	*PLA2G4A*	2.88e-03
238560_at	10241	*CALCOCO2*	2.88e-03
203428_s_at	25842	*ASF1A*	2.88e-03
234936_s_at	57545	*CC2D2A*	2.88e-03
224778_s_at	57551	*TAOK1*	2.88e-03
223114_at	84274	*COQ5*	2.88e-03
212457_at	7030	*TFE3*	2.89e-03
214193_s_at	27042	*DIEXF*	2.89e-03
218413_s_at	51193	*ZNF639*	2.89e-03
224250_s_at	79048	*SECISBP2*	2.89e-03
224416_s_at	80306	*MED28*	2.89e-03
208805_at	5687	*PSMA6*	2.90e-03
202304_at	22862	*FNDC3A*	2.90e-03
213641_at	26048	*ZNF500*	2.90e-03
217370_x_at	2521	*FUS*	2.91e-03
235146_at	57458	*TMCC3*	2.91e-03
219174_at	80173	*IFT74*	2.91e-03
223269_at	84265	*POLR3GL*	2.91e-03
221135_s_at	28990	*ASTE1*	2.92e-03
214730_s_at	2734	*GLG1*	2.93e-03
223022_s_at	51534	*VTA1*	2.93e-03
235606_at	344595	*LOC344595*	2.93e-03
205452_at	9488	*PIGB*	2.94e-03
200000_s_at	10594	*PRPF8*	2.94e-03
213440_at	5861	*RAB1A*	2.95e-03
218206_x_at	51282	*SCAND1*	2.95e-03
219842_at	54622	*ARL15*	2.95e-03
226155_at	57700	*FAM160B1*	2.95e-03
203102_s_at	4247	*MGAT2*	2.96e-03
204300_at	5188	*PET112*	2.96e-03
238909_at	6281	*S100A10*	2.96e-03
201947_s_at	10576	*CCT2*	2.96e-03
33494_at	2110	*ETFDH*	2.97e-03

226048_at	5599	*MAPK8*	2.97e-03
222026_at	5935	*RBM3*	2.97e-03
222720_x_at	54953	*C1orf27*	2.97e-03
226521_s_at	84142	*FAM175A*	2.97e-03
201257_x_at	6189	*RPS3A*	2.98e-03
225084_at	10640	*EXOC5*	2.98e-03
230656_s_at	84916	*CIRH1A*	2.98e-03
221193_s_at	54819	*ZCCHC10*	2.99e-03
222553_x_at	55074	*OXR1*	2.99e-03
222001_x_at	728855	*LINC00623*	2.99e-03
212533_at	7465	*WEE1*	3.00e-03
225562_at	22821	*RASA3*	3.00e-03
218339_at	29093	*MRPL22*	3.00e-03
208882_s_at	51366	*UBR5*	3.00e-03
218187_s_at	65265	*C8orf33*	3.00e-03
226872_at	5990	*RFX2*	3.01e-03
218470_at	51067	*YARS2*	3.01e-03
221782_at	54431	*DNAJC10*	3.01e-03
209743_s_at	83737	*ITCH*	3.01e-03
224504_s_at	84811	*BUD13*	3.01e-03
232918_at	541471	*LOC541471*	3.01e-03
1557566_at	100507634	*LOC100507634*	3.01e-03
225302_at	54495	*TMX3*	3.02e-03
226970_at	254170	*FBXO33*	3.02e-03
242471_at	647135	*SRGAP2B*	3.02e-03
234982_at	130507	*UBR3*	3.03e-03
239596_at	148867	*SLC30A7*	3.03e-03
219030_at	51002	*TPRKB*	3.04e-03
222467_s_at	55291	*PPP6R3*	3.04e-03
205345_at	580	*BARD1*	3.05e-03
222028_at	7596	*ZNF45*	3.05e-03
220127_s_at	54850	*FBXL12*	3.05e-03
230071_at	55752	*SEPT11*	3.05e-03
228442_at	4773	*NFATC2*	3.06e-03
203329_at	5797	*PTPRM*	3.06e-03
204559_s_at	51690	*LSM7*	3.06e-03
201241_at	1653	*DDX1*	3.07e-03
222815_at	51132	*RLIM*	3.08e-03
219206_x_at	51643	*TMBIM4*	3.08e-03
229193_at	51747	*LUC7L3*	3.08e-03

212000_at	10147	*SUGP2*	3.10e-03
211386_at	84786	*MGC12488*	3.10e-03
214264_s_at	90141	*EFCAB11*	3.10e-03
244828_x_at	92345	*NAF1*	3.10e-03
225014_at	389203	*C4orf52*	3.10e-03
225796_at	54899	*PXK*	3.11e-03
219146_at	79736	*TEFM*	3.11e-03
244121_at	130507	*UBR3*	3.11e-03
208705_s_at	1983	*EIF5*	3.12e-03
226330_s_at	55578	*FAM48A*	3.12e-03
241727_x_at	200895	*DHFRL1*	3.12e-03
202396_at	10915	*TCERG1*	3.13e-03
225675_at	54916	*C14orf101*	3.13e-03
1569142_at	10206	*TRIM13*	3.14e-03
225017_at	64770	*CCDC14*	3.14e-03
202309_at	4522	*MTHFD1*	3.15e-03
212804_s_at	26130	*GAPVD1*	3.15e-03
232630_at	51074	*APIP*	3.15e-03
226637_at	7328	*UBE2H*	3.16e-03
229813_x_at	26528	*DAZAP1*	3.16e-03
1553993_s_at	81857	*MED25*	3.16e-03
222464_s_at	79892	*MCMBP*	3.17e-03
204173_at	140465	*MYL6B*	3.17e-03
202352_s_at	5718	*PSMD12*	3.19e-03
218760_at	51004	*COQ6*	3.19e-03
222580_at	84146	*ZNF644*	3.19e-03
208615_s_at	8073	*PTP4A2*	3.20e-03
225321_s_at	29990	*PILRB*	3.20e-03
1566557_at	440465	*BAIAP2-AS1*	3.20e-03
225037_at	51006	*SLC35C2*	3.21e-03
212744_at	585	*BBS4*	3.22e-03
225740_x_at	4194	*MDM4*	3.22e-03
39729_at	7001	*PRDX2*	3.22e-03
1554158_at	10771	*ZMYND11*	3.22e-03
239917_at	23355	*VPS8*	3.23e-03
225326_at	54439	*RBM27*	3.23e-03
212910_at	57215	*THAP11*	3.23e-03
214722_at	388677	*NOTCH2NL*	3.23e-03
214709_s_at	3895	*KTN1*	3.24e-03
222552_at	51026	*GOLT1B*	3.24e-03

241816_at	55320	*MIS18BP1*	3.24e-03
206335_at	2588	*GALNS*	3.25e-03
227075_at	55140	*ELP3*	3.25e-03
234295_at	51163	*DBR1*	3.26e-03
203065_s_at	857	*CAV1*	3.27e-03
200781_s_at	6210	*RPS15A*	3.27e-03
222621_at	64215	*DNAJC1*	3.27e-03
204435_at	9818	*NUPL1*	3.28e-03
231283_at	11320	*MGAT4A*	3.28e-03
221825_at	90806	*ANGEL2*	3.28e-03
216870_x_at	8847	*DLEU2*	3.29e-03
218646_at	54969	*C4orf27*	3.29e-03
212491_s_at	22826	*DNAJC8*	3.30e-03
227839_at	55777	*MBD5*	3.30e-03
218285_s_at	56898	*BDH2*	3.30e-03
221738_at	57148	*RALGAPB*	3.30e-03
213957_s_at	9857	*CEP350*	3.31e-03
1556672_a_at	10180	*RBM6*	3.31e-03
224843_at	57606	*SLAIN2*	3.31e-03
223418_x_at	81573	*ANKRD13C*	3.31e-03
212971_at	833	*CARS*	3.32e-03
214374_s_at	8496	*PPFIBP1*	3.32e-03
232586_x_at	100133315	*LOC100133315*	3.32e-03
210766_s_at	1434	*CSE1L*	3.33e-03
204014_at	1846	*DUSP4*	3.33e-03
227685_at	7110	*TMF1*	3.33e-03
1554153_a_at	51317	*PHF21A*	3.33e-03
1565887_at	54822	*TRPM7*	3.33e-03
227579_at	2241	*FER*	3.34e-03
226426_at	23394	*ADNP*	3.34e-03
206825_at	5021	*OXTR*	3.35e-03
1557036_at	22890	*ZBTB1*	3.35e-03
226951_at	79074	*C2orf49*	3.35e-03
214965_at	124044	*SPATA2L*	3.35e-03
215229_at	100129973	*LOC100129973*	3.35e-03
209058_at	8721	*EDF1*	3.36e-03
212107_s_at	1660	*DHX9*	3.37e-03
202259_s_at	10443	*N4BP2L2*	3.38e-03
213762_x_at	27316	*RBMX*	3.38e-03
233873_x_at	55149	*MTPAP*	3.38e-03

235158_at	84928	TMEM209	3.38e-03
200036_s_at	4736	RPL10A	3.39e-03
235125_x_at	374986	FAM73A	3.39e-03
212184_s_at	23118	TAB2	3.40e-03
210053_at	6877	TAF5	3.41e-03
203062_s_at	9656	MDC1	3.41e-03
203763_at	51626	DYNC2LI1	3.41e-03
213340_s_at	57212	TP73-AS1	3.41e-03
222894_x_at	79133	NDUFAF5	3.41e-03
235698_at	146198	ZFP90	3.41e-03
236367_at	9887	SMG7	3.42e-03
202596_at	2029	ENSA	3.43e-03
209350_s_at	2874	GPS2	3.43e-03
213982_s_at	9910	RABGAP1L	3.43e-03
214061_at	93594	WDR67	3.43e-03
229886_at	375444	C5orf34	3.43e-03
204327_s_at	7753	ZNF202	3.44e-03
218357_s_at	26521	TIMM8B	3.44e-03
237179_at	55251	PCMTD2	3.44e-03
219392_x_at	55771	PRR11	3.44e-03
228697_at	135114	HINT3	3.44e-03
223200_s_at	55341	LSG1	3.45e-03
228282_at	256471	MFSD8	3.45e-03
202905_x_at	4683	NBN	3.46e-03
203875_at	6594	SMARCA1	3.46e-03
225240_s_at	124540	MSI2	3.46e-03
223780_s_at	9969	MED13	3.47e-03
31874_at	10634	GAS2L1	3.47e-03
212060_at	23350	U2SURP	3.47e-03
203621_at	4711	NDUFB5	3.48e-03
227476_at	9926	LPGAT1	3.48e-03
227087_at	3631	INPP4A	3.49e-03
200812_at	10574	CCT7	3.49e-03
205181_at	7746	ZNF193	3.50e-03
201936_s_at	8672	EIF4G3	3.50e-03
220917_s_at	57728	WDR19	3.50e-03
207405_s_at	5884	RAD17	3.51e-03
236016_at	6605	SMARCE1	3.51e-03
212875_s_at	25966	C2CD2	3.52e-03
231875_at	55605	KIF21A	3.52e-03

219673_at	254394	*MCM9*	3.52e-03
226165_at	401466	*C8orf59*	3.53e-03
1558184_s_at	7565	*ZNF17*	3.54e-03
202078_at	8533	*COPS3*	3.54e-03
205087_at	25950	*RWDD3*	3.54e-03
229574_at	29896	*TRA2A*	3.54e-03
201918_at	55186	*SLC25A36*	3.54e-03
1556051_a_at	636	*BICD1*	3.56e-03
208714_at	4723	*NDUFV1*	3.56e-03
206928_at	7678	*ZNF124*	3.56e-03
1562095_at	7871	*SLMAP*	3.56e-03
218605_at	64216	*TFB2M*	3.56e-03
229908_s_at	64718	*UNKL*	3.56e-03
227270_at	285550	*FAM200B*	3.56e-03
227814_at	348793	*WDR53*	3.56e-03
229870_at	644656	*LOC644656*	3.56e-03
210105_s_at	2534	*FYN*	3.57e-03
208411_x_at	5470	*PPEF2*	3.57e-03
226398_s_at	118924	*FRA10AC1*	3.57e-03
202821_s_at	4026	*LPP*	3.58e-03
214250_at	4926	*NUMA1*	3.58e-03
209561_at	7059	*THBS3*	3.58e-03
221192_x_at	79157	*MFSD11*	3.58e-03
212523_s_at	23514	*KIAA0146*	3.59e-03
1564164_at	163486	*DENND1B*	3.59e-03
212745_s_at	585	*BBS4*	3.61e-03
218941_at	26190	*FBXW2*	3.61e-03
218991_at	63897	*HEATR6*	3.61e-03
226387_at	222194	*RSBN1L*	3.61e-03
238722_x_at	222236	*NAPEPLD*	3.61e-03
211939_x_at	689	*BTF3*	3.62e-03
232483_at	9440	*MED17*	3.62e-03
239757_at	54469	*ZFAND6*	3.63e-03
225937_at	1523	*CUX1*	3.64e-03
209902_at	545	*ATR*	3.65e-03
209945_s_at	2932	*GSK3B*	3.65e-03
213459_at	6168	*RPL37A*	3.65e-03
213452_at	7738	*ZNF184*	3.65e-03
205704_s_at	23545	*ATP6V0A2*	3.65e-03
212954_at	8798	*DYRK4*	3.66e-03

219785_s_at	79791	*FBXO31*	3.66e-03
213446_s_at	8826	*IQGAP1*	3.67e-03
218181_s_at	9448	*MAP4K4*	3.67e-03
214664_at	10606	*PAICS*	3.68e-03
225083_at	112495	*GTF3C6*	3.68e-03
221819_at	11021	*RAB35*	3.70e-03
201566_x_at	3398	*ID2*	3.71e-03
204676_at	25880	*TMEM186*	3.71e-03
225509_at	79685	*SAP30L*	3.71e-03
224430_s_at	25821	*MTO1*	3.73e-03
203221_at	7088	*TLE1*	3.74e-03
201166_s_at	9698	*PUM1*	3.74e-03
215641_at	9871	*SEC24D*	3.74e-03
235384_at	390916	*NUDT19*	3.74e-03
236645_at	100506312	*LOC100506312*	3.74e-03
208708_x_at	1983	*EIF5*	3.75e-03
220456_at	55304	*SPTLC3*	3.75e-03
228129_at	26135	*SERBP1*	3.76e-03
228736_at	113510	*HELQ*	3.76e-03
228647_at	100049716	*LOC100049716*	3.76e-03
207132_x_at	5204	*PFDN5*	3.77e-03
240928_at	51077	*FCF1*	3.77e-03
211503_s_at	51552	*RAB14*	3.77e-03
218852_at	55012	*PPP2R3C*	3.77e-03
217804_s_at	3609	*ILF3*	3.78e-03
200877_at	10575	*CCT4*	3.78e-03
209447_at	23345	*SYNE1*	3.78e-03
211721_s_at	90233	*ZNF551*	3.78e-03
224951_at	91012	*CERS5*	3.78e-03
212742_at	27246	*RNF115*	3.79e-03
227095_at	54741	*LEPROT*	3.79e-03
215567_at	51077	*FCF1*	3.80e-03
223590_at	90592	*ZNF700*	3.80e-03
210102_at	4013	*VWA5A*	3.81e-03
202209_at	27258	*LSM3*	3.81e-03
218370_s_at	64766	*S100PBP*	3.81e-03
236816_at	80018	*NAA25*	3.81e-03
213002_at	4082	*MARCKS*	3.82e-03
200855_at	9611	*NCOR1*	3.82e-03
204370_at	10978	*CLP1*	3.83e-03

1569385_s_at	54790	*TET2*	3.83e-03
214177_s_at	57326	*PBXIP1*	3.83e-03
233164_x_at	84236	*RHBDD1*	3.83e-03
232312_at	55291	*PPP6R3*	3.84e-03
224647_at	219771	*CCNY*	3.84e-03
215162_at	253959	*RALGAPA1*	3.84e-03
223639_s_at	30834	*ZNRD1*	3.85e-03
238067_at	54885	*TBC1D8B*	3.85e-03
239232_at	124540	*MSI2*	3.85e-03
235509_at	137682	*NDUFAF6*	3.85e-03
212342_at	286451	*YIPF6*	3.85e-03
235567_at	6095	*RORA*	3.86e-03
217527_s_at	84901	*NFATC2IP*	3.86e-03
216941_s_at	9014	*TAF1B*	3.87e-03
203848_at	10270	*AKAP8*	3.87e-03
228014_at	138428	*PTRH1*	3.87e-03
226668_at	151525	*WDSUB1*	3.87e-03
242133_s_at	654342	*LOC654342*	3.87e-03
203222_s_at	7088	*TLE1*	3.88e-03
226366_at	257218	*SHPRH*	3.88e-03
218909_at	26750	*RPS6KC1*	3.89e-03
1562442_a_at	6742	*SSBP1*	3.90e-03
222606_at	55055	*ZWILCH*	3.90e-03
222433_at	55740	*ENAH*	3.90e-03
235648_at	163081	*ZNF567*	3.90e-03
212209_at	23389	*MED13L*	3.91e-03
202302_s_at	65117	*RSRC2*	3.91e-03
226337_at	92344	*GORAB*	3.91e-03
1556493_a_at	23081	*KDM4C*	3.92e-03
228111_s_at	25981	*DNAH1*	3.92e-03
223018_at	28987	*NOB1*	3.92e-03
208986_at	6938	*TCF12*	3.93e-03
201844_s_at	23429	*RYBP*	3.93e-03
212407_at	51603	*METTL13*	3.93e-03
209688_s_at	54520	*CCDC93*	3.93e-03
236837_x_at	650794	*MIPEPP3*	3.93e-03
217982_s_at	10933	*MORF4L1*	3.94e-03
213001_at	23452	*ANGPTL2*	3.94e-03
219602_s_at	63895	*PIEZO2*	3.94e-03
202447_at	1666	*DECR1*	3.95e-03

211946_s_at	23215	PRRC2C	3.95e-03
223368_s_at	28989	NTMT1	3.95e-03
228693_at	152137	CCDC50	3.95e-03
226965_at	201627	FAM116A	3.95e-03
209130_at	8773	SNAP23	3.96e-03
1552378_s_at	157506	RDH10	3.96e-03
1554476_x_at	388558	ZNF808	3.96e-03
230028_at	22889	KIAA0907	3.97e-03
214663_at	25778	DSTYK	3.97e-03
238601_at	5257	PHKB	3.98e-03
212140_at	23244	PDS5A	3.99e-03
212689_s_at	55818	KDM3A	3.99e-03
227239_at	84668	FAM126A	3.99e-03
243696_at	9731	CEP104	4.00e-03
203306_s_at	10559	SLC35A1	4.00e-03
222883_at	65260	SELRC1	4.00e-03
226225_at	4163	MCC	4.01e-03
212848_s_at	84909	C9orf3	4.01e-03
202569_s_at	4140	MARK3	4.02e-03
202305_s_at	9637	FEZ2	4.02e-03
214231_s_at	23078	VWA8	4.02e-03
201580_s_at	56255	TMX4	4.02e-03
242224_at	55105	GPATCH2	4.03e-03
213269_at	57209	ZNF248	4.03e-03
223711_s_at	29087	THYN1	4.04e-03
238879_at	54165	DCUN1D1	4.04e-03
232000_at	158219	TTC39B	4.04e-03
222530_s_at	8195	MKKS	4.05e-03
224180_x_at	51057	WDPCP	4.05e-03
223519_at	51776	ZAK	4.05e-03
239831_at	79022	TMEM106C	4.05e-03
219599_at	1975	EIF4B	4.06e-03
217926_at	28974	C19orf53	4.06e-03
232911_at	57677	ZFP14	4.06e-03
235643_at	219285	SAMD9L	4.06e-03
204071_s_at	10210	TOPORS	4.07e-03
217196_s_at	23271	CAMSAP2	4.07e-03
218651_s_at	55323	LARP6	4.07e-03
233106_at	145438	FRMD6-AS1	4.07e-03
203707_at	10127	ZNF263	4.08e-03

223431_at	55330	*BLOC1S4*	4.08e-03
224897_at	80232	*WDR26*	4.09e-03
210438_x_at	6738	*TROVE2*	4.10e-03
1561206_at	57563	*KLHL8*	4.11e-03
220940_at	57730	*ANKRD36B*	4.12e-03
210283_x_at	10605	*PAIP1*	4.13e-03
224632_at	54865	*GPATCH4*	4.14e-03
202852_s_at	79719	*AAGAB*	4.14e-03
220609_at	202181	*LOC202181*	4.14e-03
231292_at	493861	*EID3*	4.14e-03
209681_at	10560	*SLC19A2*	4.15e-03
224905_at	80232	*WDR26*	4.15e-03
243417_at	284273	*ZADH2*	4.15e-03
221290_s_at	84939	*MUM1*	4.16e-03
200047_s_at	7528	*YY1*	4.17e-03
200728_at	10097	*ACTR2*	4.17e-03
212170_at	10137	*RBM12*	4.17e-03
203571_s_at	10974	*C10orf116*	4.17e-03
212704_at	23318	*ZCCHC11*	4.17e-03
231716_at	54542	*RC3H2*	4.17e-03
1554277_s_at	57697	*FANCM*	4.17e-03
226464_at	205428	*C3orf58*	4.18e-03
209932_s_at	1854	*DUT*	4.19e-03
219862_s_at	26502	*NARF*	4.19e-03
202194_at	50999	*TMED5*	4.19e-03
206451_at	55171	*TBCCD1*	4.19e-03
218097_s_at	79004	*CUEDC2*	4.19e-03
213256_at	115123	*MARCH3*	4.19e-03
227465_at	23383	*MAU2*	4.20e-03
212446_s_at	253782	*CERS6*	4.20e-03
222047_s_at	51593	*SRRT*	4.21e-03
203787_at	23635	*SSBP2*	4.22e-03
200942_s_at	3281	*HSBP1*	4.23e-03
221832_s_at	7798	*LUZP1*	4.23e-03
224968_at	112942	*CCDC104*	4.23e-03
238681_at	284161	*GDPD1*	4.23e-03
225340_s_at	4076	*CAPRIN1*	4.24e-03
239024_at	7707	*ZNF148*	4.24e-03
226554_at	51341	*ZBTB7A*	4.24e-03
225810_at	54893	*MTMR10*	4.24e-03

221208_s_at	79684	*MSANTD2*	4.24e-03
209944_at	57862	*ZNF410*	4.25e-03
209310_s_at	837	*CASP4*	4.26e-03
205530_at	2110	*ETFDH*	4.26e-03
203075_at	4087	*SMAD2*	4.26e-03
201803_at	5431	*POLR2B*	4.26e-03
204074_s_at	9731	*CEP104*	4.27e-03
208109_s_at	81698	*LINC00597*	4.27e-03
230389_at	23048	*FNBP1*	4.28e-03
222465_at	51187	*RSL24D1*	4.28e-03
225273_at	55841	*WWC3*	4.28e-03
65493_at	63897	*HEATR6*	4.28e-03
200658_s_at	5245	*PHB*	4.30e-03
214093_s_at	8880	*FUBP1*	4.30e-03
205308_at	51101	*ZC2HC1A*	4.30e-03
202355_s_at	2962	*GTF2F1*	4.31e-03
222410_s_at	58533	*SNX6*	4.31e-03
236557_at	253461	*ZBTB38*	4.31e-03
226652_at	9960	*USP3*	4.34e-03
1554513_s_at	84902	*CEP89*	4.34e-03
201326_at	908	*CCT6A*	4.35e-03
201143_s_at	1965	*EIF2S1*	4.36e-03
222768_s_at	51605	*TRMT6*	4.36e-03
1557275_a_at	727910	*TLCD2*	4.36e-03
213088_s_at	23234	*DNAJC9*	4.37e-03
231090_s_at	196528	*ARID2*	4.37e-03
203227_s_at	6302	*TSPAN31*	4.38e-03
209390_at	7248	*TSC1*	4.38e-03
212836_at	10714	*POLD3*	4.38e-03
201634_s_at	80777	*CYB5B*	4.39e-03
225930_at	28512	*NKIRAS1*	4.40e-03
218667_at	64219	*PJA1*	4.40e-03
203140_at	604	*BCL6*	4.41e-03
238056_at	6391	*SDHC*	4.41e-03
229982_at	79832	*QSER1*	4.41e-03
225770_at	89970	*RSPRY1*	4.41e-03
214173_x_at	8725	*URI1*	4.42e-03
232138_at	10150	*MBNL2*	4.42e-03
235232_at	10691	*GMEB1*	4.42e-03
228486_at	23446	*SLC44A1*	4.42e-03

243206_at	90799	CEP95	4.42e-03
231108_at	2521	FUS	4.43e-03
202738_s_at	5257	PHKB	4.43e-03
203655_at	7515	XRCC1	4.43e-03
212511_at	8301	PICALM	4.43e-03
209210_s_at	10979	FERMT2	4.43e-03
222607_s_at	22894	DIS3	4.44e-03
242851_at	91749	KIAA1919	4.44e-03
220298_s_at	54558	SPATA6	4.45e-03
218040_at	55119	PRPF38B	4.45e-03
231321_s_at	55331	ACER3	4.45e-03
201113_at	7284	TUFM	4.46e-03
203262_s_at	9130	FAM50A	4.46e-03
227704_at	83636	C19orf12	4.46e-03
227363_s_at	10328	EMC8	4.47e-03
212202_s_at	25963	TMEM87A	4.47e-03
227268_at	51136	RNFT1	4.47e-03
206567_s_at	51230	PHF20	4.47e-03
200092_s_at	6167	RPL37	4.48e-03
238430_x_at	162394	SLFN5	4.49e-03
201299_s_at	55233	MOB1A	4.51e-03
207120_at	63934	ZNF667	4.51e-03
203588_s_at	7029	TFDP2	4.52e-03
215146_s_at	23331	TTC28	4.52e-03
228577_x_at	57489	ODF2L	4.53e-03
230136_at	400099	LOC400099	4.53e-03
235766_x_at	5873	RAB27A	4.54e-03
209161_at	9128	PRPF4	4.54e-03
209455_at	23291	FBXW11	4.54e-03
243612_at	64324	NSD1	4.54e-03
204386_s_at	78988	MRP63	4.54e-03
233724_at	405	ARNT	4.55e-03
231927_at	22926	ATF6	4.55e-03
209273_s_at	81689	ISCA1	4.55e-03
226073_at	219854	TMEM218	4.55e-03
209362_at	9412	MED21	4.56e-03
203833_s_at	10618	TGOLN2	4.56e-03
226025_at	23243	ANKRD28	4.56e-03
218728_s_at	29097	CNIH4	4.56e-03
213237_at	400506	C16orf88	4.56e-03

242617_at	283578	*TMED8*	4.57e-03
208940_at	22929	*SEPHS1*	4.58e-03
224702_at	153339	*TMEM167A*	4.59e-03
204526_s_at	11138	*TBC1D8*	4.60e-03
203345_s_at	22823	*MTF2*	4.60e-03
1569543_at	6251	*RSU1*	4.62e-03
222909_s_at	9530	*BAG4*	4.62e-03
202629_at	10513	*APPBP2*	4.62e-03
232865_at	27125	*AFF4*	4.62e-03
221883_at	5316	*PKNOX1*	4.63e-03
232266_x_at	8621	*CDK13*	4.63e-03
203597_s_at	11193	*WBP4*	4.63e-03
228348_at	55180	*LINS*	4.63e-03
1570210_x_at	9701	*PPP6R2*	4.64e-03
212589_at	22800	*RRAS2*	4.64e-03
212026_s_at	23265	*EXOC7*	4.64e-03
221702_s_at	80213	*TM2D3*	4.66e-03
221953_s_at	10893	*MMP24*	4.67e-03
209036_s_at	4191	*MDH2*	4.68e-03
205887_x_at	4437	*MSH3*	4.68e-03
242622_x_at	5728	*PTEN*	4.68e-03
1556060_a_at	26036	*ZNF451*	4.69e-03
221647_s_at	60626	*RIC8A*	4.69e-03
212208_at	23389	*MED13L*	4.70e-03
206519_x_at	946	*SIGLEC6*	4.71e-03
201324_at	2012	*EMP1*	4.72e-03
208929_x_at	6137	*RPL13*	4.72e-03
204367_at	6668	*SP2*	4.72e-03
225153_at	85476	*GFM1*	4.73e-03
208974_x_at	3837	*KPNB1*	4.74e-03
212920_at	5978	*REST*	4.74e-03
211034_s_at	283450	*HECTD4*	4.74e-03
227105_at	79848	*CSPP1*	4.75e-03
204203_at	1054	*CEBPG*	4.76e-03
211036_x_at	51433	*ANAPC5*	4.76e-03
224163_s_at	55929	*DMAP1*	4.76e-03
218618_s_at	64778	*FNDC3B*	4.76e-03
230320_at	84897	*TBRG1*	4.76e-03
230250_at	5787	*PTPRB*	4.77e-03
200686_s_at	9295	*SRSF11*	4.77e-03

202300_at	10542	*HBXIP*	4.77e-03
243631_at	54737	*MPHOSPH8*	4.77e-03
204352_at	7188	*TRAF5*	4.78e-03
242750_at	166785	*MMAA*	4.78e-03
201472_at	7411	*VBP1*	4.79e-03
228603_at	10096	*ACTR3*	4.79e-03
212082_s_at	4637	*MYL6*	4.80e-03
211747_s_at	23658	*LSM5*	4.81e-03
225395_s_at	158293	*FAM120AOS*	4.81e-03
205395_s_at	4361	*MRE11A*	4.82e-03
1555864_s_at	5160	*PDHA1*	4.82e-03
208117_s_at	81887	*LAS1L*	4.82e-03
231735_s_at	378938	*MALAT1*	4.82e-03
1563321_s_at	8028	*MLLT10*	4.83e-03
203653_s_at	8161	*COIL*	4.83e-03
244132_x_at	9849	*ZNF518A*	4.83e-03
226327_at	22847	*ZNF507*	4.83e-03
227551_at	51104	*FAM108B1*	4.83e-03
201478_s_at	1736	*DKC1*	4.84e-03
208174_x_at	8233	*ZRSR2*	4.84e-03
236006_s_at	11216	*AKAP10*	4.84e-03
218415_at	26276	*VPS33B*	4.85e-03
214600_at	7003	*TEAD1*	4.86e-03
203856_at	7443	*VRK1*	4.86e-03
206497_at	55744	*COA1*	4.86e-03
228916_at	143884	*CWF19L2*	4.86e-03
202288_at	2475	*MTOR*	4.88e-03
206565_x_at	11039	*SMA4*	4.88e-03
220890_s_at	51202	*DDX47*	4.88e-03
230069_at	94081	*SFXN1*	4.89e-03
203401_at	5634	*PRPS2*	4.90e-03
220939_s_at	54878	*DPP8*	4.90e-03
221311_x_at	57226	*LYRM2*	4.90e-03
1569157_s_at	162993	*ZNF846*	4.91e-03
214882_s_at	6427	*SRSF2*	4.93e-03
203182_s_at	6733	*SRPK2*	4.93e-03
224711_at	7528	*YY1*	4.93e-03
205356_at	8975	*USP13*	4.93e-03
227836_at	84294	*UTP23*	4.93e-03
218515_at	94104	*GCFC1*	4.93e-03

204366_s_at	2976	*GTF3C2*	4.94e-03
204308_s_at	9895	*TECPR2*	4.94e-03
218256_s_at	53371	*NUP54*	4.95e-03
240926_at	84859	*LRCH3*	4.95e-03
239364_at	2120	*ETV6*	4.96e-03
208642_s_at	7520	*XRCC5*	4.96e-03
204844_at	2028	*ENPEP*	4.97e-03
213399_x_at	6185	*RPN2*	4.97e-03
218418_s_at	25959	*KANK2*	4.97e-03
221090_s_at	55239	*OGFOD1*	4.97e-03
205003_at	9732	*DOCK4*	4.98e-03
1558331_at	22933	*SIRT2*	4.98e-03
210094_s_at	56288	*PARD3*	4.98e-03
225126_at	92399	*MRRF*	4.99e-03
222494_at	1112	*FOXN3*	5.00e-03
219336_s_at	51008	*ASCC1*	5.00e-03
203225_s_at	55312	*RFK*	5.00e-03
203481_at	55719	*FAM178A*	5.00e-03
229235_at	84901	*NFATC2IP*	5.00e-03
226752_at	345757	*FAM174A*	5.00e-03
208030_s_at	118	*ADD1*	5.01e-03
204461_x_at	5810	*RAD1*	5.01e-03
224029_x_at	11280	*SCN11A*	5.01e-03
218242_s_at	51111	*SUV420H1*	5.01e-03
216711_s_at	6872	*TAF1*	5.02e-03
201558_at	8480	*RAE1*	5.02e-03
207791_s_at	5861	*RAB1A*	5.03e-03
223283_s_at	10194	*TSHZ1*	5.03e-03
242470_at	126272	*EID2B*	5.03e-03
208662_s_at	7267	*TTC3*	5.04e-03
222753_s_at	60559	*SPCS3*	5.04e-03
226021_at	157506	*RDH10*	5.05e-03
226896_at	118487	*CHCHD1*	5.06e-03
203704_s_at	6239	*RREB1*	5.07e-03
218739_at	51099	*ABHD5*	5.09e-03
50400_at	196743	*PAOX*	5.09e-03
238005_s_at	25942	*SIN3A*	5.10e-03
220741_s_at	27068	*PPA2*	5.11e-03
233632_s_at	54464	*XRN1*	5.11e-03
1558560_s_at	8548	*BLZF1*	5.12e-03

201779_s_at	11342	*RNF13*	5.12e-03
239247_at	401577	*CD99P1*	5.12e-03
222627_at	51542	*VPS54*	5.13e-03
202530_at	1432	*MAPK14*	5.14e-03
202930_s_at	8803	*SUCLA2*	5.14e-03
224586_x_at	10923	*SUB1*	5.14e-03
1552633_at	94039	*ZNF101*	5.14e-03
227370_at	165215	*FAM171B*	5.14e-03
221858_at	23232	*TBC1D12*	5.15e-03
219220_x_at	56945	*MRPS22*	5.15e-03
204860_s_at	4671	*NAIP*	5.16e-03
224985_at	4893	*NRAS*	5.16e-03
226370_at	80311	*KLHL15*	5.16e-03
201546_at	9320	*TRIP12*	5.17e-03
202349_at	1861	*TOR1A*	5.19e-03
229453_at	2923	*PDIA3*	5.19e-03
235692_at	30011	*SH3KBP1*	5.19e-03
219110_at	54433	*GAR1*	5.19e-03
202049_s_at	9202	*ZMYM4*	5.20e-03
219375_at	10390	*CEPT1*	5.21e-03
1555446_s_at	7109	*TRAPPC10*	5.22e-03
235353_at	23231	*SEL1L3*	5.22e-03
213092_x_at	23234	*DNAJC9*	5.22e-03
211445_x_at	83955	*NACAP1*	5.22e-03
225760_at	114803	*MYSM1*	5.22e-03
228185_at	219749	*ZNF25*	5.23e-03
233480_at	79188	*TMEM43*	5.24e-03
228005_at	158586	*ZXDB*	5.24e-03
208696_at	22948	*CCT5*	5.25e-03
1568619_s_at	162073	*ITPRIPL2*	5.25e-03
223993_s_at	29097	*CNIH4*	5.26e-03
217820_s_at	55740	*ENAH*	5.26e-03
225950_at	142891	*SAMD8*	5.26e-03
212959_s_at	79158	*GNPTAB*	5.27e-03
208054_at	26091	*HERC4*	5.28e-03
228032_s_at	163486	*DENND1B*	5.28e-03
203078_at	8453	*CUL2*	5.30e-03
222550_at	55156	*ARMC1*	5.30e-03
1555882_at	169981	*SPIN3*	5.30e-03
201955_at	892	*CCNC*	5.31e-03

202512_s_at	9474	*ATG5*	5.31e-03
226837_at	161742	*SPRED1*	5.31e-03
207115_x_at	54799	*MBTD1*	5.32e-03
201648_at	3716	*JAK1*	5.33e-03
207040_s_at	6767	*ST13*	5.33e-03
1564276_at	441108	*C5orf56*	5.33e-03
209252_at	23438	*HARS2*	5.35e-03
217952_x_at	23469	*PHF3*	5.35e-03
222825_at	51633	*OTUD6B*	5.35e-03
232048_at	143684	*FAM76B*	5.35e-03
236124_at	153546	*LOC153546*	5.35e-03
223034_s_at	25912	*C1orf43*	5.37e-03
206571_s_at	9448	*MAP4K4*	5.38e-03
223915_at	54880	*BCOR*	5.38e-03
218210_at	79672	*FN3KRP*	5.38e-03
225957_at	153222	*CREBRF*	5.38e-03
223175_s_at	55527	*FEM1A*	5.40e-03
231940_at	57711	*ZNF529*	5.40e-03
218979_at	80010	*RMI1*	5.40e-03
225807_at	84962	*AJUBA*	5.40e-03
208820_at	5747	*PTK2*	5.42e-03
214864_s_at	9380	*GRHPR*	5.42e-03
225662_at	51776	*ZAK*	5.42e-03
225413_at	84833	*USMG5*	5.42e-03
225297_at	115106	*HAUS1*	5.42e-03
208966_x_at	3428	*IFI16*	5.43e-03
225476_at	7918	*GPANK1*	5.43e-03
223115_at	9440	*MED17*	5.43e-03
220690_s_at	25979	*DHRS7B*	5.43e-03
218089_at	25980	*AAR2*	5.43e-03
221263_s_at	83443	*SF3B5*	5.43e-03
237784_at	10923	*SUB1*	5.44e-03
227352_at	126074	*SWSAP1*	5.44e-03
209788_s_at	51752	*ERAP1*	5.46e-03
228141_at	493869	*GPX8*	5.47e-03
201366_at	310	*ANXA7*	5.48e-03
209444_at	5910	*RAP1GDS1*	5.48e-03
212846_at	23076	*RRP1B*	5.48e-03
200020_at	23435	*TARDBP*	5.48e-03
223591_at	84282	*RNF135*	5.48e-03

235365_at	494513	*DFNB59*	5.48e-03
202202_s_at	3910	*LAMA4*	5.49e-03
232860_x_at	55285	*RBM41*	5.49e-03
202100_at	5899	*RALB*	5.51e-03
224315_at	11218	*DDX20*	5.51e-03
209187_at	1810	*DR1*	5.52e-03
212893_at	26009	*ZZZ3*	5.52e-03
213773_x_at	55695	*NSUN5*	5.52e-03
223697_x_at	84267	*C9orf64*	5.52e-03
214092_x_at	10147	*SUGP2*	5.53e-03
212222_at	23198	*PSME4*	5.53e-03
224704_at	27327	*TNRC6A*	5.54e-03
211710_x_at	6124	*RPL4*	5.55e-03
223128_at	55572	*FOXRED1*	5.55e-03
219523_s_at	55714	*ODZ3*	5.55e-03
203595_s_at	24138	*IFIT5*	5.56e-03
208895_s_at	8886	*DDX18*	5.57e-03
223619_x_at	55825	*PECR*	5.57e-03
204084_s_at	1203	*CLN5*	5.58e-03
200685_at	9295	*SRSF11*	5.58e-03
218799_at	54707	*GPN2*	5.58e-03
223402_at	54935	*DUSP23*	5.58e-03
226312_at	253260	*RICTOR*	5.58e-03
238121_at	256356	*GK5*	5.58e-03
204605_at	10668	*CGRRF1*	5.59e-03
203278_s_at	51317	*PHF21A*	5.60e-03
235381_at	51773	*RSF1*	5.60e-03
1553099_at	200765	*TIGD1*	5.60e-03
208919_s_at	65220	*NADK*	5.61e-03
225946_at	11228	*RASSF8*	5.62e-03
227322_s_at	56647	*BCCIP*	5.62e-03
228709_at	7175	*TPR*	5.63e-03
236262_at	79812	*MMRN2*	5.63e-03
225210_s_at	83640	*FAM103A1*	5.64e-03
213127_s_at	112950	*MED8*	5.65e-03
209628_at	55916	*NXT2*	5.66e-03
235623_at	55250	*ELP2*	5.67e-03
224972_at	140823	*ROMO1*	5.68e-03
226544_x_at	63915	*BLOC1S5*	5.69e-03
228543_at	100303755	*PET117*	5.70e-03

225554_s_at	51434	ANAPC7	5.71e-03
219363_s_at	51001	MTERFD1	5.72e-03
59999_at	55662	HIF1AN	5.72e-03
202031_s_at	26100	WIPI2	5.73e-03
231995_at	79886	CAAP1	5.73e-03
239138_at	80218	NAA50	5.73e-03
203374_s_at	7174	TPP2	5.74e-03
217837_s_at	51652	CHMP3	5.75e-03
219587_at	54970	TTC12	5.75e-03
227607_at	57559	STAMBPL1	5.75e-03
200031_s_at	6205	RPS11	5.76e-03
224894_at	10413	YAP1	5.76e-03
214323_s_at	65110	UPF3A	5.76e-03
204417_at	2581	GALC	5.77e-03
1558201_s_at	22950	SLC4A1AP	5.78e-03
235719_at	285440	CYP4V2	5.78e-03
225522_at	22848	AAK1	5.79e-03
223766_at	100133130	LOC100133130	5.79e-03
228157_at	7756	ZNF207	5.80e-03
209139_s_at	8575	PRKRA	5.80e-03
217822_at	51729	WBP11	5.80e-03
228328_at	54813	KLHL28	5.80e-03
226998_at	80155	NAA15	5.80e-03
212287_at	23512	SUZ12	5.81e-03
227152_at	55196	KIAA1551	5.81e-03
227141_at	127253	TYW3	5.82e-03
217650_x_at	6483	ST3GAL2	5.83e-03
228574_at	160335	TMTC2	5.83e-03
201338_x_at	2971	GTF3A	5.84e-03
225336_at	9169	SCAF11	5.84e-03
232366_at	9778	KIAA0232	5.84e-03
209493_at	23037	PDZD2	5.84e-03
213364_s_at	6642	SNX1	5.85e-03
215493_x_at	11120	BTN2A1	5.85e-03
203334_at	1659	DHX8	5.86e-03
225243_s_at	7871	SLMAP	5.86e-03
224437_s_at	51534	VTA1	5.86e-03
218462_at	80135	RPF1	5.87e-03
209476_at	81542	TMX1	5.87e-03
212813_at	83700	JAM3	5.89e-03

243807_at	135112	*NCOA7*	5.89e-03
223066_at	23557	*SNAPIN*	5.90e-03
218672_at	79005	*SCNM1*	5.90e-03
206918_s_at	8904	*CPNE1*	5.91e-03
232097_at	9878	*TOX4*	5.92e-03
201560_at	25932	*CLIC4*	5.92e-03
227916_x_at	51010	*EXOSC3*	5.92e-03
228283_at	152100	*CMC1*	5.92e-03
213329_at	23380	*SRGAP2*	5.93e-03
227029_at	283635	*FAM177A1*	5.93e-03
226024_at	150684	*COMMD1*	5.94e-03
225381_at	399959	*MIR100HG*	5.94e-03
202191_s_at	8522	*GAS7*	5.95e-03
229871_at	55095	*SAMD4B*	5.95e-03
223004_s_at	51300	*TIMMDC1*	5.97e-03
201386_s_at	1665	*DHX15*	5.98e-03
202703_at	8446	*DUSP11*	5.98e-03
202697_at	11051	*NUDT21*	5.98e-03
201881_s_at	25820	*ARIH1*	5.98e-03
244881_at	89782	*LMLN*	5.98e-03
225427_s_at	128240	*APOA1BP*	5.98e-03
200949_x_at	6224	*RPS20*	5.99e-03
212111_at	23673	*STX12*	5.99e-03
220408_x_at	55578	*FAM48A*	5.99e-03
224352_s_at	1073	*CFL2*	6.00e-03
226701_at	2702	*GJA5*	6.01e-03
218568_at	55750	*AGK*	6.02e-03
212758_s_at	6935	*ZEB1*	6.04e-03
218398_at	10884	*MRPS30*	6.04e-03
218721_s_at	54953	*C1orf27*	6.04e-03
224666_at	197370	*NSMCE1*	6.04e-03
210908_s_at	5204	*PFDN5*	6.05e-03
211578_s_at	6198	*RPS6KB1*	6.05e-03
201653_at	10175	*CNIH*	6.05e-03
222437_s_at	51652	*CHMP3*	6.05e-03
212248_at	92140	*MTDH*	6.05e-03
243092_at	100288730	*PAN3-AS1*	6.05e-03
203053_at	10286	*BCAS2*	6.06e-03
225878_at	23095	*KIF1B*	6.06e-03
208923_at	23191	*CYFIP1*	6.06e-03

225099_at	200933	*FBXO45*	6.06e-03
221860_at	3191	*HNRNPL*	6.07e-03
202927_at	5300	*PIN1*	6.07e-03
208103_s_at	81611	*ANP32E*	6.07e-03
213747_at	51582	*AZIN1*	6.08e-03
202749_at	7485	*WRB*	6.09e-03
231968_at	56886	*UGGT1*	6.09e-03
218496_at	246243	*RNASEH1*	6.09e-03
204422_s_at	2247	*FGF2*	6.11e-03
202549_at	9217	*VAPB*	6.11e-03
214004_s_at	9686	*VGLL4*	6.11e-03
225268_at	3840	*KPNA4*	6.12e-03
238070_at	9557	*CHD1L*	6.12e-03
1554456_a_at	55180	*LINS*	6.12e-03
221987_s_at	55720	*TSR1*	6.12e-03
235096_at	123169	*LEO1*	6.12e-03
213605_s_at	728093	*LOC728093*	6.12e-03
220669_at	54726	*OTUD4*	6.13e-03
214394_x_at	1936	*EEF1D*	6.14e-03
214214_s_at	708	*C1QBP*	6.15e-03
218249_at	64429	*ZDHHC6*	6.15e-03
231850_x_at	80817	*CEP44*	6.15e-03
236390_at	128710	*C20orf94*	6.16e-03
224649_x_at	219771	*CCNY*	6.16e-03
1558076_at	84250	*ANKRD32*	6.17e-03
235324_at	6428	*SRSF3*	6.18e-03
201635_s_at	8087	*FXR1*	6.18e-03
202258_s_at	10443	*N4BP2L2*	6.18e-03
209248_at	27069	*GHITM*	6.18e-03
224958_at	57532	*NUFIP2*	6.18e-03
1570523_s_at	83734	*ATG10*	6.18e-03
229060_at	388403	*YPEL2*	6.19e-03
202013_s_at	2132	*EXT2*	6.20e-03
226367_at	5927	*KDM5A*	6.20e-03
220924_s_at	54407	*SLC38A2*	6.20e-03
207335_x_at	521	*ATP5I*	6.21e-03
218432_at	26273	*FBXO3*	6.21e-03
218446_s_at	51030	*FAM18B1*	6.21e-03
1556277_a_at	167153	*PAPD4*	6.21e-03
238653_at	9860	*LRIG2*	6.22e-03

215418_at	55742	*PARVA*	6.22e-03
223486_at	29083	*GTPBP8*	6.24e-03
225657_at	152217	*LOC152217*	6.24e-03
225169_at	92105	*INTS4*	6.25e-03
228867_at	128387	*TATDN3*	6.25e-03
1561615_s_at	6546	*SLC8A1*	6.26e-03
203971_at	1317	*SLC31A1*	6.29e-03
238447_at	27303	*RBMS3*	6.29e-03
225637_at	54849	*DEF8*	6.29e-03
1556827_at	339929	*LPP-AS2*	6.29e-03
214807_at	100509635	*LOC100509635*	6.29e-03
225462_at	85013	*TMEM128*	6.30e-03
202767_at	53	*ACP2*	6.31e-03
1554507_at	10003	*NAALAD2*	6.32e-03
203801_at	63931	*MRPS14*	6.32e-03
215160_x_at	642236	*LOC642236*	6.32e-03
209122_at	123	*PLIN2*	6.33e-03
212062_at	10079	*ATP9A*	6.34e-03
226383_at	120534	*ARL14EP*	6.34e-03
226910_at	51122	*COMMD2*	6.35e-03
223513_at	55835	*CENPJ*	6.35e-03
226582_at	400043	*LOC400043*	6.35e-03
1559045_at	100128288	*LOC100128288*	6.35e-03
210214_s_at	659	*BMPR2*	6.37e-03
224217_s_at	11124	*FAF1*	6.37e-03
34764_at	23395	*LARS2*	6.38e-03
222728_s_at	79101	*TAF1D*	6.39e-03
225270_at	4756	*NEO1*	6.40e-03
231235_at	4820	*NKTR*	6.40e-03
221739_at	56005	*C19orf10*	6.40e-03
226575_at	58499	*ZNF462*	6.40e-03
209363_s_at	9412	*MED21*	6.41e-03
1558346_at	10063	*COX17*	6.41e-03
210555_s_at	4775	*NFATC3*	6.43e-03
202844_s_at	10928	*RALBP1*	6.43e-03
209224_s_at	4695	*NDUFA2*	6.44e-03
219549_s_at	10313	*RTN3*	6.44e-03
231193_s_at	57551	*TAOK1*	6.44e-03
203344_s_at	5932	*RBBP8*	6.45e-03
218598_at	60561	*RINT1*	6.45e-03

242443_at	161436	*EML5*	6.45e-03
235056_at	2120	*ETV6*	6.46e-03
227110_at	3183	*HNRNPC*	6.48e-03
208663_s_at	7267	*TTC3*	6.48e-03
231102_at	54677	*CROT*	6.48e-03
206108_s_at	6431	*SRSF6*	6.49e-03
215294_s_at	6594	*SMARCA1*	6.49e-03
214960_at	8539	*API5*	6.49e-03
235003_at	127933	*UHMK1*	6.51e-03
242554_at	219931	*TPCN2*	6.51e-03
201093_x_at	6389	*SDHA*	6.52e-03
202361_at	9632	*SEC24C*	6.53e-03
228286_at	348654	*GEN1*	6.53e-03
223281_s_at	1355	*COX15*	6.54e-03
238476_at	153222	*CREBRF*	6.54e-03
1553677_a_at	261726	*TIPRL*	6.54e-03
1557718_at	5527	*PPP2R5C*	6.55e-03
220419_s_at	29761	*USP25*	6.55e-03
227923_at	85358	*SHANK3*	6.55e-03
1553994_at	4907	*NT5E*	6.56e-03
204566_at	8493	*PPM1D*	6.56e-03
201732_s_at	1182	*CLCN3*	6.57e-03
200786_at	5695	*PSMB7*	6.58e-03
222594_s_at	65244	*SPATS2*	6.58e-03
225278_at	5565	*PRKAB2*	6.59e-03
238949_at	153830	*RNF145*	6.59e-03
202224_at	1398	*CRK*	6.60e-03
202290_at	11333	*PDAP1*	6.60e-03
218214_at	60673	*C12orf44*	6.61e-03
206412_at	2241	*FER*	6.63e-03
201705_at	5713	*PSMD7*	6.63e-03
224639_at	121665	*SPPL3*	6.63e-03
240344_x_at	90624	*LYRM7*	6.64e-03
231247_s_at	727820	*LOC727820*	6.64e-03
212238_at	171023	*ASXL1*	6.65e-03
201829_at	10276	*NET1*	6.66e-03
1552694_at	114134	*SLC2A13*	6.66e-03
215296_at	8476	*CDC42BPA*	6.67e-03
212447_at	25948	*KBTBD2*	6.67e-03
226028_at	54538	*ROBO4*	6.68e-03

202548_s_at	8874	*ARHGEF7*	6.69e-03
244611_at	9969	*MED13*	6.69e-03
217802_s_at	64710	*NUCKS1*	6.71e-03
204838_s_at	27030	*MLH3*	6.72e-03
1553672_at	55740	*ENAH*	6.72e-03
226093_at	196513	*DCP1B*	6.72e-03
225433_at	2957	*GTF2A1*	6.73e-03
227947_at	9749	*PHACTR2*	6.74e-03
221222_s_at	54964	*C1orf56*	6.74e-03
232746_at	57007	*CXCR7*	6.74e-03
224709_s_at	56990	*CDC42SE2*	6.75e-03
237040_at	143884	*CWF19L2*	6.75e-03
227967_at	114791	*TUBGCP5*	6.76e-03
228249_at	119710	*C11orf74*	6.76e-03
235556_at	153222	*CREBRF*	6.76e-03
202816_s_at	6760	*SS18*	6.77e-03
237182_at	653479	*MRPL45P2*	6.77e-03
212024_x_at	2314	*FLII*	6.78e-03
227884_at	8148	*TAF15*	6.78e-03
210136_at	4155	*MBP*	6.79e-03
200845_s_at	9588	*PRDX6*	6.81e-03
202203_s_at	267	*AMFR*	6.82e-03
204396_s_at	2869	*GRK5*	6.82e-03
209317_at	9533	*POLR1C*	6.82e-03
201584_s_at	10212	*DDX39A*	6.83e-03
200876_s_at	5689	*PSMB1*	6.84e-03
210011_s_at	2130	*EWSR1*	6.85e-03
223892_s_at	51643	*TMBIM4*	6.85e-03
220720_x_at	80097	*MZT2B*	6.85e-03
212426_s_at	10971	*YWHAQ*	6.86e-03
226161_at	55676	*SLC30A6*	6.86e-03
205851_at	10201	*NME6*	6.87e-03
209593_s_at	27348	*TOR1B*	6.87e-03
202010_s_at	57862	*ZNF410*	6.87e-03
201597_at	1347	*COX7A2*	6.88e-03
210878_s_at	51780	*KDM3B*	6.88e-03
235057_at	83737	*ITCH*	6.88e-03
211085_s_at	6789	*STK4*	6.89e-03
215269_at	7109	*TRAPPC10*	6.89e-03
200850_s_at	10768	*AHCYL1*	6.89e-03

219113_x_at	51171	*HSD17B14*	6.89e-03
215513_at	57061	*HYMAI*	6.89e-03
221808_at	9367	*RAB9A*	6.90e-03
228091_at	55014	*STX17*	6.90e-03
1554455_at	55180	*LINS*	6.90e-03
230986_at	11279	*KLF8*	6.91e-03
204180_s_at	23099	*ZBTB43*	6.91e-03
223532_at	51239	*ANKRD39*	6.91e-03
224635_s_at	57448	*BIRC6*	6.92e-03
242447_at	285382	*C3orf70*	6.92e-03
228067_at	343990	*KIAA1211L*	6.93e-03
213473_at	8315	*BRAP*	6.94e-03
208113_x_at	5042	*PABPC3*	6.95e-03
228968_at	203523	*ZNF449*	6.95e-03
201446_s_at	7072	*TIA1*	6.96e-03
210213_s_at	3692	*EIF6*	6.97e-03
201023_at	6879	*TAF7*	6.99e-03
209578_s_at	23275	*POFUT2*	6.99e-03
208904_s_at	6234	*RPS28*	7.01e-03
203737_s_at	23082	*PPRC1*	7.01e-03
238545_at	29117	*BRD7*	7.02e-03
225735_at	57182	*ANKRD50*	7.02e-03
230337_at	6654	*SOS1*	7.03e-03
239762_at	286437	*LOC286437*	7.03e-03
225549_at	1656	*DDX6*	7.04e-03
202282_at	3028	*HSD17B10*	7.05e-03
202743_at	8503	*PIK3R3*	7.06e-03
201833_at	3066	*HDAC2*	7.07e-03
208398_s_at	9519	*TBPL1*	7.07e-03
204162_at	10403	*NDC80*	7.07e-03
223430_at	23235	*SIK2*	7.07e-03
210027_s_at	328	*APEX1*	7.08e-03
204458_at	23659	*PLA2G15*	7.08e-03
235023_at	54832	*VPS13C*	7.08e-03
204847_at	27107	*ZBTB11*	7.09e-03
244822_at	2618	*GART*	7.10e-03
232633_at	7520	*XRCC5*	7.11e-03
211137_s_at	27032	*ATP2C1*	7.11e-03
224076_s_at	54904	*WHSC1L1*	7.11e-03
202599_s_at	8204	*NRIP1*	7.12e-03

204761_at	9712	USP6NL	7.12e-03
223244_s_at	55967	NDUFA12	7.13e-03
234978_at	120103	SLC36A4	7.13e-03
225535_s_at	100287932	TIMM23	7.14e-03
201233_at	5719	PSMD13	7.15e-03
226120_at	123016	TTC8	7.15e-03
215308_at	2547	XRCC6	7.16e-03
230056_at	2186	BPTF	7.17e-03
200063_s_at	4869	NPM1	7.17e-03
212534_at	7572	ZNF24	7.18e-03
204510_at	8317	CDC7	7.18e-03
202984_s_at	9529	BAG5	7.18e-03
212139_at	10985	GCN1L1	7.18e-03
203776_at	27238	GPKOW	7.18e-03
1552426_a_at	80213	TM2D3	7.19e-03
230734_x_at	6801	STRN	7.20e-03
225019_at	817	CAMK2D	7.21e-03
214143_x_at	6152	RPL24	7.21e-03
203743_s_at	6996	TDG	7.21e-03
224691_at	127933	UHMK1	7.21e-03
208012_x_at	3431	SP110	7.23e-03
219208_at	80204	FBXO11	7.23e-03
217608_at	285672	SREK1IP1	7.24e-03
225623_at	85457	KIAA1737	7.27e-03
222473_s_at	55914	ERBB2IP	7.28e-03
241027_at	4976	OPA1	7.29e-03
220143_x_at	55692	LUC7L	7.29e-03
1554085_at	317781	DDX51	7.29e-03
226463_at	528	ATP6V1C1	7.30e-03
207231_at	9666	DZIP3	7.31e-03
219347_at	55270	NUDT15	7.31e-03
232303_at	57507	ZNF608	7.31e-03
221509_at	8562	DENR	7.32e-03
1555837_s_at	5431	POLR2B	7.33e-03
229091_s_at	54619	CCNJ	7.33e-03
200955_at	10989	IMMT	7.34e-03
232520_s_at	55968	NSFL1C	7.34e-03
235654_at	219854	TMEM218	7.35e-03
235511_at	5936	RBM4	7.36e-03
211537_x_at	6885	MAP3K7	7.36e-03

215716_s_at	490	*ATP2B1*	7.37e-03
215575_at	9659	*PDE4DIP*	7.37e-03
1554627_a_at	51008	*ASCC1*	7.37e-03
227402_s_at	84294	*UTP23*	7.37e-03
212289_at	23253	*ANKRD12*	7.38e-03
203377_s_at	51362	*CDC40*	7.38e-03
214814_at	91746	*YTHDC1*	7.38e-03
213346_at	93081	*TEX30*	7.39e-03
221918_at	5128	*CDK17*	7.40e-03
1556061_at	10556	*RPP30*	7.40e-03
223560_s_at	55471	*C2orf56*	7.44e-03
231878_at	79447	*C16orf53*	7.44e-03
213302_at	5198	*PFAS*	7.45e-03
218163_at	28985	*MCTS1*	7.45e-03
217220_at	100287387	*LOC100287387*	7.45e-03
201752_s_at	120	*ADD3*	7.46e-03
217985_s_at	11177	*BAZ1A*	7.46e-03
202133_at	25937	*WWTR1*	7.46e-03
222875_at	56919	*DHX33*	7.46e-03
201086_x_at	6651	*SON*	7.47e-03
213793_s_at	9456	*HOMER1*	7.47e-03
226475_at	55007	*FAM118A*	7.47e-03
235406_x_at	100505894	*TMEM161B-AS1*	7.48e-03
229790_at	7014	*TERF2*	7.49e-03
244293_at	7381	*UQCRB*	7.49e-03
202487_s_at	94239	*H2AFV*	7.49e-03
215199_at	800	*CALD1*	7.50e-03
201795_at	3930	*LBR*	7.50e-03
212265_at	9444	*QKI*	7.51e-03
1552274_at	54899	*PXK*	7.52e-03
209862_s_at	9702	*CEP57*	7.53e-03
214985_at	2131	*EXT1*	7.54e-03
218715_at	55813	*UTP6*	7.55e-03
202968_s_at	8445	*DYRK2*	7.56e-03
232304_at	57162	*PELI1*	7.57e-03
200978_at	4190	*MDH1*	7.58e-03
208551_at	8369	*HIST1H4G*	7.58e-03
200712_s_at	22919	*MAPRE1*	7.59e-03
203333_at	22920	*KIFAP3*	7.59e-03
232461_at	54806	*AHI1*	7.59e-03

227224_at	55103	*RALGPS2*	7.59e-03
205022_s_at	1112	*FOXN3*	7.60e-03
211713_x_at	9768	*KIAA0101*	7.61e-03
36553_at	8623	*ASMTL*	7.62e-03
212040_at	10618	*TGOLN2*	7.62e-03
204237_at	51454	*GULP1*	7.62e-03
218374_s_at	57102	*C12orf4*	7.62e-03
1559042_at	4712	*NDUFB6*	7.63e-03
235348_at	84945	*ABHD13*	7.63e-03
212556_at	23513	*SCRIB*	7.64e-03
232431_at	2908	*NR3C1*	7.65e-03
210755_at	3082	*HGF*	7.65e-03
226767_s_at	81889	*FAHD1*	7.65e-03
1554588_a_at	150737	*TTC30B*	7.65e-03
44669_at	644096	*SDHAF1*	7.65e-03
202963_at	5993	*RFX5*	7.66e-03
209184_s_at	8660	*IRS2*	7.66e-03
237741_at	55186	*SLC25A36*	7.66e-03
228908_s_at	642852	*LOC642852*	7.66e-03
211095_at	4763	*NF1*	7.67e-03
52285_f_at	79959	*CEP76*	7.67e-03
1569128_at	285237	*C3orf38*	7.67e-03
201661_s_at	2181	*ACSL3*	7.68e-03
227718_at	5814	*PURB*	7.70e-03
208988_at	22992	*KDM2A*	7.70e-03
219539_at	79833	*GEMIN6*	7.71e-03
226276_at	153339	*TMEM167A*	7.71e-03
230737_s_at	387647	*LOC387647*	7.71e-03
228315_at	64393	*ZMAT3*	7.72e-03
208070_s_at	5980	*REV3L*	7.74e-03
212405_s_at	51603	*METTL13*	7.74e-03
212956_at	23158	*TBC1D9*	7.75e-03
229211_at	285193	*DUSP28*	7.75e-03
214430_at	2717	*GLA*	7.76e-03
209913_x_at	9907	*AP5Z1*	7.78e-03
224617_at	9991	*PTBP3*	7.78e-03
233080_s_at	55660	*PRPF40A*	7.78e-03
239212_at	84946	*LTV1*	7.78e-03
201667_at	2697	*GJA1*	7.79e-03
215285_s_at	10745	*PHTF1*	7.79e-03

212782_x_at	5439	*POLR2J*	7.80e-03
202683_s_at	8731	*RNMT*	7.80e-03
213021_at	9527	*GOSR1*	7.80e-03
215084_s_at	115353	*LRRC42*	7.80e-03
228254_at	10254	*STAM2*	7.83e-03
225989_at	26091	*HERC4*	7.83e-03
224162_s_at	79791	*FBXO31*	7.84e-03
202971_s_at	8445	*DYRK2*	7.85e-03
233019_at	29883	*CNOT7*	7.85e-03
235369_at	122525	*C14orf28*	7.85e-03
235709_at	283431	*GAS2L3*	7.85e-03
202289_s_at	10579	*TACC2*	7.86e-03
233226_at	5780	*PTPN9*	7.87e-03
213552_at	26035	*GLCE*	7.87e-03
238013_at	59339	*PLEKHA2*	7.87e-03
225308_s_at	85461	*TANC1*	7.87e-03
235352_at	3140	*MR1*	7.88e-03
218032_at	8303	*SNN*	7.88e-03
205655_at	4194	*MDM4*	7.89e-03
204928_s_at	8273	*SLC10A3*	7.89e-03
217863_at	8554	*PIAS1*	7.89e-03
226609_at	285761	*DCBLD1*	7.89e-03
225361_x_at	159090	*FAM122B*	7.90e-03
203745_at	3052	*HCCS*	7.91e-03
210840_s_at	8826	*IQGAP1*	7.91e-03
228310_at	55740	*ENAH*	7.91e-03
224677_x_at	280636	*C11orf31*	7.92e-03
207616_s_at	10010	*TANK*	7.93e-03
201154_x_at	6124	*RPL4*	7.94e-03
225999_at	57494	*RIMKLB*	7.94e-03
201767_s_at	60528	*ELAC2*	7.94e-03
205644_s_at	6637	*SNRPG*	7.95e-03
209682_at	868	*CBLB*	7.96e-03
231249_at	23334	*SZT2*	7.96e-03
225405_at	221092	*HNRNPUL2*	7.96e-03
212441_at	9778	*KIAA0232*	7.97e-03
229099_at	790955	*C11orf83*	7.97e-03
209475_at	9958	*USP15*	7.98e-03
222980_at	10890	*RAB10*	7.98e-03
1557363_a_at	55023	*PHIP*	7.98e-03

221276_s_at	81493	*SYNC*	7.99e-03
217591_at	6498	*SKIL*	8.00e-03
213118_at	23074	*UHRF1BP1L*	8.00e-03
226003_at	55605	*KIF21A*	8.00e-03
1554283_at	25819	*CCRN4L*	8.01e-03
225283_at	91947	*ARRDC4*	8.01e-03
204595_s_at	6781	*STC1*	8.02e-03
204089_x_at	4216	*MAP3K4*	8.04e-03
234926_s_at	51507	*C20orf43*	8.04e-03
201530_x_at	1973	*EIF4A1*	8.05e-03
227150_at	4520	*MTF1*	8.05e-03
205084_at	55973	*BCAP29*	8.05e-03
201901_s_at	7528	*YY1*	8.06e-03
204369_at	5290	*PIK3CA*	8.07e-03
205315_s_at	6645	*SNTB2*	8.07e-03
210600_s_at	2868	*GRK4*	8.08e-03
201751_at	9929	*JOSD1*	8.09e-03
225594_at	58487	*CREBZF*	8.09e-03
236535_at	79677	*SMC6*	8.09e-03
209472_at	56267	*CCBL2*	8.11e-03
202863_at	6672	*SP100*	8.13e-03
206081_at	9187	*SLC24A1*	8.13e-03
222438_at	29079	*MED4*	8.13e-03
201681_s_at	9231	*DLG5*	8.14e-03
225192_at	143384	*CACUL1*	8.14e-03
216044_x_at	388650	*FAM69A*	8.14e-03
217257_at	6452	*SH3BP2*	8.15e-03
1558136_s_at	6882	*TAF11*	8.15e-03
201780_s_at	11342	*RNF13*	8.15e-03
236325_at	57562	*KIAA1377*	8.15e-03
202298_at	4694	*NDUFA1*	8.16e-03
202461_at	8892	*EIF2B2*	8.16e-03
200033_at	1655	*DDX5*	8.17e-03
208015_at	4086	*SMAD1*	8.17e-03
212919_at	167227	*DCP2*	8.17e-03
219362_at	60560	*NAA35*	8.18e-03
31807_at	54555	*DDX49*	8.19e-03
226072_at	197258	*FUK*	8.19e-03
1557360_at	10128	*LRPPRC*	8.21e-03
206752_s_at	1677	*DFFB*	8.22e-03

217792_at	27131	*SNX5*	8.22e-03
1556222_at	285961	*SEPT7L*	8.22e-03
1561965_at	6629	*SNRPB2*	8.25e-03
218738_s_at	51444	*RNF138*	8.26e-03
224580_at	81539	*SLC38A1*	8.27e-03
226697_at	92689	*FAM114A1*	8.28e-03
1553292_s_at	124923	*SGK494*	8.28e-03
206236_at	2828	*GPR4*	8.29e-03
204662_at	9738	*CCP110*	8.29e-03
212421_at	23313	*KIAA0930*	8.29e-03
219482_at	54093	*SETD4*	8.29e-03
237640_at	79609	*METTL21D*	8.29e-03
214773_x_at	261726	*TIPRL*	8.29e-03
203721_s_at	51096	*UTP18*	8.30e-03
202160_at	1387	*CREBBP*	8.31e-03
219303_at	79596	*RNF219*	8.31e-03
228468_at	84930	*MASTL*	8.31e-03
201377_at	9898	*UBAP2L*	8.33e-03
224772_at	89796	*NAV1*	8.34e-03
209824_s_at	406	*ARNTL*	8.36e-03
212475_at	23080	*AVL9*	8.36e-03
211501_s_at	8662	*EIF3B*	8.37e-03
212308_at	23122	*CLASP2*	8.37e-03
233087_at	64839	*FBXL17*	8.38e-03
232014_at	90075	*ZNF30*	8.38e-03
229253_at	117145	*THEM4*	8.38e-03
203196_at	10257	*ABCC4*	8.39e-03
224852_at	55761	*TTC17*	8.39e-03
238960_s_at	113251	*LARP4*	8.40e-03
207808_s_at	5627	*PROS1*	8.41e-03
206898_at	28513	*CDH19*	8.41e-03
227020_at	388403	*YPEL2*	8.41e-03
209580_s_at	8930	*MBD4*	8.42e-03
206580_s_at	30008	*EFEMP2*	8.43e-03
201711_x_at	5903	*RANBP2*	8.44e-03
1555560_at	55757	*UGGT2*	8.44e-03
1558569_at	100131541	*LOC100131541*	8.44e-03
204227_s_at	7084	*TK2*	8.45e-03
205672_at	7507	*XPA*	8.46e-03
212373_at	10116	*FEM1B*	8.46e-03

202011_at	7082	*TJP1*	8.47e-03
218768_at	57122	*NUP107*	8.48e-03
232940_s_at	58508	*MLL3*	8.48e-03
205550_s_at	9577	*BRE*	8.50e-03
233595_at	9736	*USP34*	8.50e-03
209149_s_at	10548	*TM9SF1*	8.50e-03
212896_at	23517	*SKIV2L2*	8.50e-03
223000_s_at	50848	*F11R*	8.51e-03
204783_at	4291	*MLF1*	8.52e-03
222602_at	55236	*UBA6*	8.52e-03
228946_at	27152	*INTU*	8.53e-03
218929_at	55602	*CDKN2AIP*	8.53e-03
244871_s_at	84669	*USP32*	8.53e-03
211452_x_at	9208	*LRRFIP1*	8.54e-03
233438_at	57150	*C6orf162*	8.54e-03
212299_at	91754	*NEK9*	8.54e-03
216241_s_at	6917	*TCEA1*	8.55e-03
202574_s_at	1455	*CSNK1G2*	8.56e-03
1554271_a_at	91687	*CENPL*	8.56e-03
201664_at	10051	*SMC4*	8.57e-03
220206_at	79830	*ZMYM1*	8.57e-03
236669_at	100507495	*SDCBP2-AS1*	8.58e-03
225114_at	8540	*AGPS*	8.59e-03
240735_at	8476	*CDC42BPA*	8.60e-03
1558467_a_at	55757	*UGGT2*	8.61e-03
223401_at	56985	*ADPRM*	8.61e-03
229146_at	136895	*C7orf31*	8.61e-03
204387_x_at	78988	*MRP63*	8.62e-03
234947_s_at	63877	*FAM204A*	8.63e-03
201599_at	4942	*OAT*	8.64e-03
211956_s_at	10209	*EIF1*	8.64e-03
215548_s_at	23256	*SCFD1*	8.64e-03
218442_at	7268	*TTC4*	8.66e-03
1559534_at	100996419	*LOC100996419*	8.66e-03
203336_s_at	9270	*ITGB1BP1*	8.67e-03
214696_at	84981	*MIR22HG*	8.67e-03
203232_s_at	6310	*ATXN1*	8.68e-03
212458_at	200734	*SPRED2*	8.68e-03
235122_at	59269	*HIVEP3*	8.69e-03
207922_s_at	10296	*MAEA*	8.71e-03

211680_at	10611	*PDLIM5*	8.71e-03
222715_s_at	11276	*SYNRG*	8.71e-03
210829_s_at	23635	*SSBP2*	8.71e-03
226607_at	25943	*C20orf194*	8.71e-03
225646_at	1075	*CTSC*	8.72e-03
203630_s_at	10466	*COG5*	8.72e-03
1559413_at	255394	*TCP11L2*	8.72e-03
212104_s_at	23543	*RBFOX2*	8.73e-03
211787_s_at	1973	*EIF4A1*	8.74e-03
228334_x_at	80817	*CEP44*	8.74e-03
226909_at	85460	*ZNF518B*	8.74e-03
241379_at	200558	*APLF*	8.74e-03
225040_s_at	6120	*RPE*	8.76e-03
228287_at	84289	*ING5*	8.76e-03
213379_at	27235	*COQ2*	8.78e-03
202399_s_at	10239	*AP3S2*	8.81e-03
1554966_a_at	11259	*FILIP1L*	8.81e-03
210498_at	1213	*CLTC*	8.82e-03
205593_s_at	5152	*PDE9A*	8.82e-03
202813_at	6894	*TARBP1*	8.82e-03
220688_s_at	51154	*MRTO4*	8.82e-03
222428_s_at	51520	*LARS*	8.82e-03
212641_at	3097	*HIVEP2*	8.84e-03
223184_s_at	56894	*AGPAT3*	8.84e-03
1569129_s_at	285237	*C3orf38*	8.84e-03
209649_at	10254	*STAM2*	8.85e-03
221545_x_at	10025	*MED16*	8.86e-03
201182_s_at	1108	*CHD4*	8.88e-03
219848_s_at	9668	*ZNF432*	8.88e-03
233124_s_at	55862	*ECHDC1*	8.88e-03
222537_s_at	56882	*CDC42SE1*	8.88e-03
239010_at	503639	*DUXAP10*	8.88e-03
201615_x_at	800	*CALD1*	8.89e-03
209744_x_at	83737	*ITCH*	8.89e-03
226255_at	10009	*ZBTB33*	8.91e-03
203723_at	3707	*ITPKB*	8.92e-03
222014_x_at	25821	*MTO1*	8.95e-03
213051_at	56829	*ZC3HAV1*	8.95e-03
1556203_a_at	23380	*SRGAP2*	8.96e-03
214129_at	9659	*PDE4DIP*	8.97e-03

231713_s_at	55250	*ELP2*	8.98e-03
212043_at	10618	*TGOLN2*	8.99e-03
203583_at	25972	*UNC50*	8.99e-03
243109_at	55784	*MCTP2*	8.99e-03
212950_at	221395	*GPR116*	8.99e-03
209412_at	7109	*TRAPPC10*	9.01e-03
201487_at	1075	*CTSC*	9.02e-03
235492_at	154214	*RNF217*	9.02e-03
203323_at	858	*CAV2*	9.03e-03
218068_s_at	79894	*ZNF672*	9.04e-03
232291_at	407975	*MIR17HG*	9.05e-03
200682_s_at	7332	*UBE2L3*	9.08e-03
218652_s_at	54872	*PIGG*	9.08e-03
209523_at	6873	*TAF2*	9.09e-03
206158_s_at	7555	*CNBP*	9.09e-03
235051_at	152137	*CCDC50*	9.09e-03
241854_at	1773	*DNASE1*	9.14e-03
202560_s_at	26097	*CHTOP*	9.14e-03
228667_at	56895	*AGPAT4*	9.14e-03
226753_at	143684	*FAM76B*	9.14e-03
200963_x_at	6160	*RPL31*	9.15e-03
222347_at	644450	*LOC644450*	9.15e-03
227069_at	1523	*CUX1*	9.16e-03
205854_at	7289	*TULP3*	9.16e-03
1559593_a_at	9441	*MED26*	9.16e-03
219806_s_at	56935	*C11orf75*	9.18e-03