

## **Proteomic profile of maternal aged blastocoel fluid suggests a novel role for ubiquitin system in blastocyst quality**

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**Table S4: Functional analysis of differentially expressed proteins.** The proteins were manually grouped according to their function in biological processes taking into account, besides GOMF, GOBP and GOCC, also keywords and annotations known from the literature. It was therefore possible to ascribe each protein to 6 major groups: 1) fertilization and embryo implantation, 2) embryo development, 3) nucleic acid interaction, 4) signaling, 5) uncharacterized proteins. Proteins excluded from the groups listed above were categorized as “other”. The table lists only the proteins present and quantified in at least 3 out of 5 technical repeats using a false positive rate of 0.05 and minimum peptide length 9 amino acids, reporting bold the proteins identified with FDR 0.01.

Under expressed in B or present only in A			Over expressed or present only in B			
	Gene Name	Protein name		Gene name	Protein name	
<b>Fertilization, Embryo pre-implantation, Implantation</b>	only A	C17orf75		only B	DEFB121	Beta-defensin 121
	only A	KLK12	Kallikrein-12			
	only A	LAMC1	Laminin subunit gamma-1			
	only A	PSMD4	26S proteasome non-ATPase regulatory subunit 4			
	only A	RANGAP1	Ran GTPase-activating protein 1			
		<b>FAAH2</b>	Fatty-acid amide hydrolase 2			
		<b>CALM2;CALM1</b>	Calmodulin			
		UCHL1	Ubiquitin carboxyl-terminal hydrolase isozyme L1			
	<b>CSTA</b>	Cystatin-A				
<b>Embryo development</b>	only A	<b>AMY1A;AMY2A...</b>	Alpha-amylase 1;Pancreatic alpha-amylase;Alpha-amylase 2B	only B	DAB1	Isoform DAB553 of Disabled homolog 1
	only A	ATR	Serine/threonine-protein kinase ATR	only B	OFD1	Oral-facial-digital syndrome 1 protein
	only A	KIF21A	Kinesin-like protein KIF21A			
	only A	<b>LTF</b>	Lactotransferrin;Kaliocin-1;Lactoferroxin-A;Lactoferroxin-B;Lactoferroxin-C	only B	<b>SOX2</b>	Transcription factor SOX-2
	only A	MSI2	RNA-binding protein Musashi homolog 2	only B	GPC3	Glypican-3;Secreted glypican-3
	only A	NR0B1	Nuclear receptor subfamily 0 group B member 1	only B	<b>MUCL1</b>	Mucin-like protein 1
	only A	SLC4A5	Electrogenic sodium bicarbonate cotransporter 4	only B	CEP89	Centrosomal protein of 89 kDa
	only A	UNC45A	Protein unc-45 homolog A		BROMI;C6orf170	Protein broad-minded
		<b>DSG1</b>	Desmoglein-1		<b>UBQLN2</b>	Ubiquilin-2
		<b>GALNT9</b>	Polypeptide N-acetylgalactosaminyltransferase 9		MYO1E	Unconventional myosin-Ie
		SLC2A5	Solute carrier family 2, facilitated glucose transporter member 5		EVL	Ena/VASP-like protein
		CDSN	Corneodesmosin		<b>JUP</b>	Junction plakoglobin

<b>INS-IGF2;INS</b>	Insulin;Insulin B chain;Insulin A chain
<b>S100A8</b>	Protein S100-A8
<b>BAIAP2</b>	Brain-specific angiogenesis inhibitor 1-associated protein 2
<b>TNRC6C</b>	Trinucleotide repeat-containing gene 6C protein
MEIS1	Homeobox protein Meis1
<b>BORA;FLJ22624</b>	Protein aurora borealis
CEP250	Centrosome-associated protein CEP250
ALDH1A2	Isoform 3 of Retinal dehydrogenase 2
PAM	Peptidyl-glycine alpha-amidating monooxygenase....
<b>PRSS1</b>	Trypsin-1;Alpha-trypsin chain 1;Alpha-trypsin chain 2
<b>HMCN1</b>	Hemicentin-1
<b>SBSN</b>	Suprabasin
<b>LCN1;LCNIP1</b>	Lipocalin-1;Putative lipocalin 1-like protein 1
<b>DMBT1</b>	Deleted in malignant brain tumors 1 protein
<b>PMCH</b>	Pro-MCH;Neuropeptide-glycine-glutamic acid...

#### Nucleic Acid interaction

only A	<b>PCGF1</b>	Polycomb group RING finger protein 1	only B	<b>H2AFX;HIST1H2AA;HIST1H2AB....</b>	Histone H2A.x;Histone H2A type 1-A;Histone H2A type 1-B/E;Histone H2A type 1.....
	<b>NRBF2</b>	Nuclear receptor-binding factor 2	only B	<b>HIST1H4A</b>	Histone H4
	NFIB	Nuclear factor 1;Nuclear factor 1 B-type	only B	<b>EEF1A2;EEF1A1;EEF1A1P5</b>	Elongation factor 1-alpha 2;Elongation factor 1-alpha 1;Putative elongation factor 1-alpha-like 3
			only B	<b>HIST2H2BF;HIST1H2BK....</b>	Histone H2B;Histone H2B type 1-K;Histone H2B type 1-J;Histone H2B type 1-O.....
				BEND4	BEN domain-containing protein 4

#### Signalling

only A	DOCK4	Dedicator of cytokinesis protein 4	only B	PLCB4	1-phosphatidylinositol 4,5-bisphosphate phosphodiesterase beta-4
only A	EIF2AK1	Eukaryotic translation initiation factor 2-alpha kinase 1	only B	GPR160	Probable G-protein coupled receptor 160
only A	<b>EIF4EBP2</b>	Eukaryotic translation initiation factor 4E-binding protein 2		<b>SH2B1</b>	SH2B adapter protein 1
only A	TREML2	Trem-like transcript 2 protein		PPP1R8	Isoform Gamma of Nuclear inhibitor of protein phosphatase 1
only A	ZAK	Isoform 2 of Mitogen-activated protein kinase kinase kinase MLT			
only A	ZFAND6	AN1-type zinc finger protein 6			
only A	NGFRAP1	Isoform 2 of Protein BEX3			
	<b>PTCH1</b>	Isoform S of Protein patched homolog 1			

<b>Uncharacterized</b>	only A	<b>C3orf51</b>	Putative uncharacterized protein C3orf51	only B	NCRNA00204	Putative uncharacterized protein CXorf52B
	only A	<b>XKR4</b>	XK-related protein 4	only B	PCNXL3	Pecanex-like protein 3
	only A	FAM189A1	Isoform 2 of Protein FAM189A1			
		C9orf43	Uncharacterized protein C9orf43			
		KIAA1671	Uncharacterized protein KIAA1671			
		<b>HEATR8</b>	Maestro heat-like repeat-containing protein family member 7			
		<b>CCDC77</b>	Coiled-coil domain-containing protein 77			
		<b>MORC4</b>	MORC family CW-type zinc finger protein 4			
<b>Others</b>	only A	ISCU	Isoform 2 of Iron-sulfur cluster assembly enzyme ISCU, mitochondrial	only B	C1orf61	Protein CROC-4
	only A	<b>KCTD2</b>	BTB/POZ domain-containing protein KCTD2		MAT2B	Isoform 5 of Methionine adenosyltransferase 2 subunit beta
	only A	KLHL17	Kelch-like protein 17		<b>CHGB</b>	Secretogranin-1;GAWK peptide;CCB peptide
	only A	MAGEC3	MAGEC3 protein		SLC35B3	Adenosine 3-phospho 5-phosphosulfate transporter 2
	only A	<b>MPDZ</b>	Multiple PDZ domain protein		<b>SSFA2</b>	Sperm-specific antigen 2
	only A	SCGB2A1	Mammaglobin-B		AANAT	Serotonin N-acetyltransferase
	only A	<b>SPINK5</b>	Isoform long of Serine protease inhibitor Kazal-type 5		<b>KPRP</b>	Keratinocyte proline-rich protein
	only A	AKT1S1	Isoform 3 of Proline-rich AKT1 substrate 1		<b>PDZD4</b>	PDZ domain-containing protein 4
		<b>LCN10</b>	Epididymal-specific lipocalin-10		EPG5	Ectopic P granules protein 5 homolog
		<b>UBC;UBB;RPS27A;UBA52</b>	Polyubiquitin-C;Ubiquitin;Polyubiquitin-B;Ubiquitin.....		INADL	Isoform 5 of InaD-like protein
		<b>MFSD9</b>	Major facilitator superfamily domain-containing protein 9			
		<b>IFNA10;IFNA21;IFNA17....</b>	Interferon alpha-10;Interferon alpha-21....			
		<b>RNF223</b>	RING finger protein 223			
		CEP112	Centrosomal protein of 112 kDa			
		<b>LYZ</b>	Lysozyme C			
		<b>DCD</b>	Dermcidin;Survival-promoting peptide;DCD-1			
		CALML5	Calmodulin-like protein 5			
		<b>S100A7;S100A7A</b>	Protein S100-A7;Protein S100-A7A			
		LETM1	LETM1 and EF-hand domain-containing protein 1, mitochondrial			
		<b>ADAMTS17</b>	A disintegrin and metalloproteinase with thrombospondin motifs 17			
		<b>GOLM1</b>	Golgi membrane protein 1			

