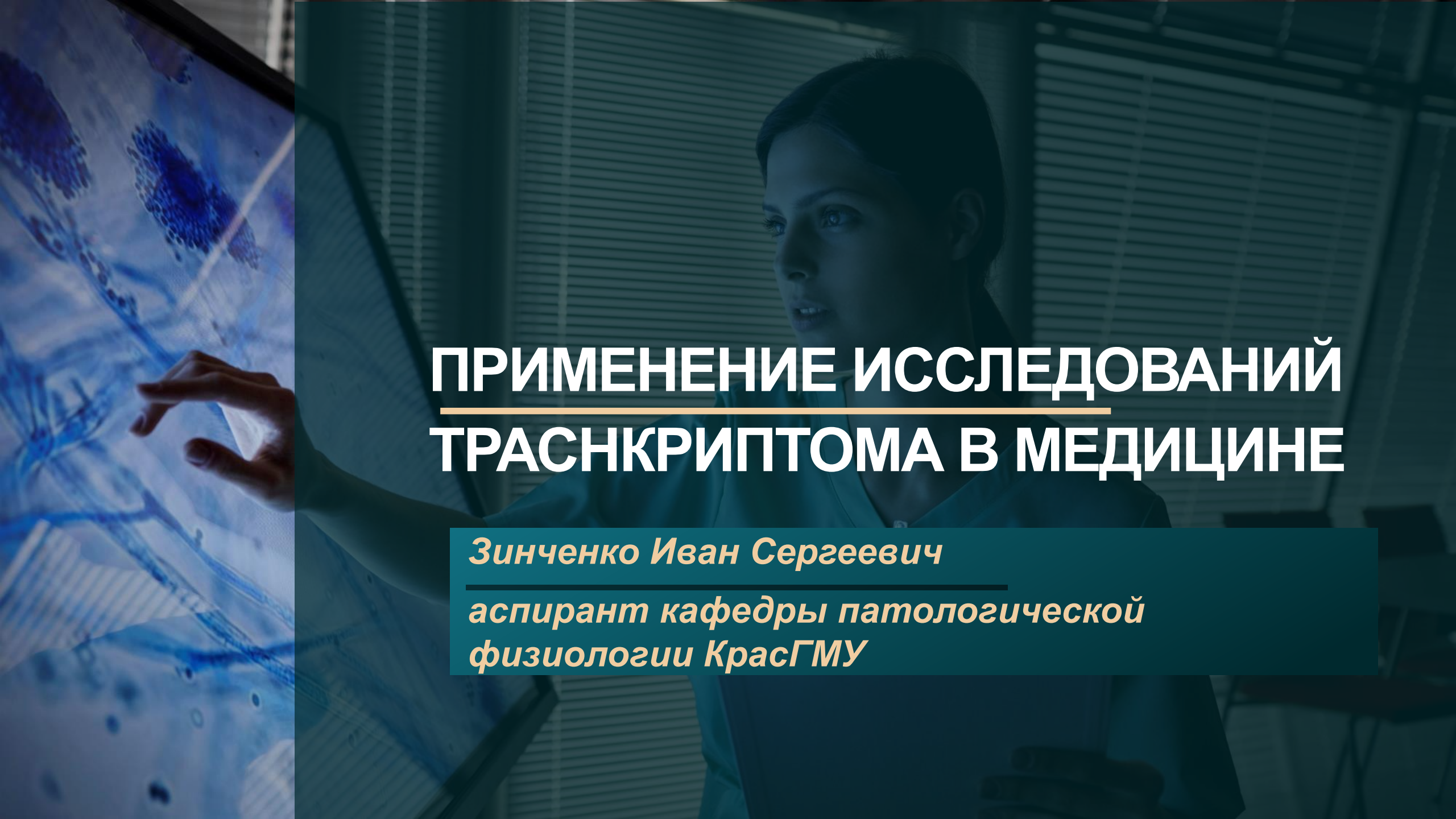
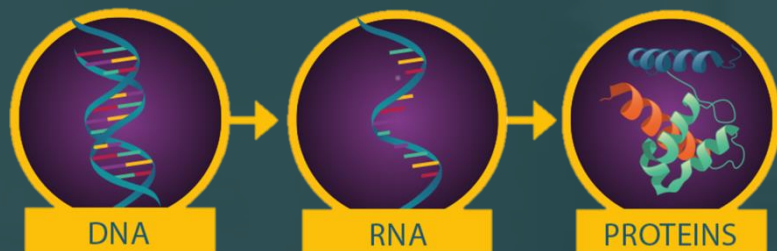




ПРИМЕНЕНИЕ ИССЛЕДОВАНИЙ ТРАНСКРИПТОМА В МЕДИЦИНЕ

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ПРОГРАММА «ГЕНОМ ЧЕЛОВЕКА»

Транскриптом – совокупность всех транскриптов РНК, продуцируемых геномом в определенное время

Менее 2% генома кодируют белки.

20 000 – 25 000 кодирующих генов.

Кодируют более 100 000 белковых молекул.



МЕТОДЫ ПОЛУЧЕНИЯ ТРАНСКРИПТОМА



Микрочипирование (Microarray)

- **Плюсы**

Относительная дешевизна и доступность

Простота интерпретации полученных результатов

- **Минусы**

Чувствительность

Получаем заранее известные последовательности



Секвенирование нового поколения (NGS)

- **Плюсы**

Чувствительность

Получаем всю последовательность нуклеотидов на определенном участке

- **Минусы**

Дороговизна 

Для интерпретации результатов требуется специалист

МИКРОЧИПИРОВАНИЕ

Синтез первой одноцепочечной кДНК

Отчистка

Синтез 3'адаптера

Синтез двуцепочечной кДНК

Синтез комплементарной РНК

Отчистка кРНК

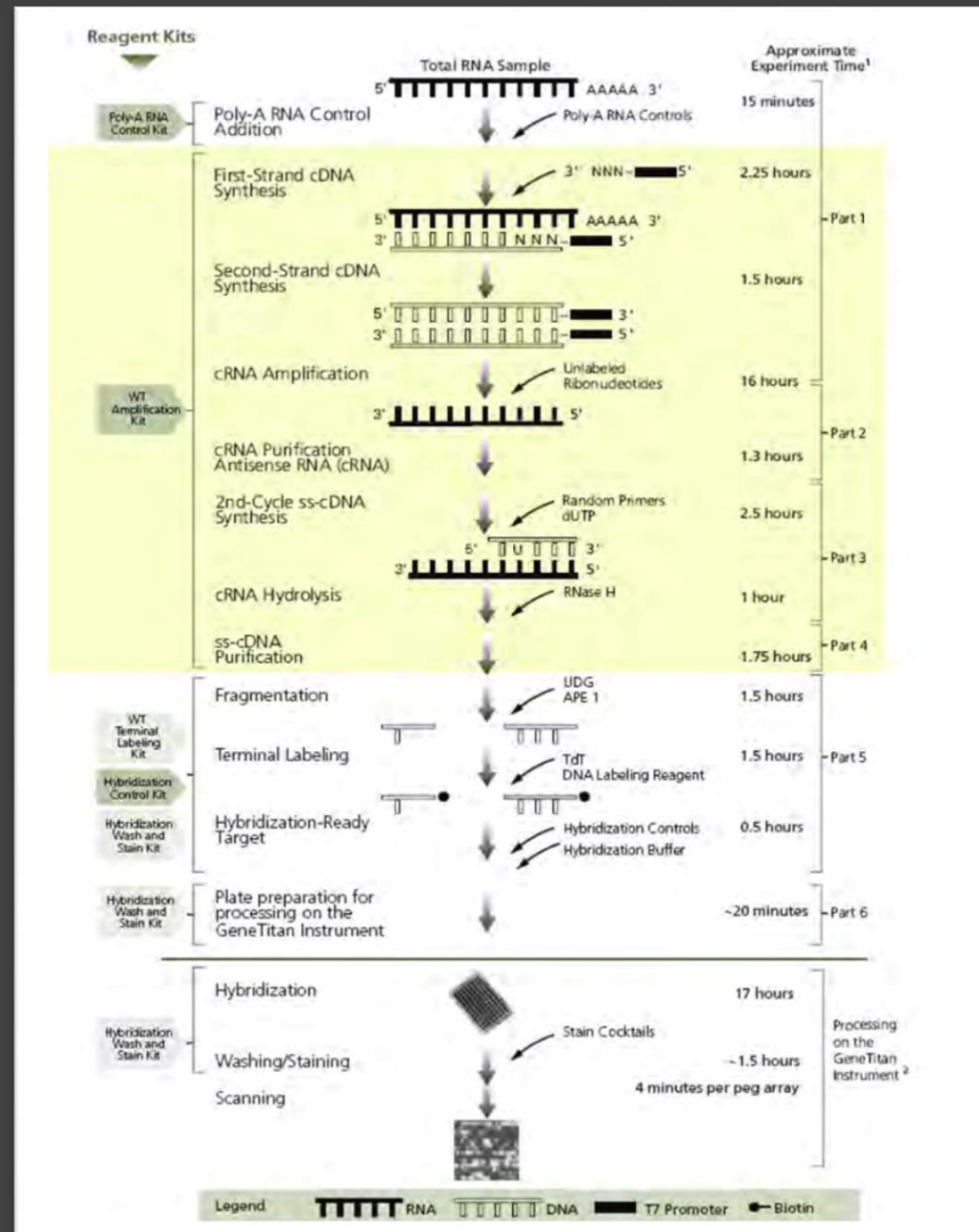
Синтез кДНК второго цикла

Гидролиз кРНК с помощью РНКазой

Отчистка кДНК

Фрагментация и мечение оц-кДНК

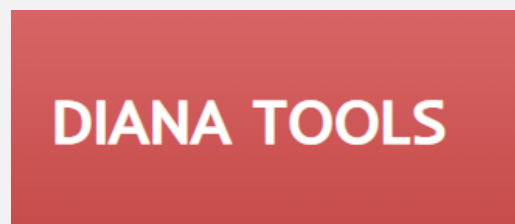
Гибридизации фрагментов на чип матрицы



ИНТЕРПРЕТАЦИЯ РЕЗУЛЬТАТОВ



БИОИНФОРМАТИЧЕСКИЙ АНАЛИЗ



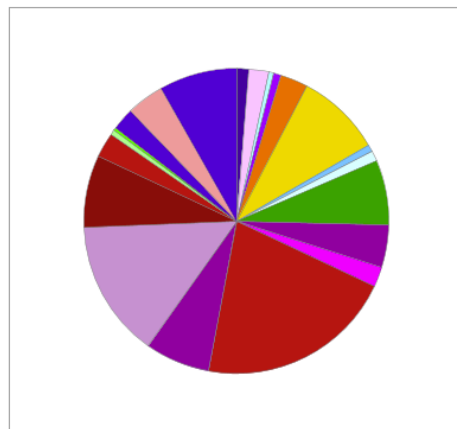
PANTHER GO



Select Ontology: **Protein Class** View: **100%**

PANTHER Protein Class

Total # Genes: 583 Total # protein class hits: 378



**Chart tooltips are read as: Category name (Accession): # genes; Percent of gene hit against total # genes; Percent of gene hit against total # Protein Class hits

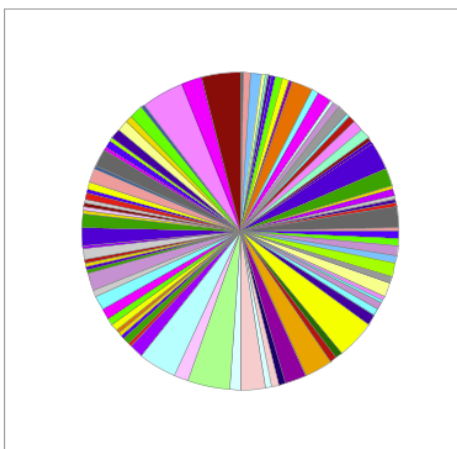
Click to get gene list for a category:

- [calcium-binding protein \(PC00060\)](#)
- [cell adhesion molecule \(PC00069\)](#)
- [cell junction protein \(PC00070\)](#)
- [chaperone \(PC00072\)](#)
- [chromatin/chromatin-binding, or -regulatory protein \(PC00077\)](#)
- [cytoskeletal protein \(PC00085\)](#)
- [defense/immunity protein \(PC00090\)](#)
- [extracellular matrix protein \(PC00102\)](#)
- [gene-specific transcriptional regulator \(PC00264\)](#)
- [intercellular signal molecule \(PC00207\)](#)
- [membrane traffic protein \(PC00150\)](#)
- [metabolite interconversion enzyme \(PC00262\)](#)
- [nucleic acid metabolism protein \(PC00171\)](#)
- [protein modifying enzyme \(PC00260\)](#)
- [protein-binding activity modulator \(PC00095\)](#)
- [scaffold/adaptor protein \(PC00226\)](#)
- [structural protein \(PC00211\)](#)
- [transfer/carrier protein \(PC00219\)](#)
- [translational protein \(PC00263\)](#)
- [transmembrane signal receptor \(PC00197\)](#)
- [transporter \(PC00227\)](#)

Select Ontology: **Pathway** View: **100%**

PANTHER Pathway

Total # Genes: 583 Total # pathway hits: 280



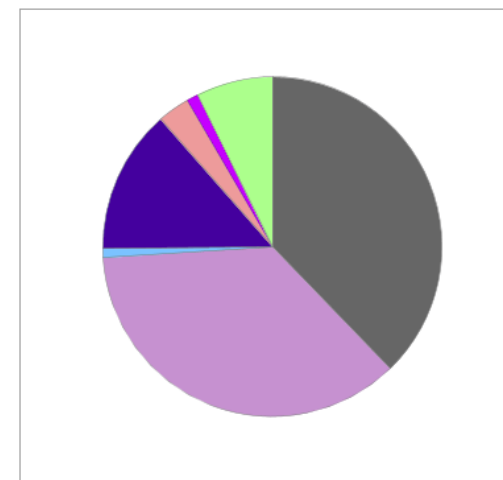
Click to get gene list for a category:

- [5-Hydroxytryptamine degradation \(P04372\)](#)
- [SHT1 type receptor mediated signaling pathway \(P04373\)](#)
- [SHT2 type receptor mediated signaling pathway \(P04374\)](#)
- [SHT4 type receptor mediated signaling pathway \(P04376\)](#)
- [Acetate utilization \(P02722\)](#)
- [Alanine biosynthesis \(P02724\)](#)
- [Alpha adrenergic receptor signaling pathway \(P00002\)](#)
- [Alzheimer disease-amyloid secretase pathway \(P00003\)](#)
- [Alzheimer disease-presenilin pathway \(P00004\)](#)
- [Androgen/estrogen/progesterone biosynthesis \(P02727\)](#)
- [Angiogenesis \(P00005\)](#)
- [Angiotensin II-stimulated signaling through G proteins and beta-arrestin \(P05911\)](#)
- [Apoptosis signaling pathway \(P00006\)](#)
- [Asparagine and aspartate biosynthesis \(P02730\)](#)
- [Axon guidance mediated by Slit/Robo \(P00008\)](#)
- [Axon guidance mediated by netrin \(P00009\)](#)
- [Axon guidance mediated by semaphorins \(P00007\)](#)
- [B cell activation \(P00010\)](#)
- [Beta1 adrenergic receptor signaling pathway \(P04377\)](#)

Select Ontology: **Molecular Function** View: **100%**

PANTHER GO-Slim Molecular Function

Total # Genes: 583 Total # function hits: 453



Click to get gene list for a category:

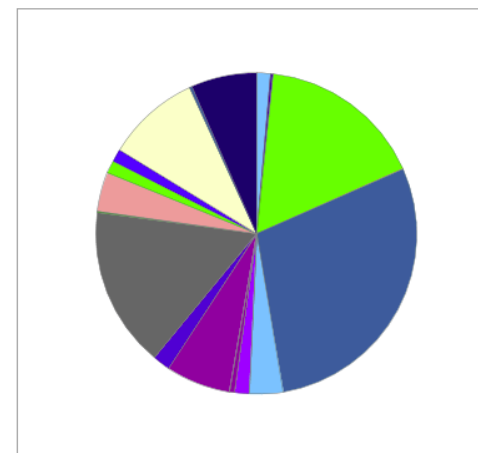
- [binding \(GO:0005488\)](#)
- [catalytic activity \(GO:0003824\)](#)
- [molecular adaptor activity \(GO:0060090\)](#)
- [molecular function regulator \(GO:0098772\)](#)
- [molecular transducer activity \(GO:0060089\)](#)
- [structural molecule activity \(GO:0005198\)](#)
- [transporter activity \(GO:0005215\)](#)

Color picker powered by Web Colors by VisiBone

Select Ontology: **Biological Process** View: **100%**

PANTHER GO-Slim Biological Process

Total # Genes: 583 Total # process hits: 1157



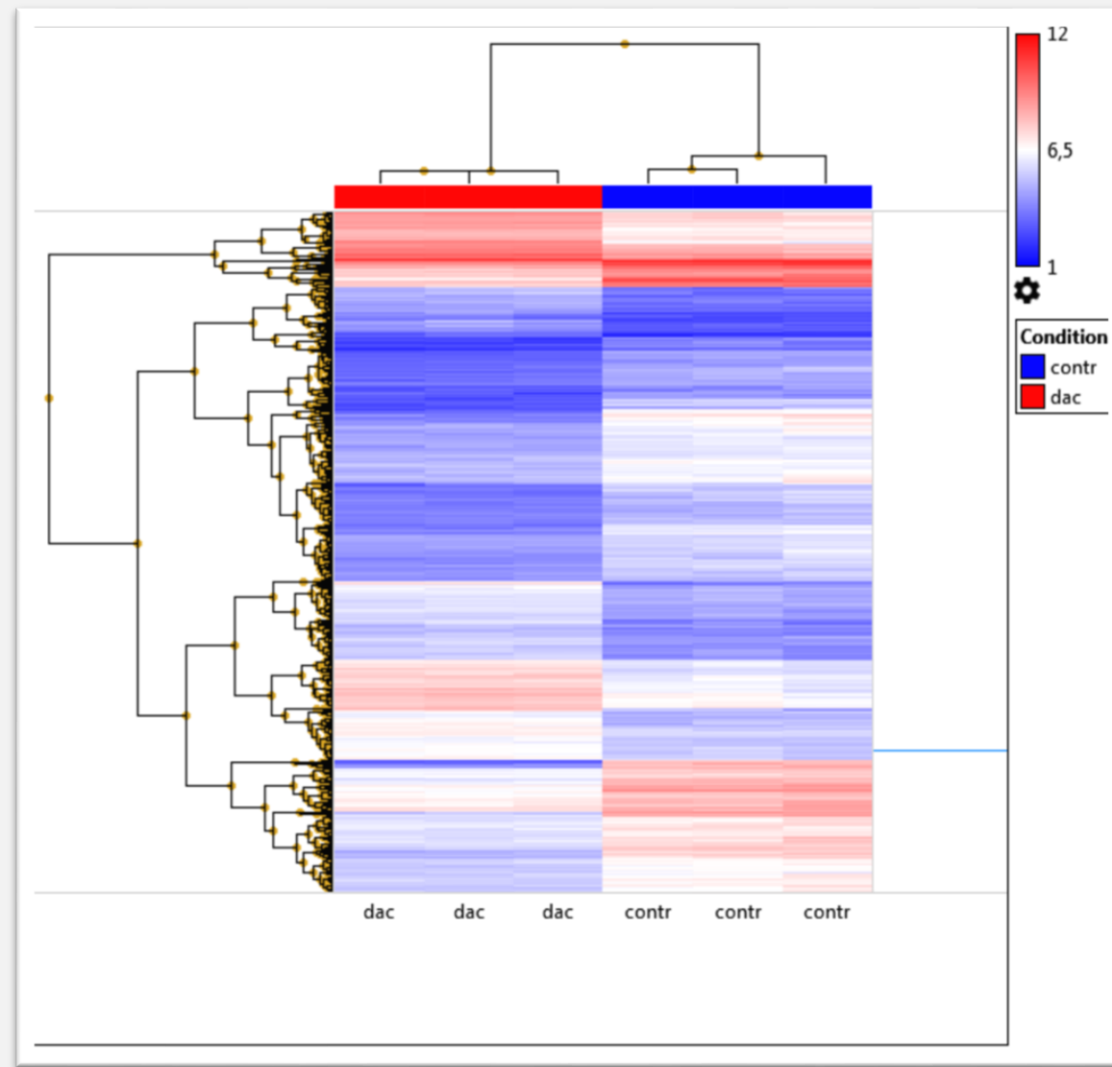
Click to get gene list for a category:

- [biological adhesion \(GO:0022610\)](#)
- [biological phase \(GO:0044848\)](#)
- [biological regulation \(GO:0065007\)](#)
- [biomineralization \(GO:0110148\)](#)
- [cellular process \(GO:0009987\)](#)
- [developmental process \(GO:0032502\)](#)
- [growth \(GO:0040007\)](#)
- [immune system process \(GO:0002376\)](#)
- [interspecies interaction between organisms \(GO:0044419\)](#)
- [localization \(GO:0051179\)](#)
- [locomotion \(GO:0040011\)](#)
- [metabolic process \(GO:0008152\)](#)
- [multi-organism process \(GO:0051704\)](#)
- [multicellular organismal process \(GO:0032501\)](#)
- [reproduction \(GO:0000003\)](#)
- [reproductive process \(GO:0022414\)](#)
- [response to stimulus \(GO:0050896\)](#)
- [rhythmic process \(GO:0048511\)](#)
- [signaling \(GO:0023052\)](#)

БИОИНФОРМАТИЧЕСКИЙ АНАЛИЗ КЛЕТОК МЕЛАНОМЫ

ID count: 1456	Gene Symbol	contr Avg (log2)	dac Avg (log2)	Fold Change	P-val	FDR P-val	Description
16666485	IFI44L	8,05	2,93	34,78	1,09E-11	5,23E-07	interferon-induced protei...
16757373	OAS2	9,03	4,4	24,67	5,42E-11	7,78E-07	2-5-oligoadenylate synth...
17108816	MXRA5	7,56	2,89	25,34	8,12E-11	7,78E-07	matrix-remodelling assoc...
16705011	DKK1	7,59	2,86	26,52	9,41E-11	7,78E-07	dickkopf WNT signaling...
17020846	COL12A1	8,15	3,11	33	1,11E-10	7,78E-07	collagen, type XII, alpha 1
16757324	OAS1	8,15	4,34	14,01	1,14E-10	7,78E-07	2-5-oligoadenylate synth...
16908037	FN1	11,47	7,8	12,69	1,17E-10	7,78E-07	fibronectin 1
17059355	SEMA3D	5,78	2,55	9,41	1,55E-10	7,78E-07	sema domain, immunogl...
16773727	RXFP2	6,4	3,03	10,38	1,56E-10	7,78E-07	relaxin/insulin-like family...
16785127	RHOJ	7,37	3,13	18,8	1,61E-10	7,78E-07	ras homolog family mem...
16997816	EDIL3	8,28	4,14	17,61	2,13E-10	8,08E-07	EGF-like repeats and disc...
17059119	SEMA3C	8,04	4,71	10,06	2,16E-10	8,08E-07	sema domain, immunogl...
16965377	SLIT2	6,37	3,27	8,57	2,31E-10	8,08E-07	slit guidance ligand 2
16968735	HERC6	8,58	4,43	17,76	2,35E-10	8,08E-07	HECT and RLD domain c...
17083370	PDCD1LG2	6,67	3,83	7,2	4,57E-10	1,47E-06	programmed cell death 1...
16981730	VEGFC	10,48	7,9	5,96	6,04E-10	1,81E-06	vascular endothelial grow...
16947357	PTX3	6,92	2,99	15,23	7,12E-10	1,81E-06	pentraxin 3, long
16666509	IFI44	9,9	7,01	7,43	7,12E-10	1,81E-06	interferon-induced protei...
16714618	ANK3	8,54	5,3	9,43	7,96E-10	1,92E-06	ankyrin 3, node of Ranvie...
16830202	XAF1	8,9	5,72	9,03	9,34E-10	2,15E-06	XIAP associated factor 1
16897834	EFEMP1	7,26	4,02	9,49	1,05E-09	2,24E-06	EGF containing fibulin-lik...
16994272	SEMA5A	6,62	3,98	6,25	1,09E-09	2,24E-06	sema domain, seven thro...
16996684	ADAMTS6	6,14	3,18	7,82	1,12E-09	2,24E-06	ADAM metalloproteinase...
17067696	NRG1	7,51	4,59	7,57	1,30E-09	2,36E-06	neuregulin 1
16852871	SERPINF...	8,97	5,73	9,46	1,32E-09	2,36E-06	serpin peptidase inhibitor...

Изменение экспрессии в 607 генах.
Повысилась в 263 генах
Снизилась – 344 генах



Cell cycle Signaling Pathway
VEGFA-VEGFR2 Signaling Pathway

СПАСИБО ЗА ВНИМАНИЕ!



Зинченко Иван Сергеевич

АСПИРАНТ КАФЕДРЫ ПАТОЛОГИЧЕСКОЙ ФИЗИОЛОГИИ



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