Supplementary material

Supplementary figure captions:

Figure S1: Interaction network of the chemical barrier proteins in serum. Each circle represents a protein and the lines indicate interactions. The lines with an arrow represent activation, blocking lines represent inhibition, and simple lines represent protein–protein interaction. Line color indicates the type of interaction: green color refers to activation, red color to inhibition, blue color to binding, yellow color to co-expression and purple color to catalysis. The proteins are labeled with their gene name. The identified small clusters are composed of the following proteins: cluster 1: calpains, clusters 2 and 3: disintegrin and metalloproteinase domain-containing proteins, cluster 4: several members of the S100 family, cluster 5: amylases, cluster 6: plastin, gelsolin and drebrin-like protein and cluster 7: carboxypeptidases.

Figure S2: Interaction network of the chemical barrier proteins in tears. Each circle represents a protein and the lines indicate interactions. The lines with an arrow represent activation, blocking lines represent inhibition, and simple lines represent protein–protein interaction. Line color indicates the type of interaction: green color refers to activation, red color to inhibition, blue color to binding, yellow color to co-expression and purple color to catalysis. The proteins are labeled with their gene name. The small clusters are composed of the following proteins: cluster 1: members of the S100 family and peptidoglycan recognition proteins, cluster 2: calpains and other proteases and cluster 3: plastin, gelsolin and drebrin-like protein.

Figure S3: Interaction network of the chemical barrier proteins in saliva. Each circle represents a protein and the lines indicate interactions. The lines with an arrow represent activation, blocking lines represent inhibition, and simple lines represent protein–protein interaction. Line color indicates the type of interaction: green color refers to activation, red color to inhibition, blue color to binding, yellow color to co-expression and purple color to catalysis. The proteins are labeled with their gene name. The small clusters are composed of the following proteins: clusters 1 and 2: members of the S100 family and peptidoglycan recognition proteins, cluster 3: calpains and other pro-teases, cluster 4: plastin, gelsolin and drebrin-like protein, and cluster 5: amylases.

Figure S4: Interaction network of the chemical barrier proteins in nasal secretion. Each circle represents a protein and the lines indicate interactions. The lines with an arrow represent activation, blocking lines represent inhibition, and simple lines represent protein–protein interaction. Line color indicates the type of interaction: green color refers to activation, red color to inhibition, blue color to binding, yellow color to co-expression and purple color to catalysis. The proteins are labeled with their gene name. The minor clusters are composed of the following proteins: clusters 1-2: members of the S100 family and calpains (cluster 2) and cluster 3: beta-hexosaminidases.

Figure S5: Interaction network of the chemical barrier proteins in sweat. Each circle represents a protein and the lines indicate interactions. The lines with an arrow represent activation, blocking lines represent inhibition, and simple lines represent protein–protein interaction. Line color indicates the type of interaction: green color refers to activation, red color to inhibition, blue color to binding, yellow color to co-expression and purple color to catalysis. The proteins are labeled with their gene name. The minor clusters are composed of the following proteins: clusters 1-3: members of the S100 family and peptidoglycan recognition proteins (cluster 1) and cluster 4: protease inhibitors.

Figure S6: Interaction network of the chemical barrier proteins in urine. Each circle represents a protein and the lines indicate interactions. The lines with an arrow represent activation, blocking lines represent inhibition, and simple lines represent protein–protein interaction. Line color indicates the type of interaction: green color refers to activation, red color to inhibition, blue color to binding, yellow color to co-expression and purple color to catalysis. The proteins are labeled with their gene name. The minor clusters are composed of the following proteins: clusters 1-3: members of the S100 family, cluster 2: peptidoglycan recognition proteins, cluster 3: calpains, cluster 4: disintegrin and metalloproteinase domain-containing proteins, cluster 5: plastin, gelsolin and drebrin-like protein and cluster 6: amylases.

Figure S7: Interaction network of the chemical barrier proteins in cervicovaginal fluid. Each circle represents a protein and the lines indicate interactions. The lines with an arrow represent activation, blocking lines represent inhibition, and simple lines represent protein–protein interaction. Line color indicates the type of interaction: green color refers to activation, red color to inhibition, blue color to binding, yellow color to co-expression and purple color to catalysis. The proteins are labeled with their gene name. The minor clusters are composed of the following proteins: clusters 1 and 2: the members of the S100 family, cluster 3: calpains and other proteases, cluster 4: plastin, gelsolin and drebrin-like protein and cluster 5: amylases.

Figure S8: Interaction network of the chemical barrier proteins in the seminal fluid. Each circle represents a protein and the lines indicate interactions. The lines with an arrow represent activation, blocking lines represent inhibition, and simple lines represent protein–protein interaction. Line color indicates the type of interaction: green color refers to activation, red color to inhibition, blue color to binding, yellow color to co-expression and purple color to catalysis. The proteins are labeled with their gene name. The minor clusters are composed of the following proteins: cluster 1: several members of the S100 family, cluster 2: calpains and other proteases, cluster 3: plastin, gelsolin and drebrin-like protein, cluster 4: amylases, cluster 5: disinteg-rin and metalloproteinase domain-containing proteins, and cluster 6: protease enzymes.

Figure S9: Interaction network of the chemical barrier proteins in CSF. Each circle represents a protein and the lines indicate interactions. The lines with an arrow represent activation, blocking lines represent inhibition, and simple lines represent protein–protein interaction. Line color indicates the type of interaction: green color refers to activation, red color to inhibition, blue color to binding, yellow color to co-expression and purple color to catalysis. The proteins are labeled with their gene name. The minor clusters are composed of the following proteins: cluster 1: calpains, cluster 2: members of the S100 family, cluster 3: carboxypeptidases, cluster 4: amylases and cluster 5: gelsolin and drebrin-like protein.

Supplementary tables:

Table S1. Proteins involved in the first line of host defense in serum.

Protein name	UniProt entry	Function	Reference
Acrosin	P10323	Serine protease activity	[1]
ADAM DEC1	O15204	Immunomodulatory effect	[2]
Alpha-1-acid glycoprotein 1	P02763	Immunomodulatory effect	[3]
Alpha-1-acid glycoprotein 2	P19652	Immunomodulatory effect	[3]
Alpha-1-antichymotrypsin	P01011	Protease inhibitor	[4]
Alpha-1-antitrypsin	P01009	Protease inhibitor	[5]
Alpha-1B-glycoprotein	P04217	Immunomodulatory effect	[6]
Alpha-2-antiplasmin	P08697	Protease inhibitor	[7]
Alpha-2-HS-glycoprotein	P02765	Anti-inflammatory effect	[8]
Alpha-2-macroglobulin	P01023	Protease inhibitor	[9]
Alpha-2-macroglobulin-like protein 1	A8K2U0	Protease inhibitor	[10]
Alpha-amylase 1A	P0DUB6	Regulation of biofilm formation	[11]
Alpha-amylase 1B	P0DTE7	Regulation of biofilm formation	[11]
Alpha-amylase 1C	P0DTE8	Regulation of biofilm formation	[11]
Alpha-amylase 2B	P19961	Regulation of biofilm formation	[11]
Aminopeptidase B	Q9H4A4	Exopeptidase activity	[12]
Aminopeptidase N	P15144	Exopeptidase activity	[13]
Aminopeptidase O	Q8N6M6	Exopeptidase activity	[14]
Amyloid-beta precursor protein	P05067	Antimicrobial activity	[15]
Angiogenin	P03950	Antimicrobial activity	[16]
Antileukoproteinase	P03973	Protease inhibitor Immunomodulatory effect	[17,18]
Antithrombin-III	P01008	Protease inhibitor	[19]

Apolipoprotein A-I	P02647	Antimicrobial activity	[20]
Apolipoprotein A-II	P02652	Immunomodulatory effect	[21]
Apolipoprotein A-IV	P06727	Immunomodulatory effect	[22]
Apolipoprotein B-100	P04114	Antimicrobial activity	[23]
Apolipoprotein C-III	P02656	Immunomodulatory effect	[24]
Apolipoprotein C-IV	P55056	Immunomodulatory effect	[25]
Apolipoprotein D	P05090	Immunomodulatory effect	[26]
Apolipoprotein E	P02649	Immunomodulatory effect	[27]
Apolipoprotein L1	O14791	Immunomodulatory effect	[28]
Apolipoprotein M	O95445	Immunomodulatory effect	[29]
Arginase-1	P05089	Antifungal activity Immunomodulatory effect	[30,31]
Aspartyl aminopeptidase	Q9ULA0	Exopeptidase activity	[32]
Azurocidin	P20160	Antimicrobial activity	[33]
Bactericidal permeability-increasing protein	P17213	Antimicrobial activity	[33,34]
Beta-2-glycoprotein 1	P02749	Immunomodulatory effect	[35]
Beta-2-microglobulin	P61769	Antimicrobial activity Immunomodulatory effect	[36,37]
Beta-Ala-His dipeptidase	Q96KN2	Carboxypeptidase activity	[38]
Beta-defensin 1	P60022	Antimicrobial activity	[33]
Beta-defensin 118	Q96PH6	Antimicrobial activity	[33]
Beta-defensin 126	Q9BYW3	Antimicrobial activity	[33]
Beta-defensin 129	Q9H1M3	Antimicrobial activity	[33]
Beta-defensin 132	Q7Z7B7	Antimicrobial activity	[33]
Beta-defensin 4A	O15263	Antimicrobial activity	[33]
Beta-hexosaminidase subunit alpha	P06865	Antimicrobial activity	[39]
Beta-hexosaminidase subunit beta	P07686	Antimicrobial activity	[39]
Bone marrow stromal antigen 2	Q10589	Antiviral effect	[40]
BPI fold-containing family A member 1	Q9NP55	Antimicrobial activity	[41]
BPI fold-containing family A member 2	Q96DR5	Antimicrobial activity	[42]
BPI fold-containing family A member 3	Q9BQP9	Antimicrobial activity	[43]
BPI fold-containing family B member 1	Q8TDL5	Antimicrobial activity	[44]
BPI fold-containing family B member 2	Q8N4F0	Antimicrobial activity	[44]
BPI fold-containing family B member 3	P59826	Antimicrobial activity	[45]
BPI fold-containing family B member 4	P59827	Antimicrobial activity	[46]
Brain-specific serine protease 4	Q9GZN4	Serine protease activity	[47]
Calcitonin gene-related peptide 1	P06881	Antimicrobial activity	[48]
Calpain-1 catalytic subunit	P07384	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-10	Q9HC96	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-11	Q9UMQ6	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-12	Q6ZSI9	Endopeptidase activity Immunomodulatory effect	[49]

Calpain-13	Q6MZZ7	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-2 catalytic subunit	P17655	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-3	P20807	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-5	O15484	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-6	Q9Y6Q1	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-7	Q9Y6W3	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-8	A6NHC0	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-9	O14815	Endopeptidase activity Immunomodulatory effect	[49]
Calpastatin	P20810	Protease inhibitor	[50]
Carboxypeptidase A1	P15085	Carboxypeptidase activity	[51]
Carboxypeptidase A2	P48052	Carboxypeptidase activity	[51]
Carboxypeptidase A4	Q9UI42	Carboxypeptidase activity	[51]
Carboxypeptidase A5	Q8WXQ8	Carboxypeptidase activity	[51]
Carboxypeptidase A6	Q8N4T0	Carboxypeptidase activity	[51]
Carboxypeptidase B	P15086	Carboxypeptidase activity	[52]
Carboxypeptidase B2	Q96IY4	Carboxypeptidase activity	[52]
Carboxypeptidase D	O75976	Carboxypeptidase activity	[53]
Carboxypeptidase E	P16870	Carboxypeptidase activity	[53]
Carboxypeptidase M	P14384	Carboxypeptidase activity	[54]
Carboxypeptidase N catalytic chain	P15169	Carboxypeptidase activity	[55]
Carboxypeptidase Q	Q9Y646	Carboxypeptidase activity	[56]
Carcinoembryonic antigen-related cell adhesion molecule 1	P13688	Immunomodulatory effect	[57]
Carcinoembryonic antigen-related cell adhesion molecule 3	P40198	Immunomodulatory effect	[58]
Catalase	P04040	Antimicrobial activity	[59]
Cathelicidin antimicrobial peptide	P49913	Antimicrobial activity	[33]
Cathepsin B	P07858	Endopeptidase activity	[60]
Cathepsin D	P07339	Endopeptidase activity	[60]
Cathepsin F	Q9UBX1	Endopeptidase activity	[60]
Cathepsin G	P08311	Endopeptidase activity	[60]
Cathepsin K	P43235	Endopeptidase activity	[60]
Cathepsin L2	O60911	Endopeptidase activity	[60]
Cathepsin O	P43234	Endopeptidase activity	[60]
Cathepsin S	P25774	Endopeptidase activity	[60]
Cathepsin W	P56202	Endopeptidase activity	[60]
Cathepsin Z	Q9UBR2	Endopeptidase activity	[60]
Cell surface glycoprotein MUC18	P43121	Immunomodulatory effect	[61]

Ceruloplasmin	P00450	Cu^{2+} sequestering activity	[62]
Chitinase-3-like protein 1	P36222	Antimicrobial activity	[63]
Chitotriosidase-1	Q13231	Antifungal activity	[64]
Chromogranin-A	P10645	Processed forms have antimicrobial activity	[65]
Clusterin	P10909	Immunomodulatory effect	[66]
Collagen alpha-1(XII) chain	Q99715	Immunomodulatory effect	[67]
Core histone macro-H2A.1	O75367	Antimicrobial activity	[68]
Core histone macro-H2A.2	Q9P0M6	Antimicrobial activity	[68]
Corticosteroid-binding globulin	P08185	Protease inhibitor	[69]
C-reactive protein	P02741	Acute phase protein	[70]
Cystatin-A	P01040	Protease inhibitor	[71]
Cystatin-B	P04080	Protease inhibitor	[71]
Cystatin-C	P01034	Protease inhibitor	[71]
Cystatin-D	P28325	Protease inhibitor	[71]
Cystatin-F	O76096	Protease inhibitor	[71]
Cystatin-M	Q15828	Protease inhibitor	[71]
Cystatin-S	P01036	Protease inhibitor	[71]
Cystatin-SA	P09228	Protease inhibitor	[71]
Cystatin-SN	P01037	Protease inhibitor	[71]
Cytosol aminopeptidase	P28838	Aminopeptidase activity	[72]
Cytosolic carboxypeptidase 1	Q9UPW5	Carboxypeptidase activity	[73]
Cytosolic carboxypeptidase 3	Q8NEM8	Carboxypeptidase activity	[74]
Cytosolic non-specific dipeptidase	Q96KP4	Carboxypeptidase activity	[75]
Defensin-5	Q01523	Antimicrobial activity	[33]
Defensin-6	Q01524	Antimicrobial activity	[33]
Deleted in malignant brain tumors 1 protein	Q9UGM3	Immunomodulatory effect Antimicrobial activity	[76,77]
Deoxyribonuclease-1	P24855	Endonuclease activity	[78]
Dermcidin	P81605	Antimicrobial activity	[33]
Dipeptidase 1	P16444	Carboxypeptidase activity	[79]
Dipeptidase 2	Q9H4A9	Carboxypeptidase activity	[80]
Dipeptidase 3	Q9H4B8	Carboxypeptidase activity	[80]
Dipeptidyl peptidase 1	P53634	Carboxypeptidase activity	[81]
Dipeptidyl peptidase 2	Q9UHL4	Carboxypeptidase activity	[82]
Dipeptidyl peptidase 3	Q9NY33	Carboxypeptidase activity	[83]
Dipeptidyl peptidase 4	P27487	Carboxypeptidase activity	[84]
Dipeptidyl peptidase 9	Q86TI2	Carboxypeptidase activity	[85]
Disintegrin and metalloproteinase domain-containing protein 10	O14672	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 11	O75078	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 12	O43184	Metalloendopeptidase activity	[86]

Disintegrin and metalloproteinase domain-containing protein 15	Q13444	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 17	P78536	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 18	Q9Y3Q7	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 19	Q9H013	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 2	Q99965	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 20	O43506	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 22	Q9P0K1	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 23	O75077	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 28	Q9UKQ2	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 29	Q9UKF5	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 30	Q9UKF2	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 32	Q8TC27	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 33	Q9BZ11	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 7	Q9H2U9	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 8	P78325	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 9	Q13443	Metalloendopeptidase activity	[86]
Drebrin-like protein	Q9UJU6	Immunomodulatory effect	[87]
Elafin	P19957	Protease inhibitor	[88]
Endoplasmic reticulum aminopeptidase 1	Q9NZ08	Aminopeptidase activity	[89]
Endoplasmic reticulum aminopeptidase 2	Q6P179	Aminopeptidase activity	[89]
Eosinophil cationic protein	P12724	Antimicrobial activity	[90]
Eosinophil peroxidase	P11678	Antimicrobial activity	[91]
Extracellular glycoprotein lacritin	Q9GZZ8	Antimicrobial activity	[92]
Fatty acid-binding protein 4	P15090	Immunomodulatory effect	[93]
Fatty acid-binding protein 5	Q01469	Immunomodulatory effect	[94]
Fibrinogen alpha chain	P02671	Immunomodulatory effect	[95]
Fibrinogen beta chain	P02675	Immunomodulatory effect	[95]

Fibrinogen gamma chain	P02679	Immunomodulatory effect	[95]
Fibrocystin-L	Q86WI1	Immunomodulatory effect	[96]
Fibroleukin	Q14314	Immunomodulatory effect	[97]
Folliculin-interacting protein 1	Q8TF40	Immunomodulatory effect	[98]
Furin	P09958	Serine protease activity	[99]
FYN-binding protein 1	O15117	Immunomodulatory effect	[100]
Galectin-1	P09382	Immunomodulatory effect	[101]
Galectin-10	Q05315	Immunomodulatory effect	[102]
Galectin-3	P17931	Immunomodulatory effect	[103]
Galectin-3-binding protein	Q08380	Antimicrobial activity Immunomodulatory effect	[104,105]
Galectin-7	P47929	Immunomodulatory effect	[106]
Galectin-9	O00182	Immunomodulatory effect	[107]
Gastricsin	P20142	Aspartic-type endopeptidase activity	[108]
Gelsolin	P06396	Processed from has antimicrobial activity	[109]
Glia-derived nexin	P07093	Protease inhibitor	[110]
Glucose-6-phosphate isomerase	P06744	Induces immunoglobulin secretion	[111]
Glutamate carboxypeptidase 2	Q04609	Carboxypeptidase activity	[112]
Glutamyl aminopeptidase	Q07075	Aminopeptidase activity	[113]
Glutathione S-transferase omega-1	P78417	Immunomodulatory effect	[114]
Glutathione S-transferase P	P09211	Immunomodulatory effect	[115]
Glyceraldehyde-3-phosphate dehydrogenase	P04406	Immunomodulatory effect	[116]
Granzyme A	P12544	Serine protease activity	[117]
Granzyme B	P10144	Serine protease activity	[117]
Granzyme H	P20718	Serine protease activity	[117]
Granzyme K	P49863	Serine protease activity	[117]
Granzyme M	P51124	Serine protease activity	[117]
Growth-regulated alpha protein	P09341	Antimicrobial activity	[118]
Guanylate-binding protein 1	P32455	Immunomodulatory effect	[119]
Guanylate-binding protein 2	P32456	Antiviral effect	[120]
Guanylate-binding protein 4	Q96PP9	Immunomodulatory effect	[119]
Guanylate-binding protein 5	Q96PP8	Immunomodulatory effect	[121]
Haptoglobin	P00738	Immunomodulatory effect Iron sequestrating	[122]
Haptoglobin-related protein	P00739	Anti-parasitic effect	[123]
Heme-binding protein 1	Q9NRV9	Heme/iron sequestration	[124]
Heme-binding protein 2	Q9Y5Z4	Heme/iron sequestration	[124]
Hemoglobin subunit alpha	P69905	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemoglobin subunit beta	P68871	Processed forms (hemocidins) have antimicrobial	[125]

		activity	
Hemopexin	P02790	Antibacterail effect Anti-inflammatory effect	[126]
Heparin cofactor 2	P05546	Protease inhibitor	[127]
Hepcidin	P81172	Antimicrobial activity Iron sequestration	[128,129]
High mobility group protein B1	P09429	Immunomodulatory effect	[130]
High mobility group protein B2	P26583	Antimicrobial activity	[131]
High mobility group protein B3	O15347	Immunomodulatory effect	[132]
Histidine-rich glycoprotein	P04196	Antimicrobial activity	[133]
Histone H1.0	P07305	Antimicrobial activity	[134]
Histone H1.1	Q02539	Antimicrobial activity	[134]
Histone H1.10	Q92522	Antimicrobial activity	[134]
Histone H1.2	P16403	Antimicrobial activity	[134]
Histone H1.3	P16402	Antimicrobial activity	[134]
Histone H1.4	P10412	Antimicrobial activity	[134]
Histone H1.5	P16401	Antimicrobial activity	[134]
Histone H1t	P22492	Antimicrobial activity	[134]
Histone H2A type 1-B/E	P04908	Antimicrobial activity	[134]
Histone H2A type 2-A	Q6FI13	Antimicrobial activity	[134]
Histone H2A type 3	Q7L7L0	Antimicrobial activity	[134]
Histone H2A.Z	P0C0S5	Antimicrobial activity	[134]
Histone H2AX	P16104	Antimicrobial activity	[134]
Histone H2B type 1-A	Q96A08	Antimicrobial activity	[134]
Histone H2B type 1-B	P33778	Antimicrobial activity	[134]
Histone H2B type 1-C/E/F/G/I	P62807	Antimicrobial activity	[134]
Histone H2B type 1-H	Q93079	Antimicrobial activity	[134]
Histone H2B type 1-K	O60814	Antimicrobial activity	[134]
Histone H2B type 1-L	Q99880	Antimicrobial activity	[134]
Histone H3.1	P68431	Antimicrobial activity	[134]
Histone H3.2	Q71DI3	Antimicrobial activity	[134]
Histone H3.3	P84243	Antimicrobial activity	[134]
Histone H3-7	Q5TEC6	Antimicrobial activity	[134]
Histone H4	P62805	Antimicrobial activity	[134]
Inter-alpha-trypsin inhibitor heavy chain H1	P19827	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H2	P19823	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H3	Q06033	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H4	Q14624	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H5	Q86UX2	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H6	Q6UXX5	Protease inhibitor	[135]
Interferon-induced 35 kDa protein	P80217	Immunomodulatory effect	[136]
Interferon-stimulated gene 20 kDa protein	Q96AZ6	Antiviral effect	[137]
Kallikrein-11	Q9UBX7	Serine protease activity	[138]
Kallikrein-12	Q9UKR0	Serine protease activity	[138]

Kallikrein-13	Q9UKR3	Serine protease activity	[138]
Kallikrein-14	Q9P0G3	Serine protease activity	[138]
Kallikrein-15	Q9H2R5	Serine protease activity	[138]
Kallikrein-2	P20151	Serine protease activity	[138]
Kallikrein-3	P07288	Serine protease activity	[138]
Kallikrein-5	Q9Y337	Serine protease activity Processing the maturation of LL-37 cathelicidin	[138,139]
Kallikrein-6	Q92876	Serine protease activity	[138]
Kallikrein-7	P49862	Serine protease activity Processing the maturation of LL-37 cathelicidin	[138]
Kallikrein-8	O60259	Serine protease activity	[138]
Kininogen-1	P01042	Antimicrobial activity	[140,141]
Kunitz-type protease inhibitor 1	O43278	Protease inhibitor	[142]
Kunitz-type protease inhibitor 2	O43291	Protease inhibitor	[142]
Lactoperoxidase	P22079	Antimicrobial activity	[143]
Lactotransferrin	P02788	Antimicrobial activity Iron sequestration	[33]
Legumain	Q99538	Endopeptidase activity	[144]
Leukocyte elastase inhibitor	P30740	Protease inhibitor	[145]
Lipocalin-1	P31025	Immunomodulatory effect Iron sequestration	[146,147]
Lipocalin-2	P80188	Immunomodulatory effect Iron sequestration	[146,147]
Lipopolysaccharide-binding protein	P18428	Immunomodulatory effect	[148]
Liver-expressed antimicrobial peptide 2	Q969E1	Antimicrobial activity	[149]
Lymphotactin	P47992	Antimicrobial activity	[150]
Lysozyme C	P61626	Antimicrobial activity	[33]
Macrophage migration inhibitory factor	P14174	Antimicrobial activity	[151]
Major vault protein	Q14764	Immunomodulatory effect	[152]
Mammaglobin-B	O75556	Immunomodulatory effect	[153]
Mast cell carboxypeptidase A	P15088	Carboxypeptidase activity	[154]
Matrix metalloproteinase-9	P14780	Metalloprotease activity	[155]
Melanotransferrin	P08582	Iron sequestration	[156]
Metalloproteinase inhibitor 1	P01033	Protease Inhibitor	[157]
Metalloproteinase inhibitor 2	P16035	Protease Inhibitor	[157]
Metalloproteinase inhibitor 4	Q99727	Protease Inhibitor	[157]
Midkine	P21741	Immunomodulatory effect	[158]
Moesin	P26038	Immunomodulatory effect	[159]
Mucin-1	P15941	Antimicrobial activity	[160]
Mucin-13	Q9H3R2	Antimicrobial activity	[160]
Mucin-15	Q8N387	Antimicrobial activity	[160]
Mucin-16	Q8WXI7	Antimicrobial activity	[160]

Mucin-17	Q685J3	Antimicrobial activity	[160]
Mucin-2	Q02817	Antimicrobial activity	[160]
Mucin-4	Q99102	Antimicrobial activity	[160]
Mucin-5AC	P98088	Antimicrobial activity	[160]
Mucin-5B	Q9HC84	Antimicrobial activity	[160]
Mucin-6	Q6W4X9	Antimicrobial activity	[160]
Mucin-7	Q8TAX7	Antimicrobial activity	[160]
Myeloblastin	P24158	Serine protease activity	[161]
Myeloperoxidase	P05164	Antimicrobial activity	[162]
Myoglobin	P02144	Processed forms (hemocidins) have antimicrobial activity	[163]
N-acetylmuramoyl-L-alanine amidase	Q96PD5	Antimicrobial activity	[164]
Neprilysin	P08473	Endopeptidase activity	[165]
Neutrophil collagenase	P22894	Endopeptidase activity Immunomodulatory effect	[166]
Neutrophil defensin 1	P59665	Antimicrobial activity	[33]
Neutrophil defensin 3	P59666	Antimicrobial activity	[33]
Neutrophil defensin 4	P12838	Antimicrobial activity	[33]
Neutrophil elastase	P08246	Serine protease activity	[167]
Nicotinamide phosphoribosyltransferase	P43490	Immunomodulatory effect	[168]
Non-histone chromosomal protein HMG-17	P05204	Antimicrobial activity	[169]
Non-secretory ribonuclease	P10153	Ribonuclease activity	[170]
Opiorphin prepropeptide	Q99935	Protease inhibitor	[171]
Peptidase inhibitor 16	Q6UXB8	Protease inhibitor	[172]
Peptidoglycan recognition protein 1	O75594	Antimicrobial activity	[173]
Perforin-1	P14222	Antimicrobial activity	[174]
Phospholipase B-like 1	Q6P4A8	Suggested antimicrobial activity	[175]
Pigment epithelium-derived factor	P36955	Protease inhibitor	[176]
Plasma kallikrein	P03952	Serine protease activity	[138]
Plasma serine protease inhibitor	P05154	Protease inhibitor	[177]
Plastin-2	P13796	Immunomodulatory effect	[178]
Poly(rC)-binding protein 1	Q15365	Antiviral effect	[179]
Poly(rC)-binding protein 2	Q15366	Antiviral effect	[180]
Pregnancy zone protein	P20742	Protease inhibitor	[181]
Pro-adrenomedullin	P35318	Antimicrobial activity Immunomodulatory effect	[182,183]
Pro-cathepsin H	P09668	Endopeptidase activity	[60]
Procathepsin L	P07711	Endopeptidase activity	[60]
Progranulin	P28799	Immunomodulatory effect	[184]
Prolactin-inducible protein	P12273	Aspartic-type endopeptidase activity Modulates the activity of Zn-α2 glycoprotein	[185,186]
Proline-rich protein 11	Q96HE9	Antimicrobial activity	[187]

Proline-rich protein 14	Q9BWN1	Antimicrobial activity	[187]
Proline-rich protein 18	Q8N4B5	Antimicrobial activity	[187]
Proline-rich protein 30	Q53SZ7	Antimicrobial activity	[187]
Proline-rich protein 4	Q16378	Antimicrobial activity	[187]
Proline-rich protein 5	P85299	Antimicrobial activity	[187]
Prolyl endopeptidase	P48147	Endopeptidase activity	[188]
Pro-opiomelanocortin	P01189	Antimicrobial activity	[189]
Prosalusin	Q8N2E6	Antimicrobial activity	[190]
Prosaposin	P07602	Processed forms has antimicrobial effect	[191]
Prostasin	Q16651	Serine protease activity	[192]
Protein AMBP	P02760	Protease inhibitor	[193]
Protein FAM3A	P98173	Antifungal effect	[194]
Protein S100-A1	P23297	Immunomodulatory effect	[195]
Protein S100-A10	P60903	Immunomodulatory effect	[196]
Protein S100-A11	P31949	Immunomodulatory effect	[197]
Protein S100-A12	P80511	Immunomodulatory effect	[196]
Protein S100-A13	Q99584	Immunomodulatory effect	[198]
Protein S100-A14	Q9HCY8	Immunomodulatory effect	[199]
Protein S100-A2	P29034	Immunomodulatory effect	[200]
Protein S100-A4	P26447	Immunomodulatory effect	[196]
Protein S100-A6	P06703	Immunomodulatory effect	[201]
Protein S100-A7	P31151	Immunomodulatory effect	[196]
Protein S100-A8	P05109	Immunomodulatory effect	[196]
Protein S100-A9	P06702	Immunomodulatory effect	[196]
Protein S100-B	P04271	Immunomodulatory effect	[196]
Protein S100-P	P25815	Immunomodulatory effect	[196]
Protein WFDC9	Q8NEX5	Protease inhibitor	[202]
Puromycin-sensitive aminopeptidase	P55786	Aminopeptidase activity	[203]
RelA-associated inhibitor	Q8WUF5	Antiviral effect Immunomodulatory effect	[204]
Retroviral-like aspartic protease 1	Q53RT3	Aspartic-type endopeptidase activity	[205]
Ribonuclease 4	P34096	Ribonuclease activity	[170]
Ribonuclease 8	Q8TDE3	Ribonuclease activity	[170]
Ribonuclease K6	Q93091	Ribonuclease activity	[170]
Ribonuclease pancreatic	P07998	Ribonuclease activity	[170]
Ribonuclease T2	O00584	Ribonuclease activity	[170]
Secreted Ly-6/uPAR-related protein 1	P55000	Immunomodulatory effect	[206]
Secretoglobin family 1D member 2	O95969	Immunomodulatory effect	[207]
Secretoglobin family 3A member 1	Q96QR1	Immunomodulatory effect	[208]
Secretoglobin family 3A member 2	Q96PL1	Immunomodulatory effect	[207]
Semenogelin-1	P04279	Processed forms has antimicrobial activity	[209–211]
Semenogelin-2	Q02383	Processed forms has antimi-	[209–211]

		crobial activity	
Serine protease 1	P07477	Serine protease activity	[212]
Serine protease 23	O95084	Serine protease activity	[212]
Serine protease 27	Q9BQR3	Serine protease activity	[212]
Serine protease 57	Q6UWY2	Serine protease activity	[212]
Serine protease HTRA1	Q92743	Serine protease activity	[212]
Serine protease HTRA2	O43464	Serine protease activity	[212]
Serine protease HTRA3	P83110	Serine protease activity	[212]
Serine protease HTRA4	P83105	Serine protease activity	[212]
Serine protease inhibitor Kazal-type 1	P00995	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 5	Q9NQ38	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 6	Q6UWN8	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 7	P58062	Protease inhibitor	[213]
Serotransferrin	P02787	Iron sequestration	[214]
Serpin B10	P48595	Protease inhibitor	[215]
Serpin B11	Q96P15	Protease inhibitor	[215]
Serpin B12	Q96P63	Protease inhibitor	[215]
Serpin B13	Q9UIV8	Protease inhibitor	[215]
Serpin B3	P29508	Protease inhibitor	[215]
Serpin B4	P48594	Protease inhibitor	[215]
Serpin B5	P36952	Protease inhibitor	[215]
Serpin B6	P35237	Protease inhibitor	[215]
Serpin B7	O75635	Protease inhibitor	[215]
Serpin B8	P50452	Protease inhibitor	[215]
Serpin B9	P50453	Protease inhibitor	[215]
Serum amyloid A-1 protein	P0DJI8	Immunomodulatory effect	[216]
Serum amyloid A-2 protein	P0DJI9	Immunomodulatory effect	[216]
Serum amyloid A-4 protein	P35542	Immunomodulatory effect	[216]
Serum amyloid P-component	P02743	Antiviral effect	[217]
Sialomucin core protein 24	Q04900	Immunomodulatory effect	[218]
Small proline-rich protein 3	Q9UBC9	Antimicrobial effect	[187]
Syntenin-1	O00560	Immunomodulatory effect	[219]
T-cell immunomodulatory protein	Q8TB96	Immunomodulatory effect	[220]
Thioredoxin domain-containing protein 17	Q9BRA2	Immunomodulatory effect	[221]
Thymosin beta-10	P63313	Antimicrobial activity	[222]
Thymosin beta-4	P62328	Antimicrobial activity	[222]
Thyroxine-binding globulin	P05543	Protease inhibitor	[223]
Toll-interacting protein	Q9H0E2	Immunomodulatory effect	[224]
Transgelin	Q01995	Immunomodulatory effect	[225]
Transgelin-2	P37802	Immunomodulatory effect	[226]
Transmembrane protease serine 11A	Q6ZMR5	Serine protease activity	[227]
Transmembrane protease serine 11D	O60235	Serine protease activity	[228]
Transmembrane protease serine 11E	Q9UL52	Serine protease activity	[229]
Triokinase/FMN cyclase	Q3LXA3	Immunomodulatory effect	[230]

Tripeptidyl-peptidase 1	O14773	Serine protease activity	[231]
Tripeptidyl-peptidase 2	P29144	Serine protease activity	[232]
Trypsin-2	P07478	Serine protease activity	[233]
Trypsin-3	P35030	Serine protease activity	[234]
Tryptase alpha/beta-1	Q15661	Serine protease activity	[235]
Tryptase beta-2	P20231	Serine protease activity	[234]
Tryptase delta	Q9BZJ3	Serine protease activity	[234]
Uromodulin	P07911	Antimicrobial activity	[236,237]
Uteroglobin	P11684	Immunomodulatory effect	[238]
Vitamin D-binding protein	P02774	Immunomodulatory effect	[239]
WAP four-disulfide core domain protein 1	Q9HC57	Protease inhibitor	[240]
WAP four-disulfide core domain protein 2	Q14508	Protease inhibitor	[240]
WAP four-disulfide core domain protein 6	Q9BQY6	Protease inhibitor	[240]
WAP four-disulfide core domain protein 8	Q8IUA0	Protease inhibitor	[240]
WAP, Kazal, immunoglobulin, Kunitz and NTR domain-containing protein 2	Q8TEU8	Protease inhibitor	[240]
Xaa-Pro aminopeptidase 1	Q9NQW7	Aminopeptidase activity	[241]
Xaa-Pro aminopeptidase 2	O43895	Aminopeptidase activity	[241]
Xaa-Pro dipeptidase	P12955	Carboxypeptidase activity	[242]
Zinc-alpha-2-glycoprotein	P25311	Immunomodulatory effect	[243]
Zymogen granule membrane protein 16	O60844	Antimicrobial activity	[244]
Zymogen granule protein 16 homolog B	Q96DA0	Antimicrobial activity	[245]

Table S2. Proteins involved in the first line of host defense in tears.

Protein name	UniProt entry	Function	Reference
Alpha-1-acid glycoprotein 1	P02763	Immunomodulatory effect	[3]
Alpha-1-acid glycoprotein 2	P19652	Immunomodulatory effect	[3]
Alpha-1-antichymotrypsin	P01011	Protease inhibitor	[4]
Alpha-1-antitrypsin	P01009	Protease inhibitor	[5]
Alpha-1B-glycoprotein	P04217	Immunomodulatory effect	[6]
Alpha-2-antiplasmin	P08697	Protease inhibitor	[7]
Alpha-2-HS-glycoprotein	P02765	Anti-inflammatory effect	[8]
Alpha-amylase 1A	P0DUB6	Regulation of biofilm formation	[11]
Alpha-amylase 1B	P0DTE7	Regulation of biofilm formation	[11]
Alpha-amylase 1C	P0DTE8	Regulation of biofilm formation	[11]
Aminopeptidase B	Q9H4A4	Exopeptidase activity	[12]
Aminopeptidase N	P15144	Exopeptidase activity	[13]
Amyloid-beta precursor protein	P05067	Antimicrobial activity	[15]
Angiogenin	P03950	Antimicrobial activity	[16]

Antileukoproteinase	P03973	Protease inhibitor Immunomodulatory effect	[17,18]
Antithrombin-III	P01008	Protease inhibitor	[19]
Apolipoprotein A-I	P02647	Antimicrobial activity	[20]
Apolipoprotein A-II	P02652	Immunomodulatory effect	[21]
Apolipoprotein A-IV	P06727	Immunomodulatory effect	[22]
Apolipoprotein B-100	P04114	Antimicrobial activity	[23]
Apolipoprotein C-III	P02656	Immunomodulatory effect	[24]
Apolipoprotein D	P05090	Immunomodulatory effect	[26]
Apolipoprotein E	P02649	Immunomodulatory effect	[27]
Apolipoprotein L1	O14791	Immunomodulatory effect	[28]
Arginase-1	P05089	Antifungal activity Immunomodulatory effect	[30,31]
Aspartyl aminopeptidase	Q9ULA0	Exopeptidase activity	[32]
Azurocidin	P20160	Antimicrobial activity	[33]
Bactericidal permeability-increasing protein	P17213	Antimicrobial activity	[33,34]
Beta-2-glycoprotein 1	P02749	Immunomodulatory effect	[35]
Beta-2-microglobulin	P61769	Antimicrobial activity Immunomodulatory effect	[36,37]
Beta-hexosaminidase subunit alpha	P06865	Antimicrobial activity	[39]
Beta-hexosaminidase subunit beta	P07686	Antimicrobial activity	[39]
BPI fold-containing family B member 2	Q8N4F0	Antimicrobial activity	[44]
Calcitonin gene-related peptide 1	P06881	Antimicrobial activity	[48]
Calpain-1 catalytic subunit	P07384	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-13	Q6MZZ7	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-2 catalytic subunit	P17655	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-7	Q9Y6W3	Endopeptidase activity Immunomodulatory effect	[49]
Calpastatin	P20810	Protease inhibitor	[50]
Carboxypeptidase B2	Q96IY4	Carboxypeptidase activity	[52]
Carboxypeptidase D	O75976	Carboxypeptidase activity	[53]
Carboxypeptidase Q	Q9Y646	Carboxypeptidase activity	[56]
Carcinoembryonic antigen-related cell adhesion molecule 1	P13688	Immunomodulatory effect	[57]
Catalase	P04040	Antimicrobial activity	[59]
Cathelicidin antimicrobial peptide	P49913	Antimicrobial activity	[33]
Cathepsin B	P07858	Endopeptidase activity	[60]
Cathepsin D	P07339	Endopeptidase activity	[60]
Cathepsin F	Q9UBX1	Endopeptidase activity	[60]
Cathepsin G	P08311	Endopeptidase activity	[60]
Cathepsin S	P25774	Endopeptidase activity	[60]
Cathepsin Z	Q9UBR2	Endopeptidase activity	[60]
Ceruloplasmin	P00450	Cu^{2+} sequestering activity	[62]

Clusterin	P10909	Immunomodulatory effect	[66]
Corticosteroid-binding globulin	P08185	Protease inhibitor	[69]
Cystatin-B	P04080	Protease inhibitor	[71]
Cystatin-C	P01034	Protease inhibitor	[71]
Cystatin-D	P28325	Protease inhibitor	[71]
Cystatin-S	P01036	Protease inhibitor	[71]
Cystatin-SA	P09228	Protease inhibitor	[71]
Cystatin-SN	P01037	Protease inhibitor	[71]
Cytosol aminopeptidase	P28838	Aminopeptidase activity	[72]
Cytosolic non-specific dipeptidase	Q96KP4	Carboxypeptidase activity	[75]
Deleted in malignant brain tumors 1 protein	Q9UGM3	Immunomodulatory effect Antimicrobial activity	[76,77]
Dermcidin	P81605	Antimicrobial activity	[33]
Dipeptidyl peptidase 1	P53634	Carboxypeptidase activity	[81]
Dipeptidyl peptidase 2	Q9UHL4	Carboxypeptidase activity	[82]
Dipeptidyl peptidase 3	Q9NY33	Carboxypeptidase activity	[83]
Dipeptidyl peptidase 4	P27487	Carboxypeptidase activity	[84]
Disintegrin and metalloproteinase domain-containing protein 10	O14672	Metalloendopeptidase activity	[86]
Drebrin-like protein	Q9UJU6	Immunomodulatory effect	[87]
Endoplasmic reticulum aminopeptidase 1	Q9NZ08	Aminopeptidase activity	[89]
Eosinophil cationic protein	P12724	Antimicrobial activity	[90]
Extracellular glycoprotein lacritin	Q9GZZ8	Antimicrobial activity	[92]
Fatty acid-binding protein 5	Q01469	Immunomodulatory effect	[94]
FAU ubiquitin-like and ribosomal protein S30	P62861	Antimicrobial activity	[95]
Fibrinogen alpha chain	P02671	Immunomodulatory effect	[95]
Fibrinogen beta chain	P02675	Immunomodulatory effect	[95]
Fibrinogen gamma chain	P02679	Immunomodulatory effect	[95]
Furin	P09958	Serine protease activity	[99]
Galectin-3	P17931	Immunomodulatory effect	[103]
Galectin-3-binding protein	Q08380	Antimicrobial activity Immunomodulatory effect	[104,105]
Galectin-7	P47929	Immunomodulatory effect	[106]
Gelsolin	P06396	Processed from has antimicrobial activity	[109]
Glucose-6-phosphate isomerase	P06744	Induces immunoglobulin secretion	[111]
Glutamate carboxypeptidase 2	Q04609	Carboxypeptidase activity	[112]
Glutathione S-transferase omega-1	P78417	Immunomodulatory effect	[114]
Glutathione S-transferase P	P09211	Immunomodulatory effect	[115]
Glyceraldehyde-3-phosphate dehydrogenase	P04406	Immunomodulatory effect	[116]
Growth-regulated alpha protein	P09341	Antimicrobial activity	[118]
Guanylate-binding protein 1	P32455	Immunomodulatory effect	[119]

Guanylate-binding protein 2	P32456	Antiviral effect	[120]
Haptoglobin	P00738	Immunomodulatory effect Iron sequestrating	[122]
Haptoglobin-related protein	P00739	Anti-parasitic effect	[123]
Heme-binding protein 1	Q9NRV9	Heme/iron sequestration	[124]
Heme-binding protein 2	Q9Y5Z4	Heme/iron sequestration	[124]
Hemoglobin subunit alpha	P69905	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemoglobin subunit beta	P68871	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemopexin	P02790	Antibacterail effect Anti-inflammatory effect	[126]
Heparin cofactor 2	P05546	Protease inhibitor	[127]
High mobility group protein B1	P09429	Immunomodulatory effect	[130]
Histatin-1	P15515	Antimicrobial activity	[246]
Histidine-rich glycoprotein	P04196	Antimicrobial activity	[133]
Histone H1.2	P16403	Antimicrobial activity	[134]
Histone H1.5	P16401	Antimicrobial activity	[134]
Histone H2B type 3-B	Q8N257	Antimicrobial activity	[134]
Histone H4	P62805	Antimicrobial activity	[134]
Inter-alpha-trypsin inhibitor heavy chain H1	P19827	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H2	P19823	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H3	Q06033	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H4	Q14624	Protease inhibitor	[135]
Interferon-stimulated gene 20 kDa protein	Q96AZ6	Antiviral effect	[137]
Kininogen-1	P01042	Antimicrobial activity	[140,141]
Kunitz-type protease inhibitor 1	O43278	Protease inhibitor	[142]
Lactoperoxidase	P22079	Antimicrobial activity	[143]
Lactotransferrin	P02788	Antimicrobial activity Iron sequestration	[33]
Legumain	Q99538	Endopeptidase activity	[144]
Leukocyte elastase inhibitor	P30740	Protease inhibitor	[145]
Lipocalin-1	P31025	Immunomodulatory effect Iron sequestration	[146,147]
Lipocalin-2	P80188	Immunomodulatory effect Iron sequestration	[146,147]
Lysozyme C	P61626	Antimicrobial activity	[33]
Macrophage migration inhibitory factor	P14174	Antimicrobial activity	[151]
Major vault protein	Q14764	Immunomodulatory effect	[152]
Mammaglobin-B	O75556	Immunomodulatory effect	[153]
Matrix metalloproteinase-9	P14780	Metalloprotease activity	[155]
Melanotransferrin	P08582	Iron sequestration	[156]
Metalloproteinase inhibitor 1	P01033	Protease Inhibitor	[157]
Metalloproteinase inhibitor 2	P16035	Protease Inhibitor	[157]

Moesin	P26038	Immunomodulatory effect	[159]
Mucin-1	P15941	Antimicrobial activity	[160]
Mucin-16	Q8WXI7	Antimicrobial activity	[160]
Mucin-4	Q99102	Antimicrobial activity	[160]
Mucin-5AC	P98088	Antimicrobial activity	[160]
Mucin-7	Q8TAX7	Antimicrobial activity	[160]
Myeloblastin	P24158	Serine protease activity	[161]
Myeloperoxidase	P05164	Antimicrobial activity	[162]
Myoglobin	P02144	Processed forms (hemocidins) have antimicrobial activity	[163]
N-acetylmuramoyl-L-alanine amidase	Q96PD5	Antimicrobial activity	[164]
Neutrophil defensin 1	P59665	Antimicrobial activity	[33]
Neutrophil defensin 3	P59666	Antimicrobial activity	[33]
Neutrophil elastase	P08246	Serine protease activity	[167]
Nicotinamide phosphoribosyltransferase	P43490	Immunomodulatory effect	[168]
Opiorphin prepropeptide	Q99935	Protease inhibitor	[171]
Peptidoglycan recognition protein 1	O75594	Antimicrobial activity	[173]
Peptidoglycan recognition protein 3	Q96LB9	Antimicrobial activity	[173]
Pigment epithelium-derived factor	P36955	Protease inhibitor	[176]
Plasma kallikrein	P03952	Serine protease activity	[138]
Plasma serine protease inhibitor	P05154	Protease inhibitor	[177]
Plastin-2	P13796	Immunomodulatory effect	[178]
Poly(rC)-binding protein 1	Q15365	Antiviral effect	[179]
Poly(rC)-binding protein 2	Q15366	Antiviral effect	[180]
Pro-cathepsin H	P09668	Endopeptidase activity	[60]
Procathepsin L	P07711	Endopeptidase activity	[60]
Progranulin	P28799	Immunomodulatory effect	[184]
Prolactin-inducible protein	P12273	Aspartic-type endopeptidase activity Modulates the activity of Zn-α2 glycoprotein	[185,186]
Proline-rich protein 27	Q6MZM9	Antimicrobial activity	[187]
Proline-rich protein 4	Q16378	Antimicrobial activity	[187]
Prolyl endopeptidase	P48147	Endopeptidase activity	[188]
Prosaposin	P07602	Processed forms has antimicrobial effect	[191]
Prostasin	Q16651	Serine protease activity	[192]
Protein AMBP	P02760	Protease inhibitor	[193]
Protein S100-A11	P31949	Immunomodulatory effect	[197]
Protein S100-A13	Q99584	Immunomodulatory effect	[198]
Protein S100-A4	P26447	Immunomodulatory effect	[196]
Protein S100-A6	P06703	Immunomodulatory effect	[201]
Protein S100-A7	P31151	Immunomodulatory effect	[196]
Protein S100-A8	P05109	Immunomodulatory effect	[196]

Protein S100-A9	P06702	Immunomodulatory effect	[196]
Protein S100-P	P25815	Immunomodulatory effect	[196]
Puromycin-sensitive aminopeptidase	P55786	Aminopeptidase activity	[203]
RelA-associated inhibitor	Q8WUF5	Antiviral effect Immunomodulatory effect	[204]
Retroviral-like aspartic protease 1	Q53RT3	Aspartic-type endopeptidase activity	[205]
Ribonuclease 4	P34096	Ribonuclease activity	[170]
Ribonuclease T2	O00584	Ribonuclease activity	[170]
Secretoglobin family 1D member 1	O95968	Immunomodulatory effect	[207]
Secretoglobin family 1D member 2	O95969	Immunomodulatory effect	[207]
Serine protease 1	P07477	Serine protease activity	[212]
Serine protease HTRA1	Q92743	Serine protease activity	[212]
Serotransferrin	P02787	Iron sequestration	[214]
Serpin B3	P29508	Protease inhibitor	[215]
Serpin B5	P36952	Protease inhibitor	[215]
Serpin B6	P35237	Protease inhibitor	[215]
Serum amyloid P-component	P02743	Antiviral effect	[217]
Small proline-rich protein 3	Q9UBC9	Antimicrobial effect	[187]
Syntenin-1	O00560	Immunomodulatory effect	[219]
Thioredoxin domain-containing protein 17	Q9BRA2	Immunomodulatory effect	[221]
Thyroxine-binding globulin	P05543	Protease inhibitor	[223]
Toll-interacting protein	Q9H0E2	Immunomodulatory effect	[224]
Transgelin-2	P37802	Immunomodulatory effect	[226]
Triokinase/FMN cyclase	Q3LXA3	Immunomodulatory effect	[230]
Tripeptidyl-peptidase 1	O14773	Serine protease activity	[231]
Tripeptidyl-peptidase 2	P29144	Serine protease activity	[232]
Vitamin D-binding protein	P02774	Immunomodulatory effect	[239]
WAP four-disulfide core domain protein 2	Q14508	Protease inhibitor	[240]
Xaa-Pro aminopeptidase 1	Q9NQW7	Aminopeptidase activity	[241]
Xaa-Pro dipeptidase	P12955	Carboxypeptidase activity	[242]
Zinc-alpha-2-glycoprotein	P25311	Immunomodulatory effect	[243]
Zymogen granule membrane protein 16	O60844	Antimicrobial activity	[244]
Zymogen granule protein 16 homolog B	Q96DA0	Antimicrobial activity	[245]

Table S3. Proteins involved in the first line of host defense in saliva.

Protein name	UniProt entry	Function	Reference
Alpha-1-acid glycoprotein 1	P02763	Immunomodulatory effect	[3]
Alpha-1-acid glycoprotein 2	P19652	Immunomodulatory effect	[3]
Alpha-1-antichymotrypsin	P01011	Protease inhibitor	[4]
Alpha-1-antitrypsin	P01009	Protease inhibitor	[5]
Alpha-1B-glycoprotein	P04217	Immunomodulatory effect	[6]
Alpha-2-antiplasmin	P08697	Protease inhibitor	[7]

Alpha-2-HS-glycoprotein	P02765	Anti-inflammatory effect	[8]
Alpha-2-macroglobulin	P01023	Protease inhibitor	[9]
Alpha-2-macroglobulin-like protein 1	A8K2U0	Protease inhibitor	[10]
Alpha-amylase 1A	P0DUB6	Regulation of biofilm formation	[11]
Alpha-amylase 1B	P0DTE7	Regulation of biofilm formation	[11]
Alpha-amylase 1C	P0DTE8	Regulation of biofilm formation	[11]
Alpha-amylase 2B	P19961	Regulation of biofilm formation	[11]
Aminopeptidase B	Q9H4A4	Exopeptidase activity	[12]
Aminopeptidase N	P15144	Exopeptidase activity	[13]
Amyloid-beta precursor protein	P05067	Antimicrobial activity	[15]
Angiogenin	P03950	Antimicrobial activity	[16]
Antileukoproteinase	P03973	Protease inhibitor Immunomodulatory effect	[17,18]
Antithrombin-III	P01008	Protease inhibitor	[19]
Apolipoprotein A-I	P02647	Antimicrobial activity	[20]
Apolipoprotein A-II	P02652	Immunomodulatory effect	[21]
Apolipoprotein A-IV	P06727	Immunomodulatory effect	[22]
Apolipoprotein B-100	P04114	Antimicrobial activity	[23]
Apolipoprotein C-III	P02656	Immunomodulatory effect	[24]
Apolipoprotein D	P05090	Immunomodulatory effect	[26]
Apolipoprotein E	P02649	Immunomodulatory effect	[27]
Apolipoprotein L1	O14791	Immunomodulatory effect	[28]
Apolipoprotein M	O95445	Immunomodulatory effect	[29]
Arginase-1	P05089	Antifungal activity Immunomodulatory effect	[30,31]
Aspartyl aminopeptidase	Q9ULA0	Exopeptidase activity	[32]
Azurocidin	P20160	Antimicrobial activity	[33]
Bactericidal permeability-increasing protein	P17213	Antimicrobial activity	[33,34]
Beta-2-glycoprotein 1	P02749	Immunomodulatory effect	[35]
Beta-2-microglobulin	P61769	Antimicrobial activity Immunomodulatory effect	[36,37]
Beta-Ala-His dipeptidase	Q96KN2	Carboxypeptidase activity	[38]
Beta-defensin 1	P60022	Antimicrobial activity	[33]
Beta-defensin 103	P81534	Antimicrobial activity	[33]
Beta-defensin 125	Q8N687	Antimicrobial activity	[33]
Beta-defensin 4A	O15263	Antimicrobial activity	[33]
Beta-hexosaminidase subunit alpha	P06865	Antimicrobial activity	[39]
Beta-hexosaminidase subunit beta	P07686	Antimicrobial activity	[39]
BPI fold-containing family A member 1	Q9NP55	Antimicrobial activity	[41]
BPI fold-containing family A member 2	Q96DR5	Antimicrobial activity	[42]
BPI fold-containing family B member 1	Q8TDL5	Antimicrobial activity	[44]

BPI fold-containing family B member 2	Q8N4F0	Antimicrobial activity	[44]
Brain-specific serine protease 4	Q9GZN4	Serine protease activity	[47]
Calcitonin gene-related peptide 1	P06881	Antimicrobial activity	[48]
Calpain-1 catalytic subunit	P07384	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-2 catalytic subunit	P17655	Endopeptidase activity Immunomodulatory effect	[49]
Calpastatin	P20810	Protease inhibitor	[50]
Carboxypeptidase A4	Q9UI42	Carboxypeptidase activity	[51]
Carboxypeptidase B2	Q96IY4	Carboxypeptidase activity	[52]
Carboxypeptidase D	O75976	Carboxypeptidase activity	[53]
Carboxypeptidase E	P16870	Carboxypeptidase activity	[53]
Carboxypeptidase M	P14384	Carboxypeptidase activity	[54]
Carboxypeptidase N catalytic chain	P15169	Carboxypeptidase activity	[55]
Carboxypeptidase Q	Q9Y646	Carboxypeptidase activity	[56]
Carcinoembryonic antigen-related cell adhesion molecule 1	P13688	Immunomodulatory effect	[57]
Catalase	P04040	Antimicrobial activity	[59]
Cathelicidin antimicrobial peptide	P49913	Antimicrobial activity	[33]
Cathepsin B	P07858	Endopeptidase activity	[60]
Cathepsin D	P07339	Endopeptidase activity	[60]
Cathepsin F	Q9UBX1	Endopeptidase activity	[60]
Cathepsin G	P08311	Endopeptidase activity	[60]
Cathepsin L2	O60911	Endopeptidase activity	[60]
Cathepsin S	P25774	Endopeptidase activity	[60]
Cathepsin Z	Q9UBR2	Endopeptidase activity	[60]
Ceruloplasmin	P00450	Cu^{2+} sequestering activity	[62]
Chitinase-3-like protein 1	P36222	Antimicrobial activity	[63]
Chitotriosidase-1	Q13231	Antifungal activity	[64]
Chromogranin-A	P10645	Processed forms have anti-microbial activity	[65]
Clusterin	P10909	Immunomodulatory effect	[66]
Core histone macro-H2A.1	O75367	Antimicrobial activity	[68]
Corticosteroid-binding globulin	P08185	Protease inhibitor	[69]
Cystatin-A	P01040	Protease inhibitor	[71]
Cystatin-B	P04080	Protease inhibitor	[71]
Cystatin-C	P01034	Protease inhibitor	[71]
Cystatin-D	P28325	Protease inhibitor	[71]
Cystatin-F	O76096	Protease inhibitor	[71]
Cystatin-M	Q15828	Protease inhibitor	[71]
Cystatin-S	P01036	Protease inhibitor	[71]
Cystatin-SA	P09228	Protease inhibitor	[71]
Cystatin-SN	P01037	Protease inhibitor	[71]
Cytosol aminopeptidase	P28838	Aminopeptidase activity	[72]

Cytosolic non-specific dipeptidase	Q96KP4	Carboxypeptidase activity	[75]
Deleted in malignant brain tumors 1 protein	Q9UGM3	Immunomodulatory effect Antimicrobial activity	[76,77]
Deoxyribonuclease-1	P24855	Endonuclease activity	[78]
Dermcidin	P81605	Antimicrobial activity	[33]
Dipeptidyl peptidase 1	P53634	Carboxypeptidase activity	[81]
Dipeptidyl peptidase 2	Q9UHL4	Carboxypeptidase activity	[82]
Dipeptidyl peptidase 3	Q9NY33	Carboxypeptidase activity	[83]
Dipeptidyl peptidase 4	P27487	Carboxypeptidase activity	[84]
Disintegrin and metalloproteinase domain-containing protein 10	O14672	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 15	Q13444	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 9	Q13443	Metalloendopeptidase activity	[86]
Drebrin-like protein	Q9UJU6	Immunomodulatory effect	[87]
Elafin	P19957	Protease inhibitor	[88]
Endoplasmic reticulum aminopeptidase 1	Q9NZ08	Aminopeptidase activity	[89]
Endoplasmic reticulum aminopeptidase 2	Q6P179	Aminopeptidase activity	[89]
Eosinophil cationic protein	P12724	Antimicrobial activity	[90]
Extracellular glycoprotein lacritin	Q9GZZ8	Antimicrobial activity	[92]
Fatty acid-binding protein 5	Q01469	Immunomodulatory effect	[94]
Fibrinogen alpha chain	P02671	Immunomodulatory effect	[95]
Fibrinogen beta chain	P02675	Immunomodulatory effect	[95]
Fibrinogen gamma chain	P02679	Immunomodulatory effect	[95]
Fibroleukin	Q14314	Immunomodulatory effect	[97]
Furin	P09958	Serine protease activity	[99]
Galectin-1	P09382	Immunomodulatory effect	[101]
Galectin-10	Q05315	Immunomodulatory effect	[102]
Galectin-3	P17931	Immunomodulatory effect	[103]
Galectin-3-binding protein	Q08380	Antimicrobial activity Immunomodulatory effect	[104,105]
Galectin-7	P47929	Immunomodulatory effect	[106]
Gelsolin	P06396	Processed from has antimicrobial activity	[109]
Glucose-6-phosphate isomerase	P06744	Induces immunoglobulin secretion	[111]
Glutamate carboxypeptidase 2	Q04609	Carboxypeptidase activity	[112]
Glutathione S-transferase omega-1	P78417	Immunomodulatory effect	[114]
Glutathione S-transferase P	P09211	Immunomodulatory effect	[115]
Glyceraldehyde-3-phosphate dehydrogenase	P04406	Immunomodulatory effect	[116]
Growth-regulated alpha protein	P09341	Antimicrobial activity	[118]
Guanylate-binding protein 1	P32455	Immunomodulatory effect	[119]
Guanylate-binding protein 2	P32456	Antiviral effect	[120]

Guanylate-binding protein 4	Q96PP9	Immunomodulatory effect	[119]
Haptoglobin	P00738	Immunomodulatory effect Iron sequestrating	[122]
Haptoglobin-related protein	P00739	Anti-parasitic effect	[123]
Heme-binding protein 1	Q9NRV9	Heme/iron sequestration	[124]
Heme-binding protein 2	Q9Y5Z4	Heme/iron sequestration	[124]
Hemoglobin subunit alpha	P69905	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemoglobin subunit beta	P68871	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemopexin	P02790	Antibacterail effect Anti-inflammatory effect	[126]
Heparin cofactor 2	P05546	Protease inhibitor	[127]
High mobility group protein B1	P09429	Immunomodulatory effect	[130]
High mobility group protein B2	P26583	Antimicrobial activity	[131]
Histatin-1	P15515	Antimicrobial activity	[246]
Histatin-3	P15516	Antimicrobial activity	[246]
Histidine-rich glycoprotein	P04196	Antimicrobial activity	[133]
Histone H1.0	P07305	Antimicrobial activity	[134]
Histone H1.1	Q02539	Antimicrobial activity	[134]
Histone H1.10	Q92522	Antimicrobial activity	[134]
Histone H1.2	P16403	Antimicrobial activity	[134]
Histone H1.3	P16402	Antimicrobial activity	[134]
Histone H1.4	P10412	Antimicrobial activity	[134]
Histone H1.5	P16401	Antimicrobial activity	[134]
Histone H2A type 1	P0C0S8	Antimicrobial activity	[134]
Histone H2A type 1-B/E	P04908	Antimicrobial activity	[134]
Histone H2A type 1-D	P20671	Antimicrobial activity	[134]
Histone H2A type 1-H	Q96KK5	Antimicrobial activity	[134]
Histone H2A type 1-J	Q99878	Antimicrobial activity	[134]
Histone H2A type 2-A	Q6FI13	Antimicrobial activity	[134]
Histone H2A type 2-C	Q6FI13	Antimicrobial activity	[134]
Histone H2A type 3	Q7L7L0	Antimicrobial activity	[134]
Histone H2A.J	Q9BTM1	Antimicrobial activity	[134]
Histone H2A.Z	P0C0S5	Antimicrobial activity	[134]
Histone H2AX	P16104	Antimicrobial activity	[134]
Histone H2B type 1-A	Q96A08	Antimicrobial activity	[134]
Histone H2B type 1-B	P33778	Antimicrobial activity	[134]
Histone H2B type 1-C/E/F/G/I	P62807	Antimicrobial activity	[134]
Histone H2B type 1-D	P58876	Antimicrobial activity	[134]
Histone H2B type 1-H	Q93079	Antimicrobial activity	[134]
Histone H2B type 1-J	P06899	Antimicrobial activity	[134]
Histone H2B type 1-K	O60814	Antimicrobial activity	[134]

Histone H2B type 1-L	Q99880	Antimicrobial activity	[134]
Histone H2B type 1-M	Q99879	Antimicrobial activity	[134]
Histone H2B type 1-N	Q99877	Antimicrobial activity	[134]
Histone H2B type 1-O	P23527	Antimicrobial activity	[134]
Histone H2B type 2-E	Q16778	Antimicrobial activity	[134]
Histone H2B type 2-F	Q5QNW6	Antimicrobial activity	[134]
Histone H2B type 3-B	Q8N257	Antimicrobial activity	[134]
Histone H2B type F-S	P57053	Antimicrobial activity	[134]
Histone H3.1	P68431	Antimicrobial activity	[134]
Histone H3.1t	Q16695	Antimicrobial activity	[134]
Histone H3.2	Q71DI3	Antimicrobial activity	[134]
Histone H3.3	P84243	Antimicrobial activity	[134]
Histone H3.3C	Q6NXT2	Antimicrobial activity	[134]
Histone H4	P62805	Antimicrobial activity	[134]
Inter-alpha-trypsin inhibitor heavy chain H1	P19827	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H2	P19823	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H3	Q06033	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H4	Q14624	Protease inhibitor	[135]
Kallikrein-10	O43240	Serine protease activity	[138]
Kallikrein-11	Q9UBX7	Serine protease activity	[138]
Kallikrein-12	Q9UKR0	Serine protease activity	[138]
Kallikrein-13	Q9UKR3	Serine protease activity	[138]
Kallikrein-14	Q9P0G3	Serine protease activity	[138]
Kallikrein-6	Q92876	Serine protease activity	[138]
Kallikrein-7	P49862	Serine protease activity Processing the maturation of LL-37 cathelicidin	[138,139]
Kallikrein-8	O60259	Serine protease activity	[138]
Kininogen-1	P01042	Antimicrobial activity	[140,141]
Kunitz-type protease inhibitor 1	O43278	Protease inhibitor	[142]
Kunitz-type protease inhibitor 2	O43291	Protease inhibitor	[142]
Lactoperoxidase	P22079	Antimicrobial activity	[143]
Lactotransferrin	P02788	Antimicrobial activity Iron sequestration	[33]
Legumain	Q99538	Endopeptidase activity	[144]
Leukocyte elastase inhibitor	P30740	Protease inhibitor	[145]
Lipocalin-1	P31025	Immunomodulatory effect Iron sequestration	[146,147]
Lipocalin-2	P80188	Immunomodulatory effect Iron sequestration	[146,147]
Lipopolysaccharide-binding protein	P18428	Immunomodulatory effect	[148]
Lymphotactin	P47992	Antimicrobial activity	[150]
Lysozyme C	P61626	Antimicrobial activity	[33]
Macrophage migration inhibitory factor	P14174	Antimicrobial activity	[151]

Major vault protein	Q14764	Immunomodulatory effect	[152]
Mammaglobin-B	O75556	Immunomodulatory effect	[153]
Matrix metalloproteinase-9	P14780	Metalloprotease activity	[155]
Melanotransferrin	P08582	Iron sequestration	[156]
Metalloproteinase inhibitor 1	P01033	Protease Inhibitor	[157]
Metalloproteinase inhibitor 2	P16035	Protease Inhibitor	[157]
Midkine	P21741	Immunomodulatory effect	[158]
Moesin	P26038	Immunomodulatory effect	[159]
Mucin-1	P15941	Antimicrobial activity	[160]
Mucin-13	Q9H3R2	Antimicrobial activity	[160]
Mucin-15	Q8N387	Antimicrobial activity	[160]
Mucin-16	Q8WXI7	Antimicrobial activity	[160]
Mucin-4	Q99102	Antimicrobial activity	[160]
Mucin-5AC	P98088	Antimicrobial activity	[160]
Mucin-5B	Q9HC84	Antimicrobial activity	[160]
Mucin-6	Q6W4X9	Antimicrobial activity	[160]
Mucin-7	Q8TAX7	Antimicrobial activity	[160]
Myeloblastin	P24158	Serine protease activity	[161]
Myeloperoxidase	P05164	Antimicrobial activity	[162]
N-acetylmuramoyl-L-alanine amidase	Q96PD5	Antimicrobial activity	[164]
Neutrophil collagenase	P22894	Endopeptidase activity Immunomodulatory effect	[166]
Neutrophil defensin 1	P59665	Antimicrobial activity	[33]
Neutrophil defensin 3	P59666	Antimicrobial activity	[33]
Neutrophil defensin 4	P12838	Antimicrobial activity	[33]
Neutrophil elastase	P08246	Serine protease activity	[167]
Nicotinamide phosphoribosyltransferase	P43490	Immunomodulatory effect	[168]
Non-histone chromosomal protein HMG-17	P05204	Antimicrobial activity	[169]
Non-secretory ribonuclease	P10153	Ribonuclease activity	[170]
Opiorphin prepropeptide	Q99935	Protease inhibitor	[171]
Peptidase inhibitor 16	Q6UXB8	Protease inhibitor	[172]
Peptidoglycan recognition protein 1	O75594	Antimicrobial activity	[173]
Peptidoglycan recognition protein 3	Q96LB9	Antimicrobial activity	[173]
Phospholipase B-like 1	Q6P4A8	Suggested antimicrobial activity	[175]
Pigment epithelium-derived factor	P36955	Protease inhibitor	[176]
Plasma kallikrein	P03952	Serine protease activity	[138]
Plasma serine protease inhibitor	P05154	Protease inhibitor	[177]
Plastin-2	P13796	Immunomodulatory effect	[178]
Poly(rC)-binding protein 1	Q15365	Antiviral effect	[179]
Poly(rC)-binding protein 2	Q15366	Antiviral effect	[180]
Pregnancy zone protein	P20742	Protease inhibitor	[181]
Pro-cathepsin H	P09668	Endopeptidase activity	[60]
Procathepsin L	P07711	Endopeptidase activity	[60]

Progranulin	P28799	Immunomodulatory effect	[184]
Prolactin-inducible protein	P12273	Aspartic-type endopeptidase activity Modulates the activity of Zn-α2 glycoprotein	[185,186]
Proline-rich protein 27	Q16378	Antimicrobial activity	[187]
Proline-rich protein 4	Q16378	Antimicrobial activity	[187]
Prolyl endopeptidase	P48147	Endopeptidase activity	[188]
Prosaposin	P07602	Processed forms has antimicrobial effect	[191]
Prostasin	Q16651	Serine protease activity	[192]
Protein AMBP	P02760	Protease inhibitor	[193]
Protein S100-A10	P60903	Immunomodulatory effect	[196]
Protein S100-A11	P31949	Immunomodulatory effect	[197]
Protein S100-A12	P80511	Immunomodulatory effect	[196]
Protein S100-A13	Q99584	Immunomodulatory effect	[198]
Protein S100-A14	Q9HCY8	Immunomodulatory effect	[199]
Protein S100-A2	P29034	Immunomodulatory effect	[200]
Protein S100-A4	P26447	Immunomodulatory effect	[196]
Protein S100-A6	P06703	Immunomodulatory effect	[201]
Protein S100-A7	P31151	Immunomodulatory effect	[196]
Protein S100-A8	P05109	Immunomodulatory effect	[196]
Protein S100-A9	P06702	Immunomodulatory effect	[196]
Protein S100-P	P25815	Immunomodulatory effect	[196]
Puromycin-sensitive aminopeptidase	P55786	Aminopeptidase activity	[203]
Ribonuclease 4	P34096	Ribonuclease activity	[170]
Ribonuclease 7	Q9H1E1	Ribonuclease activity	[170]
Ribonuclease pancreatic	P07998	Ribonuclease activity	[170]
Ribonuclease T2	O00584	Ribonuclease activity	[170]
Secreted Ly-6/uPAR domain-containing protein 2	P0DP57	Immunomodulatory effect	[247]
Secreted Ly-6/uPAR-related protein 1	P55000	Immunomodulatory effect	[206]
Secretoglobin family 1D member 1	O95968	Immunomodulatory effect	[207]
Secretoglobin family 1D member 2	O95969	Immunomodulatory effect	[207]
Secretoglobin family 3A member 1	Q96QR1	Immunomodulatory effect	[208]
Semenogelin-1	P04279	Processed forms has antimicrobial activity	[209–211]
Semenogelin-2	Q02383	Processed forms has antimicrobial activity	[209–211]
Serine protease 1	P07477	Serine protease activity	[212]
Serine protease 23	O95084	Serine protease activity	[212]
Serine protease 27	Q9BQR3	Serine protease activity	[212]
Serine protease HTRA1	Q92743	Serine protease activity	[212]
Serine protease inhibitor Kazal-type 5	Q9NQ38	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 7	P58062	Protease inhibitor	[213]

Serotransferrin	P02787	Iron sequestration	[214]
Serpin B10	P48595	Protease inhibitor	[215]
Serpin B12	Q96P63	Protease inhibitor	[215]
Serpin B13	Q9UIV8	Protease inhibitor	[215]
Serpin B3	P29508	Protease inhibitor	[215]
Serpin B4	P48594	Protease inhibitor	[215]
Serpin B5	P36952	Protease inhibitor	[215]
Serpin B6	P35237	Protease inhibitor	[215]
Serpin B8	P50452	Protease inhibitor	[215]
Serpin B9	P50453	Protease inhibitor	[215]
Serum amyloid A-1 protein	P0DJI8	Immunomodulatory effect	[216]
Serum amyloid A-2 protein	P0DJI9	Immunomodulatory effect	[216]
Serum amyloid A-4 protein	P35542	Immunomodulatory effect	[216]
Serum amyloid P-component	P02743	Antiviral effect	[217]
Small proline-rich protein 3	Q9UBC9	Antimicrobial effect	[187]
Syntenin-1	O00560	Immunomodulatory effect	[219]
T-cell immunomodulatory protein	Q8TB96	Immunomodulatory effect	[220]
Thioredoxin domain-containing protein 17	Q9BRA2	Immunomodulatory effect	[221]
Thymosin beta-10	P63313	Antimicrobial activity	[222]
Thymosin beta-4	P62328	Antimicrobial activity	[222]
Thyroxine-binding globulin	P05543	Protease inhibitor	[223]
Toll-interacting protein	Q9H0E2	Immunomodulatory effect	[224]
Transgelin-2	P37802	Immunomodulatory effect	[226]
Transmembrane protease serine 11A	Q6ZMR5	Serine protease activity	[227]
Transmembrane protease serine 11B	Q86T26	Serine protease activity	[248]
Transmembrane protease serine 11D	O60235	Serine protease activity	[228]
Transmembrane protease serine 11E	Q9UL52	Serine protease activity	[229]
Triokinase/FMN cyclase	Q3LXA3	Immunomodulatory effect	[230]
Tripeptidyl-peptidase 1	O14773	Serine protease activity	[231]
Tripeptidyl-peptidase 2	P29144	Serine protease activity	[232]
Trypsin-3	P35030	Serine protease activity	[234]
Uromodulin	P07911	Antimicrobial activity	[236,237]
Uteroglobin	P11684	Immunomodulatory effect	[238]
Vitamin D-binding protein	P02774	Immunomodulatory effect	[239]
WAP four-disulfide core domain protein 12	Q8WWY7	Protease inhibitor	[240]
WAP four-disulfide core domain protein 2	Q14508	Protease inhibitor	[240]
Xaa-Pro aminopeptidase 1	Q9NQW7	Aminopeptidase activity	[241]
Xaa-Pro dipeptidase	P12955	Carboxypeptidase activity	[242]
Zinc-alpha-2-glycoprotein	P25311	Immunomodulatory effect	[243]
Zymogen granule membrane protein 16	O60844	Antimicrobial activity	[244]
Zymogen granule protein 16 homolog B	Q96DA0	Antimicrobial activity	[245]

Table S4. Proteins involved in the first line of host defense in sweat.

Protein name	UniProt entry	Function	Reference
Alpha-1-acid glycoprotein 1	P02763	Immunomodulatory effect	[3]
Alpha-1-acid glycoprotein 2	P19652	Immunomodulatory effect	[3]
Alpha-2-HS-glycoprotein	P02765	Anti-inflammatory effect	[8]
Alpha-2-macroglobulin	P01023	Protease inhibitor	[9]
Alpha-2-macroglobulin-like protein 1	A8K2U0	Protease inhibitor	[10]
Aminopeptidase N	P15144	Exopeptidase activity	[13]
Angiogenin	P03950	Antimicrobial activity	[16]
Antileukoproteinase	P03973	Protease inhibitor Immunomodulatory effect	[17,18]
Antithrombin-III	P01008	Protease inhibitor	[19]
Apolipoprotein A-I	P02647	Antimicrobial activity	[20]
Apolipoprotein D	P05090	Immunomodulatory effect	[26]
Beta-2-glycoprotein 1	P02749	Immunomodulatory effect	[35]
Beta-2-microglobulin	P61769	Antimicrobial activity Immunomodulatory effect	[36,37]
Beta-hexosaminidase subunit alpha	P06865	Antimicrobial activity	[39]
Beta-hexosaminidase subunit beta	P07686	Antimicrobial activity	[39]
BPI fold-containing family A member 1	Q9NP55	Antimicrobial activity	[41]
BPI fold-containing family A member 2	Q96DR5	Antimicrobial activity	[42]
BPI fold-containing family B member 4	P59827	Antimicrobial activity	[46]
Calpain-1 catalytic subunit	P07384	Endopeptidase activity Immunomodulatory effect	[49]
Carboxypeptidase A2	P48052	Carboxypeptidase activity	[51]
Carboxypeptidase A4	Q9UI42	Carboxypeptidase activity	[51]
Carboxypeptidase M	P14384	Carboxypeptidase activity	[54]
Carboxypeptidase Q	Q9Y646	Carboxypeptidase activity	[56]
Catalase	P04040	Antimicrobial activity	[59]
Cathelicidin antimicrobial peptide	P49913	Antimicrobial activity	[33]
Cathepsin B	P07858	Endopeptidase activity	[60]
Cathepsin D	P07339	Endopeptidase activity	[60]
Cathepsin F	Q9UBX1	Endopeptidase activity	[60]
Cathepsin L2	O60911	Endopeptidase activity	[60]
Cathepsin Z	Q9UBR2	Endopeptidase activity	[60]
Chitinase-3-like protein 1	P36222	Antimicrobial activity	[63]
Clusterin	P10909	Immunomodulatory effect	[66]
Cystatin-A	P01040	Protease inhibitor	[71]
Cystatin-B	P04080	Protease inhibitor	[71]
Cystatin-C	P01034	Protease inhibitor	[71]
Cystatin-D	P28325	Protease inhibitor	[71]
Cystatin-M	Q15828	Protease inhibitor	[71]
Cystatin-S	P01036	Protease inhibitor	[71]
Cystatin-SA	P09228	Protease inhibitor	[71]
Cystatin-SN	P01037	Protease inhibitor	[71]
Deoxyribonuclease-1	P24855	Endonuclease activity	[78]

Dermcidin	P81605	Antimicrobial activity	[33]
Dipeptidyl peptidase 1	P53634	Carboxypeptidase activity	[81]
Dipeptidyl peptidase 2	Q9UHL4	Carboxypeptidase activity	[82]
Dipeptidyl peptidase 3	Q9NY33	Carboxypeptidase activity	[83]
Dipeptidyl peptidase 4	P27487	Carboxypeptidase activity	[84]
Disintegrin and metalloproteinase domain-containing protein 10	O14672	Metalloendopeptidase activity	[86]
Elafin	P19957	Protease inhibitor	[88]
Extracellular glycoprotein lacritin	Q9GZZ8	Antimicrobial activity	[92]
Fatty acid-binding protein 5	Q01469	Immunomodulatory effect	[94]
Fibrinogen alpha chain	P02671	Immunomodulatory effect	[95]
Fibrinogen beta chain	P02675	Immunomodulatory effect	[95]
Fibrinogen gamma chain	P02679	Immunomodulatory effect	[95]
Furin	P09958	Serine protease activity	[99]
Galectin-3	P17931	Immunomodulatory effect	[103]
Galectin-3-binding protein	Q08380	Antimicrobial activity Immunomodulatory effect	[104,105]
Galectin-7	P47929	Immunomodulatory effect	[106]
Gelsolin	P06396	Processed from has antimicrobial activity	[109]
Glutathione S-transferase P	P09211	Immunomodulatory effect	[115]
Glyceraldehyde-3-phosphate dehydrogenase	P04406	Immunomodulatory effect	[116]
Guanylate-binding protein 1	P32455	Immunomodulatory effect	[119]
Hemoglobin subunit alpha	P69905	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemoglobin subunit beta	P68871	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemopexin	P02790	Antibacterail effect Anti-inflammatory effect	[126]
Histatin-1	P15515	Antimicrobial activity	[246]
Histidine-rich glycoprotein	P04196	Antimicrobial activity	[133]
Histone H2A.J	Q9BTM1	Antimicrobial activity	[134]
Histone H2B type 3-B	Q8N257	Antimicrobial activity	[134]
Histone H4	P62805	Antimicrobial activity	[134]
Kallikrein-10	O43240	Serine protease activity	[138]
Kallikrein-13	Q9UKR3	Serine protease activity	[138]
Kallikrein-5	Q9Y337	Serine protease activity Processing the maturation of LL-37 cathelicidin	[138,139]
Kallikrein-9	Q9UKQ9	Serine protease activity	[138]
Lactotransferrin	P02788	Antimicrobial activity Iron sequestration	[33]
Legumain	Q99538	Endopeptidase activity	[144]

Lipocalin-1	P31025	Immunomodulatory effect Iron sequestration	[146,147]
Lipocalin-2	P80188	Immunomodulatory effect Iron sequestration	[146,147]
Lysozyme C	P61626	Antimicrobial activity	[33]
Major vault protein	Q14764	Immunomodulatory effect	[152]
Mammaglobin-B	O75556	Immunomodulatory effect	[153]
Matrix metalloproteinase-9	P14780	Metalloprotease activity	[155]
Metalloproteinase inhibitor 2	P16035	Protease Inhibitor	[157]
Moesin	P26038	Immunomodulatory effect	[159]
Mucin-5AC	P98088	Antimicrobial activity	[160]
Mucin-5B	Q9HC84	Antimicrobial activity	[160]
Mucin-7	Q8TAX7	Antimicrobial activity	[160]
Myeloblastin	P24158	Serine protease activity	[161]
Neutrophil collagenase	P22894	Endopeptidase activity Immunomodulatory effect	[166]
Neutrophil defensin 1	P59665	Antimicrobial activity	[33]
Non-secretory ribonuclease	P10153	Ribonuclease activity	[170]
Opiorphin prepropeptide	Q99935	Protease inhibitor	[171]
Peptidoglycan recognition protein 3	Q96LB9	Antimicrobial activity	[173]
Phospholipase B-like 1	Q6P4A8	Suggested antimicrobial activity	[175]
Pigment epithelium-derived factor	P36955	Protease inhibitor	[176]
Plastin-2	P13796	Immunomodulatory effect	[178]
Pro-cathepsin H	P09668	Endopeptidase activity	[60]
Procathepsin L	P07711	Endopeptidase activity	[60]
Prolactin-inducible protein	P12273	Aspartic-type endopeptidase activity Modulates the activity of Zn-α2 glycoprotein	[185,186]
Proline-rich protein 27	Q16378	Antimicrobial activity	[187]
Proline-rich protein 4	Q16378	Antimicrobial activity	[187]
Prolyl endopeptidase	P48147	Endopeptidase activity	[188]
Protein AMBP	P02760	Protease inhibitor	[193]
Protein S100-A10	P60903	Immunomodulatory effect	[196]
Protein S100-A11	P31949	Immunomodulatory effect	[197]
Protein S100-A12	P80511	Immunomodulatory effect	[196]
Protein S100-A2	P29034	Immunomodulatory effect	[200]
Protein S100-A7	P31151	Immunomodulatory effect	[196]
Protein S100-A8	P05109	Immunomodulatory effect	[196]
Protein S100-A9	P06702	Immunomodulatory effect	[196]
Protein S100-P	P25815	Immunomodulatory effect	[196]
Puromycin-sensitive aminopeptidase	P55786	Aminopeptidase activity	[203]
Ribonuclease 4	P34096	Ribonuclease activity	[170]
Ribonuclease 7	Q9H1E1	Ribonuclease activity	[170]

Secretoglobin family 1D member 1	O95968	Immunomodulatory effect	[207]
Secretoglobin family 1D member 2	O95969	Immunomodulatory effect	[207]
Serine protease inhibitor Kazal-type 7	P58062	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 9	Q5DT21	Protease inhibitor	[213]
Serotransferrin	P02787	Iron sequestration	[214]
Serpin B12	Q96P63	Protease inhibitor	[215]
Serpin B5	P36952	Protease inhibitor	[215]
Small proline-rich protein 4	Q96PI1	Antimicrobial effect	[187]
Thioredoxin domain-containing protein 17	Q9BRA2	Immunomodulatory effect	[221]
Thymosin beta-4	P62328	Antimicrobial activity	[222]
Toll-interacting protein	Q9H0E2	Immunomodulatory effect	[224]
WAP four-disulfide core domain protein 12	Q8WWY7	Protease inhibitor	[240]
WAP four-disulfide core domain protein 3	Q8IUB2	Protease inhibitor	[240]
Zinc-alpha-2-glycoprotein	P25311	Immunomodulatory effect	[243]
Zymogen granule protein 16 homolog B	Q96DA0	Antimicrobial activity	[245]

Table S5. Proteins involved in the first line of host defense in the nasal secretion.

Protein name	UniProt entry	Function	Reference
Alpha-1-acid glycoprotein 1	P02763	Immunomodulatory effect	[3]
Alpha-1-acid glycoprotein 2	P19652	Immunomodulatory effect	[3]
Alpha-1-antichymotrypsin	P01011	Protease inhibitor	[4]
Alpha-1-antitrypsin	P01009	Protease inhibitor	[5]
Alpha-1B-glycoprotein	P04217	Immunomodulatory effect	[6]
Alpha-2-HS-glycoprotein	P02765	Anti-inflammatory effect	[8]
Alpha-2-macroglobulin	P01023	Protease inhibitor	[9]
Alpha-amylase 1A	P0DUB6	Regulation of biofilm formation	[11]
Alpha-amylase 1B	P0DTE7	Regulation of biofilm formation	[11]
Alpha-amylase 1C	P0DTE8	Regulation of biofilm formation	[11]
Amyloid-beta precursor protein	P05067	Antimicrobial activity	[15]
Angiogenin	P03950	Antimicrobial activity	[16]
Antileukoproteinase	P03973	Protease inhibitor Immunomodulatory effect	[17,18]
Antithrombin-III	P01008	Protease inhibitor	[19]
Apolipoprotein A-I	P02647	Antimicrobial activity	[20]
Apolipoprotein A-II	P02652	Immunomodulatory effect	[21]
Apolipoprotein A-IV	P06727	Immunomodulatory effect	[22]
Apolipoprotein B-100	P04114	Antimicrobial activity	[23]
Apolipoprotein C-III	P02656	Immunomodulatory effect	[24]
Apolipoprotein D	P05090	Immunomodulatory effect	[26]
Apolipoprotein E	P02649	Immunomodulatory effect	[27]
Azurocidin	P20160	Antimicrobial activity	[33]

Bactericidal permeability-increasing protein	P17213	Antimicrobial activity	[33,34]
Beta-2-glycoprotein 1	P02749	Immunomodulatory effect	[35]
Beta-2-microglobulin	P61769	Antimicrobial activity Immunomodulatory effect	[36,37]
Beta-hexosaminidase subunit beta	P07686	Antimicrobial activity	[39]
BPI fold-containing family A member 1	Q9NP55	Antimicrobial activity	[41]
BPI fold-containing family B member 1	Q8TDL5	Antimicrobial activity	[44]
BPI fold-containing family B member 2	Q8N4F0	Antimicrobial activity	[44]
BPI fold-containing family B member 3	P59826	Antimicrobial activity	[45]
BPI fold-containing family B member 4	P59827	Antimicrobial activity	[46]
Calcitonin gene-related peptide 1	P06881	Antimicrobial activity	[48]
Calpain-1 catalytic subunit	P07384	Endopeptidase activity Immunomodulatory effect	[49]
Catalase	P04040	Antimicrobial activity	[59]
Cathelicidin antimicrobial peptide	P49913	Antimicrobial activity	[33]
Cathepsin B	P07858	Endopeptidase activity	[60]
Cathepsin D	P07339	Endopeptidase activity	[60]
Cathepsin G	P08311	Endopeptidase activity	[60]
Cathepsin S	P25774	Endopeptidase activity	[60]
Ceruloplasmin	P00450	Cu^{2+} sequestration	[62]
Clusterin	P10909	Immunomodulatory effect	[66]
Corticosteroid-binding globulin	P08185	Protease inhibitor	[69]
Cystatin-B	P04080	Protease inhibitor	[71]
Cystatin-C	P01034	Protease inhibitor	[71]
Cystatin-D	P28325	Protease inhibitor	[71]
Cystatin-S	P01036	Protease inhibitor	[71]
Cystatin-SA	P09228	Protease inhibitor	[71]
Cystatin-SN	P01037	Protease inhibitor	[71]
Cytosol aminopeptidase	P28838	Aminopeptidase activity	[72]
Cytosolic non-specific dipeptidase	Q96KP4	Carboxypeptidase activity	[75]
Deleted in malignant brain tumors 1 protein	Q9UGM3	Immunomodulatory effect Antimicrobial activity	[76,77]
Dermcidin	P81605	Antimicrobial activity	[33]
Elafin	P19957	Protease inhibitor	[88]
Eosinophil cationic protein	P12724	Antimicrobial activity	[90]
Eosinophil peroxidase	P11678	Antimicrobial activity	[91]
Extracellular glycoprotein lacritin	Q9GZZ8	Antimicrobial activity	[92]
Fatty acid-binding protein 5	Q01469	Immunomodulatory effect	[94]
Fibrinogen alpha chain	P02671	Immunomodulatory effect	[95]
Fibrinogen beta chain	P02675	Immunomodulatory effect	[95]
Fibrinogen gamma chain	P02679	Immunomodulatory effect	[95]
Galectin-10	Q05315	Immunomodulatory effect	[102]
Galectin-3	P17931	Immunomodulatory effect	[103]
Galectin-3-binding protein	Q08380	Antimicrobial activity Immunomodulatory effect	[104,105]

Gelsolin	P06396	Processed from has antimicrobial activity	[109]
Glucose-6-phosphate isomerase	P06744	Induces immunoglobulin secretion	[111]
Glutathione S-transferase P	P09211	Immunomodulatory effect	[115]
Glyceraldehyde-3-phosphate dehydrogenase	P04406	Immunomodulatory effect	[116]
Haptoglobin	P00738	Immunomodulatory effect Iron sequestration	[122]
Haptoglobin-related protein	P00739	Antiparasitic effect	[123]
Hemoglobin subunit alpha	P69905	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemoglobin subunit beta	P68871	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemopexin	P02790	Antibacterail effect Anti-inflammatory effect	[126]
Heparin cofactor 2	P05546	Protease inhibitor	[127]
High mobility group protein B1	P09429	Immunomodulatory effect	[130]
High mobility group protein B2	P26583	Antimicrobial activity	[131]
Histidine-rich glycoprotein	P04196	Antimicrobial activity	[133]
Histone H1.0	P07305	Antimicrobial activity	[134]
Histone H1.3	P16402	Antimicrobial activity	[134]
Histone H1.4	P10412	Antimicrobial activity	[134]
Histone H2A type 1-D	P20671	Antimicrobial activity	[134]
Histone H2A type 1-H	Q96KK5	Antimicrobial activity	[134]
Histone H2A type 2-C	Q16777	Antimicrobial activity	[134]
Histone H2A.Z	P0C0S5	Antimicrobial activity	[134]
Histone H2B type 1-C/E/F/G/I	P62807	Antimicrobial activity	[134]
Histone H2B type 1-D	P58876	Antimicrobial activity	[134]
Histone H2B type 1-H	Q93079	Antimicrobial activity	[134]
Histone H2B type 1-J	P06899	Antimicrobial activity	[134]
Histone H2B type 1-K	O60814	Antimicrobial activity	[134]
Histone H2B type 1-L	Q99880	Antimicrobial activity	[134]
Histone H2B type 1-M	Q99879	Antimicrobial activity	[134]
Histone H2B type 1-N	Q99877	Antimicrobial activity	[134]
Histone H2B type 2-F	Q5QNW6	Antimicrobial activity	[134]
Histone H2B type F-S	P57053	Antimicrobial activity	[134]
Histone H3.1	P68431	Antimicrobial activity	[134]
Histone H3.1t	Q16695	Antimicrobial activity	[134]
Histone H3.2	Q71DI3	Antimicrobial activity	[134]
Histone H3.3	P84243	Antimicrobial activity	[134]
Histone H4	P62805	Antimicrobial activity	[134]
Inter-alpha-trypsin inhibitor heavy chain H1	P19827	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H2	P19823	Protease inhibitor	[135]

Inter-alpha-trypsin inhibitor heavy chain H4	Q14624	Protease inhibitor	[135]
Kallikrein-7	P49862	Serine protease activity Processing of LL37 cathelicidn	[138]
Kininogen-1	P01042	Antimicrobial activity	[140,141]
Lactoperoxidase	P22079	Antimicrobial activity	[143]
Lactotransferrin	P02788	Antimicrobial activity Iron sequestration	[33]
Leukocyte elastase inhibitor	P30740	Protease inhibitor	[145]
Lipocalin-1	P31025	Immunomodulatory effect Iron sequestration	[146,147]
Lipocalin-2	P80188	Immunomodulatory effect Iron sequestration	[146,147]
Lysozyme C	P61626	Antimicrobial activity	[33]
Macrophage migration inhibitory factor	P14174	Antimicrobial activity	[151]
Mammaglobin-B	O75556	Immunomodulatory effect	[153]
Matrix metalloproteinase-9	P14780	Metalloprotease activity	[155]
Metalloproteinase inhibitor 1	P01033	Protease Inhibitor	[157]
Moesin	P26038	Immunomodulatory effect	[159]
Mucin-5AC	P98088	Antimicrobial activity	[160]
Mucin-5B	Q9HC84	Antimicrobial activity	[160]
Mucin-7	Q8TAX7	Antimicrobial activity	[160]
Myeloblastin	P24158	Serine protease activity	[161]
Myeloperoxidase	P05164	Antimicrobial activity	[162]
N-acetylmuramoyl-L-alanine amidase	Q96PD5	Antimicrobial activity	[164]
Neutrophil collagenase	P22894	Endopeptidase activity Immunomodulatory effect	[166]
Neutrophil defensin 1	P59665	Antimicrobial activity	[33]
Neutrophil defensin 3	P59666	Antimicrobial activity	[33]
Neutrophil elastase	P08246	Serine protease activity	[167]
Nicotinamide phosphoribosyltransferase	P43490	Immunomodulatory effect	[168]
Non-secretory ribonuclease	P10153	Ribonuclease activity	[170]
Opiorphin prepropeptide	Q99935	Protease inhibitor	[171]
Peptidoglycan recognition protein 1	O75594	Antimicrobial activity	[173]
Pigment epithelium-derived factor	P36955	Protease inhibitor	[176]
Plasma kallikrein	P03952	Serine protease activity	[138]
Plastin-2	P13796	Immunomodulatory effect	[178]
Progranulin	P28799	Immunomodulatory effect	[184]
Prolactin-inducible protein	P12273	Aspartic-type endopeptidase activity Modulates the activity of Zn-α2 glycoprotein	[185,186]
Proline-rich protein 4	Q16378	Antimicrobial activity	[187]
Prosaposin	P07602	Processed forms have antimicrobial effect	[191]
Protein AMBP	P02760	Protease inhibitor	[193]

Protein S100-A11	P31949	Immunomodulatory effect	[197]
Protein S100-A12	P80511	Immunomodulatory effect	[196]
Protein S100-A4	P26447	Immunomodulatory effect	[196]
Protein S100-A6	P06703	Immunomodulatory effect	[201]
Protein S100-A7	P31151	Immunomodulatory effect	[196]
Protein S100-A8	P05109	Immunomodulatory effect	[196]
Protein S100-A9	P06702	Immunomodulatory effect	[196]
Protein S100-P	P25815	Immunomodulatory effect	[196]
Ribonuclease pancreatic	P07998	Ribonuclease activity	[170]
Secretoglobin family 1C member 1	Q8TD33	Immunomodulatory effect	[249]
Secretoglobin family 1D member 1	O95968	Immunomodulatory effect	[207]
Secretoglobin family 1D member 2	O95969	Immunomodulatory effect	[207]
Semenogelin-1	P04279	Processed forms have antimicrobial effect	[209–211]
Semenogelin-2	Q02383	Processed forms have antimicrobial effect	[209–211]
Serotransferrin	P02787	Iron sequestration	[214]
Serpin B3	P29508	Protease inhibitor	[215]
Serpin B4	P48594	Protease inhibitor	[215]
Serum amyloid P-component	P02743	Antiviral effect	[217]
Small proline-rich protein 3	Q9UBC9	Antimicrobial effect	[187]
Thymosin beta-10	P63313	Antimicrobial activity	[222]
Thymosin beta-4	P62328	Antimicrobial activity	[222]
Thyroxine-binding globulin	P05543	Protease inhibitor	[223]
Transgelin-2	P37802	Immunomodulatory effect	[226]
Uteroglobin	P11684	Immunomodulatory effect	[238]
Vitamin D-binding protein	P02774	Immunomodulatory effect	[239]
WAP four-disulfide core domain protein 2	Q14508	Protease inhibitor	[240]
Zinc-alpha-2-glycoprotein	P25311	Immunomodulatory effect	[243]
Zymogen granule membrane protein 16	O60844	Antimicrobial activity	[244]

Table S6. Proteins involved in the first line of host defense in urine.

Protein name	UniProt entry	Function	Reference
ADAM DEC1	O15204	Immunomodulatory effect	[2]
Alpha-1-acid glycoprotein 1	P02763	Immunomodulatory effect	[3]
Alpha-1-acid glycoprotein 2	P19652	Immunomodulatory effect	[3]
Alpha-1-antichymotrypsin	P01011	Protease inhibitor	[4]
Alpha-1-antitrypsin	P01009	Protease inhibitor	[5]
Alpha-1B-glycoprotein	P04217	Immunomodulatory effect	[6]
Alpha-2-antiplasmin	P08697	Protease inhibitor	[7]
Alpha-2-HS-glycoprotein	P02765	Anti-inflammatory effect	[8]
Alpha-2-macroglobulin	P01023	Protease inhibitor	[9]
Alpha-2-macroglobulin-like protein 1	A8K2U0	Protease inhibitor	[10]

Alpha-amylase 1A	P0DUB6	Regulation of biofilm formation	[11]
Alpha-amylase 1B	P0DTE7	Regulation of biofilm formation	[11]
Alpha-amylase 1C	P0DTE8	Regulation of biofilm formation	[11]
Alpha-amylase 2B	P19961	Regulation of biofilm formation	[11]
Aminopeptidase B	Q9H4A4	Exopeptidase activity	[12]
Aminopeptidase N	P15144	Exopeptidase activity	[13]
Amyloid-beta precursor protein	P05067	Antimicrobial activity	[15]
Angiogenin	P03950	Antimicrobial activity	[16]
Antileukoproteinase	P03973	Protease inhibitor Immunomodulatory effect	[17,18]
Antithrombin-III	P01008	Protease inhibitor	[19]
Apolipoprotein A-I	P02647	Antimicrobial activity	[20]
Apolipoprotein A-II	P02652	Immunomodulatory effect	[21]
Apolipoprotein A-IV	P06727	Immunomodulatory effect	[22]
Apolipoprotein B-100	P04114	Antimicrobial activity	[23]
Apolipoprotein C-III	P02656	Immunomodulatory effect	[24]
Apolipoprotein D	P05090	Immunomodulatory effect	[26]
Apolipoprotein E	P02649	Immunomodulatory effect	[27]
Apolipoprotein L1	O14791	Immunomodulatory effect	[28]
Apolipoprotein M	O95445	Immunomodulatory effect	[29]
Arginase-1	P05089	Antifungal activity Immunomodulatory effect	[30,31]
Aspartyl aminopeptidase	Q9ULA0	Exopeptidase activity	[32]
Azurocidin	P20160	Antimicrobial activity	[33]
Bactericidal permeability-increasing protein	P17213	Antimicrobial activity	[33,34]
Beta-2-glycoprotein 1	P02749	Immunomodulatory effect	[35]
Beta-2-microglobulin	P61769	Antimicrobial activity Immunomodulatory effect	[36,37]
Beta-Ala-His dipeptidase	Q96KN2	Carboxypeptidase activity	[38]
Beta-defensin 1	P60022	Antimicrobial activity	[33]
Beta-defensin 4A	O15263	Antimicrobial activity	[33]
Beta-hexosaminidase subunit alpha	P06865	Antimicrobial activity	[39]
Beta-hexosaminidase subunit beta	P07686	Antimicrobial activity	[39]
Bone marrow stromal antigen 2	Q10589	Antiviral effect	[40]
BPI fold-containing family A member 1	Q9NP55	Antimicrobial activity	[41]
BPI fold-containing family A member 2	Q96DR5	Antimicrobial activity	[42]
BPI fold-containing family B member 1	Q8TDL5	Antimicrobial activity	[44]
BPI fold-containing family B member 2	Q8N4F0	Antimicrobial activity	[44]
Brain-specific serine protease 4	Q9GZN4	Serine protease activity	[47]
Cactin	Q8WUQ7	Immunomodulatory effect	[250]
Calcitonin gene-related peptide 1	P06881	Antimicrobial activity	[48]

Calpain-1 catalytic subunit	P07384	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-10	Q9HC96	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-12	Q6ZSI9	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-2 catalytic subunit	P17655	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-5	O15484	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-6	Q9Y6Q1	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-7	Q9Y6W3	Endopeptidase activity Immunomodulatory effect	[49]
Calpastatin	P20810	Protease inhibitor	[50]
Carboxypeptidase A1	P15085	Carboxypeptidase activity	[51]
Carboxypeptidase A4	Q9UI42	Carboxypeptidase activity	[51]
Carboxypeptidase A6	Q8N4T0	Carboxypeptidase activity	[51]
Carboxypeptidase B	P15086	Carboxypeptidase activity	[52]
Carboxypeptidase B2	Q96IY4	Carboxypeptidase activity	[52]
Carboxypeptidase D	O75976	Carboxypeptidase activity	[53]
Carboxypeptidase E	P16870	Carboxypeptidase activity	[53]
Carboxypeptidase M	P14384	Carboxypeptidase activity	[54]
Carboxypeptidase N catalytic chain	P15169	Carboxypeptidase activity	[55]
Carboxypeptidase Q	Q9Y646	Carboxypeptidase activity	[56]
Carboxypeptidase Z	Q66K79	Carboxypeptidase activity	[251]
Carcinoembryonic antigen-related cell adhesion molecule 1	P13688	Immunomodulatory effect	[57]
Carcinoembryonic antigen-related cell adhesion molecule 3	P40198	Immunomodulatory effect	[58]
Carcinoembryonic antigen-related cell adhesion molecule 4	O75871	Immunomodulatory effect	[252]
Catalase	P04040	Antimicrobial activity	[59]
Cathelicidin antimicrobial peptide	P49913	Antimicrobial activity	[33]
Cathepsin B	P07858	Endopeptidase activity	[60]
Cathepsin D	P07339	Endopeptidase activity	[60]
Cathepsin E	P14091	Endopeptidase activity	[60]
Cathepsin F	Q9UBX1	Endopeptidase activity	[60]
Cathepsin G	P08311	Endopeptidase activity	[60]
Cathepsin K	P43235	Endopeptidase activity	[60]
Cathepsin L2	O60911	Endopeptidase activity	[60]
Cathepsin O	P43234	Endopeptidase activity	[60]
Cathepsin S	P25774	Endopeptidase activity	[60]
Cathepsin Z	Q9UBR2	Endopeptidase activity	[60]
Cell surface glycoprotein MUC18	P43121	Immunomodulatory effect	[61]
Ceruloplasmin	P00450	Cu^{2+} sequestering activity	[62]

Chitinase-3-like protein 1	P36222	Antimicrobial activity	[63]
Chitotriosidase-1	Q13231	Antifungal activity	[64]
Chromogranin-A	P10645	Processed forms have antimicrobial activity	[65]
Clusterin	P10909	Immunomodulatory effect	[66]
Collagen alpha-1(XII) chain	Q99715	Immunomodulatory effect	[67]
Core histone macro-H2A.1	O75367	Antimicrobial activity	[68]
Core histone macro-H2A.2	Q9P0M6	Antimicrobial activity	[68]
Corticosteroid-binding globulin	P08185	Protease inhibitor	[69]
C-reactive protein	P02741	Acute phase protein	[70]
Cystatin-A	P01040	Protease inhibitor	[71]
Cystatin-B	P04080	Protease inhibitor	[71]
Cystatin-C	P01034	Protease inhibitor	[71]
Cystatin-D	P28325	Protease inhibitor	[71]
Cystatin-F	O76096	Protease inhibitor	[71]
Cystatin-M	Q15828	Protease inhibitor	[71]
Cystatin-S	P01036	Protease inhibitor	[71]
Cystatin-SA	P09228	Protease inhibitor	[71]
Cystatin-SN	P01037	Protease inhibitor	[71]
Cytosol aminopeptidase	P28838	Aminopeptidase activity	[72]
Cytosolic non-specific dipeptidase	Q96KP4	Carboxypeptidase activity	[75]
Defensin-5	Q01523	Antimicrobial activity	[33]
Defensin-6	Q01524	Antimicrobial activity	[33]
Deleted in malignant brain tumors 1 protein	Q9UGM3	Immunomodulatory effect Antimicrobial activity	[76,77]
Deoxyribonuclease-1	P24855	Endonuclease activity	[78]
Dermcidin	P81605	Antimicrobial activity	[33]
Dipeptidase 1	P16444	Carboxypeptidase activity	[79]
Dipeptidase 2	Q9H4A9	Carboxypeptidase activity	[80]
Dipeptidyl peptidase 1	P53634	Carboxypeptidase activity	[81]
Dipeptidyl peptidase 2	Q9UHL4	Carboxypeptidase activity	[82]
Dipeptidyl peptidase 3	Q9NY33	Carboxypeptidase activity	[83]
Dipeptidyl peptidase 4	P27487	Carboxypeptidase activity	[84]
Dipeptidyl peptidase 9	Q86TI2	Carboxypeptidase activity	[85]
Disintegrin and metalloproteinase domain-containing protein 10	O14672	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 15	Q13444	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 17	P78536	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 19	Q9H013	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 22	Q9P0K1	Metalloendopeptidase activity	[86]

Disintegrin and metalloproteinase domain-containing protein 23	O75077	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 33	Q9BZ11	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 8	P78325	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 9	Q13443	Metalloendopeptidase activity	[86]
Drebrin-like protein	Q9UJU6	Immunomodulatory effect	[87]
Elafin	P19957	Protease inhibitor	[88]
Endoplasmic reticulum aminopeptidase 1	Q9NZ08	Aminopeptidase activity	[89]
Endoplasmic reticulum aminopeptidase 2	Q6P179	Aminopeptidase activity	[89]
Eosinophil cationic protein	P12724	Antimicrobial activity	[90]
Eosinophil peroxidase	P11678	Antimicrobial activity	[91]
Extracellular glycoprotein lacritin	Q9GZZ8	Antimicrobial activity	[92]
Fatty acid-binding protein 4	P15090	Immunomodulatory effect	[93]
Fatty acid-binding protein 5	Q01469	Immunomodulatory effect	[94]
Fibrinogen alpha chain	P02671	Immunomodulatory effect	[95]
Fibrinogen beta chain	P02675	Immunomodulatory effect	[95]
Fibrinogen gamma chain	P02679	Immunomodulatory effect	[95]
Fibroleukin	Q14314	Immunomodulatory effect	[97]
Furin	P09958	Serine protease activity	[99]
Galectin-1	P09382	Immunomodulatory effect	[101]
Galectin-10	Q05315	Immunomodulatory effect	[102]
Galectin-2	P09958	Immunomodulatory effect	[253]
Galectin-3	P17931	Immunomodulatory effect	[103]
Galectin-3-binding protein	Q08380	Antimicrobial activity Immunomodulatory effect	[104,105]
Galectin-7	P47929	Immunomodulatory effect	[106]
Galectin-9	O00182	Immunomodulatory effect	[107]
Gastricsin	P20142	Aspartic-type endopeptidase activity	[108]
Gelsolin	P06396	Processed from has antimicrobial activity	[109]
Glia-derived nexin	P07093	Protease inhibitor	[110]
Glucose-6-phosphate isomerase	P06744	Induces immunoglobulin secretion	[111]
Glutamate carboxypeptidase 2	Q04609	Carboxypeptidase activity	[112]
Glutamyl aminopeptidase	Q07075	Aminopeptidase activity	[113]
Glutathione S-transferase omega-1	P78417	Immunomodulatory effect	[114]
Glutathione S-transferase P	P09211	Immunomodulatory effect	[115]
Glyceraldehyde-3-phosphate dehydrogenase	P04406	Immunomodulatory effect	[116]
Growth-regulated alpha protein	P09341	Antimicrobial activity	[118]
Guanylate-binding protein 1	P32455	Immunomodulatory effect	[119]

Guanylate-binding protein 2	P32456	Antiviral effect	[120]
Guanylate-binding protein 4	Q96PP9	Immunomodulatory effect	[119]
Haptoglobin	P00738	Immunomodulatory effect Iron sequestrating	[122]
Haptoglobin-related protein	P00739	Anti-parasitic effect	[123]
Heme-binding protein 1	Q9NRV9	Heme/iron sequestration	[124]
Heme-binding protein 2	Q9Y5Z4	Heme/iron sequestration	[124]
Hemoglobin subunit alpha	P69905	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemoglobin subunit beta	P68871	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemopexin	P02790	Antibacterail effect Anti-inflammatory effect	[126]
Heparin cofactor 2	P05546	Protease inhibitor	[127]
Hepcidin	P81172	Antimicrobial activity Iron sequestration	[128,129]
High mobility group protein B1	P09429	Immunomodulatory effect	[130]
High mobility group protein B2	P26583	Antimicrobial activity	[131]
Histidine-rich glycoprotein	P04196	Antimicrobial activity	[133]
Histone H1.0	P07305	Antimicrobial activity	[134]
Histone H1.1	Q02539	Antimicrobial activity	[134]
Histone H1.10	Q92522	Antimicrobial activity	[134]
Histone H1.2	P16403	Antimicrobial activity	[134]
Histone H1.3	P16402	Antimicrobial activity	[134]
Histone H1.4	P10412	Antimicrobial activity	[134]
Histone H1.5	P16401	Antimicrobial activity	[134]
Histone H1t	P22492	Antimicrobial activity	[134]
Histone H2A type 1	P0C0S8	Antimicrobial activity	[134]
Histone H2A type 1-A	Q96QV6	Antimicrobial activity	[134]
Histone H2A type 1-B/E	P04908	Antimicrobial activity	[134]
Histone H2A type 1-C	Q93077	Antimicrobial activity	[134]
Histone H2A type 1-D	P20671	Antimicrobial activity	[134]
Histone H2A type 1-H	Q96KK5	Antimicrobial activity	[134]
Histone H2A type 1-J	Q99878	Antimicrobial activity	[134]
Histone H2A type 2-A	Q6FI13	Antimicrobial activity	[134]
Histone H2A type 2-B	Q8IUE6	Antimicrobial activity	[134]
Histone H2A type 2-C	Q16777	Antimicrobial activity	[134]
Histone H2A type 3	Q7L7L0	Antimicrobial activity	[134]
Histone H2A.J	Q9BTM1	Antimicrobial activity	[134]
Histone H2A.V	Q71UI9	Antimicrobial activity	[134]
Histone H2A.Z	P0C0S5	Antimicrobial activity	[134]
Histone H2A-Bbd type 1	P0C5Y9	Antimicrobial activity	[134]
Histone H2AX	P16104	Antimicrobial activity	[134]

Histone H2B type 1-A	Q96A08	Antimicrobial activity	[134]
Histone H2B type 1-B	P33778	Antimicrobial activity	[134]
Histone H2B type 1-C/E/F/G/I	P62807	Antimicrobial activity	[134]
Histone H2B type 1-D	P58876	Antimicrobial activity	[134]
Histone H2B type 1-H	Q93079	Antimicrobial activity	[134]
Histone H2B type 1-J	P06899	Antimicrobial activity	[134]
Histone H2B type 1-K	O60814	Antimicrobial activity	[134]
Histone H2B type 1-L	Q99880	Antimicrobial activity	[134]
Histone H2B type 1-M	Q99879	Antimicrobial activity	[134]
Histone H2B type 1-N	Q99877	Antimicrobial activity	[134]
Histone H2B type 1-O	P23527	Antimicrobial activity	[134]
Histone H2B type 2-E	Q16778	Antimicrobial activity	[134]
Histone H2B type 2-F	Q5QNW6	Antimicrobial activity	[134]
Histone H2B type 3-B	Q8N257	Antimicrobial activity	[134]
Histone H2B type F-S	P57053	Antimicrobial activity	[134]
Histone H3.1	P68431	Antimicrobial activity	[134]
Histone H3.1t	Q16695	Antimicrobial activity	[134]
Histone H3.2	Q71DI3	Antimicrobial activity	[134]
Histone H3.3	P84243	Antimicrobial activity	[134]
Histone H3.3C	Q6NXT2	Antimicrobial activity	[134]
Histone H3-7	Q5TEC6	Antimicrobial activity	[134]
Histone H4	P62805	Antimicrobial activity	[134]
Inter-alpha-trypsin inhibitor heavy chain H1	P19827	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H2	P19823	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H3	Q06033	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H4	Q14624	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H5	Q86UX2	Protease inhibitor	[135]
Interferon-induced 35 kDa protein	P80217	Immunomodulatory effect	[136]
Kallikrein-10	O43240	Serine protease activity	[138]
Kallikrein-11	Q9UBX7	Serine protease activity	[138]
Kallikrein-12	Q9UKR0	Serine protease activity	[138]
Kallikrein-13	Q9UKR3	Serine protease activity	[138]
Kallikrein-14	Q9P0G3	Serine protease activity	[138]
Kallikrein-2	P20151	Serine protease activity	[138]
Kallikrein-3	P07288	Serine protease activity	[138]
Kallikrein-5	Q9Y337	Serine protease activity Processing the maturation of LL-37 cathelicidin	[138,139]
Kallikrein-6	Q92876	Serine protease activity	[138]
Kallikrein-7	P49862	Serine protease activity Processing the maturation of LL-37 cathelicidin	[138]
Kallikrein-8	O60259	Serine protease activity	[138]

Kininogen-1	P01042	Antimicrobial activity	[140,141]
Kunitz-type protease inhibitor 1	O43278	Protease inhibitor	[142]
Kunitz-type protease inhibitor 2	O43291	Protease inhibitor	[142]
Kunitz-type protease inhibitor 3	P49223	Protease inhibitor	[142]
Lactoperoxidase	P22079	Antimicrobial activity	[143]
Lactotransferrin	P02788	Antimicrobial activity Iron sequestration	[33]
Legumain	Q99538	Endopeptidase activity	[144]
Leukocyte elastase inhibitor	P30740	Protease inhibitor	[145]
Lipocalin-1	P31025	Immunomodulatory effect Iron sequestration	[146,147]
Lipocalin-2	P80188	Immunomodulatory effect Iron sequestration	[146,147]
Lipopolysaccharide-binding protein	P18428	Immunomodulatory effect	[148]
Liver-expressed antimicrobial peptide 2	Q969E1	Antimicrobial activity	[149]
Lysozyme C	P61626	Antimicrobial activity	[33]
Macrophage migration inhibitory factor	P14174	Antimicrobial activity	[151]
Major vault protein	Q14764	Immunomodulatory effect	[152]
Mammaglobin-B	O75556	Immunomodulatory effect	[153]
Matrix metalloproteinase-9	P14780	Metalloprotease activity	[155]
Melanotransferrin	P08582	Iron sequestration	[156]
Metalloproteinase inhibitor 1	P01033	Protease Inhibitor	[157]
Metalloproteinase inhibitor 2	P16035	Protease Inhibitor	[157]
Metalloproteinase inhibitor 3	P35625	Protease Inhibitor	[157]
Metalloproteinase inhibitor 4	Q99727	Protease Inhibitor	[157]
Midkine	P21741	Immunomodulatory effect	[158]
Moesin	P26038	Immunomodulatory effect	[159]
Mucin-1	P15941	Antimicrobial activity	[160]
Mucin-13	Q9H3R2	Antimicrobial activity	[160]
Mucin-16	Q8WXI7	Antimicrobial activity	[160]
Mucin-2	Q02817	Antimicrobial activity	[160]
Mucin-4	Q99102	Antimicrobial activity	[160]
Mucin-5AC	P98088	Antimicrobial activity	[160]
Mucin-5B	Q9HC84	Antimicrobial activity	[160]
Mucin-6	Q6W4X9	Antimicrobial activity	[160]
Mucin-7	Q8TAX7	Antimicrobial activity	[160]
Myeloblastin	P24158	Serine protease activity	[161]
Myeloperoxidase	P05164	Antimicrobial activity	[162]
Myoglobin	P02144	Processed forms (hemocidins) have antimicrobial activity	[163]
N-acetylmuramoyl-L-alanine amidase	Q96PD5	Antimicrobial activity	[164]
Neprilysin	P08473	Endopeptidase activity	[165]
Neutrophil collagenase	P22894	Endopeptidase activity Immunomodulatory effect	[166]

Neutrophil defensin 1	P59665	Antimicrobial activity	[33]
Neutrophil defensin 3	P59666	Antimicrobial activity	[33]
Neutrophil defensin 4	P12838	Antimicrobial activity	[33]
Neutrophil elastase	P08246	Serine protease activity	[167]
Nicotinamide phosphoribosyltransferase	P43490	Immunomodulatory effect	[168]
Non-histone chromosomal protein HMG-17	P05204	Antimicrobial activity	[169]
Non-secretory ribonuclease	P10153	Ribonuclease activity	[170]
Peptidase inhibitor 16	Q6UXB8	Protease inhibitor	[172]
Peptidoglycan recognition protein 1	O75594	Antimicrobial activity	[173]
Phospholipase B-like 1	Q6P4A8	Suggested antimicrobial activity	[175]
Pigment epithelium-derived factor	P36955	Protease inhibitor	[176]
Plasma kallikrein	P03952	Serine protease activity	[138]
Plasma serine protease inhibitor	P05154	Protease inhibitor	[177]
Plastin-2	P13796	Immunomodulatory effect	[178]
Poly(rC)-binding protein 1	Q15365	Antiviral effect	[179]
Poly(rC)-binding protein 2	Q15366	Antiviral effect	[180]
Pregnancy zone protein	P20742	Protease inhibitor	[181]
Pro-adrenomedullin	P35318	Antimicrobial activity Immunomodulatory effect	[182,183]
Pro-cathepsin H	P09668	Endopeptidase activity	[60]
Procathepsin L	P07711	Endopeptidase activity	[60]
Progranulin	P28799	Immunomodulatory effect	[184]
Prolactin-inducible protein	P12273	Aspartic-type endopeptidase activity Modulates the activity of Zn-α2 glycoprotein	[185,186]
Proline-rich protein 15	Q8IV56	Antimicrobial activity	[187]
Proline-rich protein 4	Q16378	Antimicrobial activity	[187]
Prolyl endopeptidase	P48147	Endopeptidase activity	[188]
Prosalusin	Q8N2E6	Antimicrobial activity	[190]
Prosaposin	P07602	Processed forms has antimicrobial effect	[191]
Prostasin	Q16651	Serine protease activity	[192]
Protein AMBP	P02760	Protease inhibitor	[193]
Protein FAM3A	P98173	Antifungal effect	[194]
Protein S100-A1	P23297	Immunomodulatory effect	[195]
Protein S100-A10	P60903	Immunomodulatory effect	[196]
Protein S100-A11	P31949	Immunomodulatory effect	[197]
Protein S100-A12	P80511	Immunomodulatory effect	[196]
Protein S100-A13	Q99584	Immunomodulatory effect	[198]
Protein S100-A14	Q9HCY8	Immunomodulatory effect	[199]
Protein S100-A2	P29034	Immunomodulatory effect	[200]
Protein S100-A4	P26447	Immunomodulatory effect	[196]
Protein S100-A6	P06703	Immunomodulatory effect	[201]

Protein S100-A7	P31151	Immunomodulatory effect	[196]
Protein S100-A8	P05109	Immunomodulatory effect	[196]
Protein S100-A9	P06702	Immunomodulatory effect	[196]
Protein S100-P	P25815	Immunomodulatory effect	[196]
Puromycin-sensitive aminopeptidase	P55786	Aminopeptidase activity	[203]
RelA-associated inhibitor	Q8WUF5	Antiviral effect Immunomodulatory effect	[204]
Retroviral-like aspartic protease 1	Q53RT3	Aspartic-type endopeptidase activity	[205]
Ribonuclease 4	P34096	Ribonuclease activity	[170]
Ribonuclease 7	Q9H1E1	Ribonuclease activity	[170]
Ribonuclease K6	Q93091	Ribonuclease activity	[170]
Ribonuclease pancreatic	P07998	Ribonuclease activity	[170]
Ribonuclease T2	O00584	Ribonuclease activity	[170]
Secreted Ly-6/uPAR domain-containing protein 2	P0DP57	Immunomodulatory effect	[247]
Secreted Ly-6/uPAR-related protein 1	P55000	Immunomodulatory effect	[206]
Secretoglobin family 1D member 2	O95969	Immunomodulatory effect	[207]
Secretoglobin family 3A member 1	Q96QR1	Immunomodulatory effect	[208]
Semenogelin-1	P04279	Processed forms has antimicrobial activity	[209–211]
Semenogelin-2	Q02383	Processed forms has antimicrobial activity	[209–211]
Serine protease 1	P07477	Serine protease activity	[212]
Serine protease 23	O95084	Serine protease activity	[212]
Serine protease 27	Q9BQR3	Serine protease activity	[212]
Serine protease 53	Q2L4Q9	Serine protease activity	[212]
Serine protease 58	Q8IYP2	Serine protease activity	[212]
Serine protease HTRA1	Q92743	Serine protease activity	[212]
Serine protease HTRA2	O43464	Serine protease activity	[212]
Serine protease HTRA3	P83110	Serine protease activity	[212]
Serine protease inhibitor Kazal-type 1	P00995	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 2	P20155	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 5	Q9NQ38	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 7	P58062	Protease inhibitor	[213]
Serotransferrin	P02787	Iron sequestration	[214]
Serpin B10	P48595	Protease inhibitor	[215]
Serpin B12	Q96P63	Protease inhibitor	[215]
Serpin B13	Q9UIV8	Protease inhibitor	[215]
Serpin B3	P29508	Protease inhibitor	[215]
Serpin B4	P48594	Protease inhibitor	[215]
Serpin B5	P36952	Protease inhibitor	[215]
Serpin B6	P35237	Protease inhibitor	[215]
Serpin B7	O75635	Protease inhibitor	[215]
Serpin B8	P50452	Protease inhibitor	[215]

Serpin B9	P50453	Protease inhibitor	[215]
Serum amyloid A-1 protein	P0DJI8	Immunomodulatory effect	[216]
Serum amyloid A-2 protein	P0DJI9	Immunomodulatory effect	[216]
Serum amyloid A-4 protein	P35542	Immunomodulatory effect	[216]
Serum amyloid P-component	P02743	Antiviral effect	[217]
Sialomucin core protein 24	Q04900	Immunomodulatory effect	[218]
Small proline-rich protein 3	Q9UBC9	Antimicrobial effect	[187]
Syntenin-1	O00560	Immunomodulatory effect	[219]
T-cell immunomodulatory protein	Q8TB96	Immunomodulatory effect	[220]
Thioredoxin domain-containing protein 17	Q9BRA2	Immunomodulatory effect	[221]
Thymosin beta-10	P63313	Antimicrobial activity	[222]
Thymosin beta-4	P62328	Antimicrobial activity	[222]
Thyroxine-binding globulin	P05543	Protease inhibitor	[223]
Toll-interacting protein	Q9H0E2	Immunomodulatory effect	[224]
Transgelin	Q01995	Immunomodulatory effect	[225]
Transgelin-2	P37802	Immunomodulatory effect	[226]
Transmembrane protease serine 11A	Q6ZMR5	Serine protease activity	[227]
Transmembrane protease serine 11B	Q86T26	Serine protease activity	[248]
Transmembrane protease serine 11D	O60235	Serine protease activity	[228]
Transmembrane protease serine 11E	Q9UL52	Serine protease activity	[229]
Triokinase/FMN cyclase	Q3LXA3	Immunomodulatory effect	[230]
Tripeptidyl-peptidase 1	O14773	Serine protease activity	[231]
Tripeptidyl-peptidase 2	P29144	Serine protease activity	[232]
Trypsin-2	P07478	Serine protease activity	[233]
Trypsin-3	P35030	Serine protease activity	[234]
Tryptase alpha/beta-1	Q15661	Serine protease activity	[234]
Tryptase beta-2	P20231	Serine protease activity	[234]
Tryptase delta	Q9BZJ3	Serine protease activity	[234]
Tryptase gamma	Q9NRR2	Serine protease activity	[234]
Uromodulin	P07911	Antimicrobial activity	[236,237]
Uteroglobin	P11684	Immunomodulatory effect	[238]
Vitamin D-binding protein	P02774	Immunomodulatory effect	[239]
WAP four-disulfide core domain protein 1	Q9HC57	Protease inhibitor	[240]
WAP four-disulfide core domain protein 12	Q8WWY7	Protease inhibitor	[240]
WAP four-disulfide core domain protein 2	Q14508	Protease inhibitor	[240]
WAP, Kazal, immunoglobulin, Kunitz and NTR domain-containing protein 1	Q96NZ8	Protease inhibitor	[240]
WAP, Kazal, immunoglobulin, Kunitz and NTR domain-containing protein 2	Q8TEU8	Protease inhibitor	[240]
Xaa-Pro aminopeptidase 1	Q9NQW7	Aminopeptidase activity	[241]
Xaa-Pro aminopeptidase 2	O43895	Aminopeptidase activity	[241]
Xaa-Pro aminopeptidase 3	Q9NQH7	Aminopeptidase activity	[241]
Xaa-Pro dipeptidase	P12955	Carboxypeptidase activity	[242]

Zinc-alpha-2-glycoprotein	P25311	Immunomodulatory effect	[243]
Zymogen granule membrane protein 16	O60844	Antimicrobial activity	[244]
Zymogen granule protein 16 homolog B	Q96DA0	Antimicrobial activity	[245]

Table S7. Proteins involved in the first line of host defense in the cervicovaginal fluid.

Protein name	UniProt entry	Function	Reference
Alpha-1-acid glycoprotein 1	P02763	Immunomodulatory effect	[3]
Alpha-1-acid glycoprotein 2	P19652	Immunomodulatory effect	[3]
Alpha-1-antichymotrypsin	P01011	Protease inhibitor	[4]
Alpha-1-antitrypsin	P01009	Protease inhibitor	[5]
Alpha-1B-glycoprotein	P04217	Immunomodulatory effect	[6]
Alpha-2-antiplasmin	P08697	Protease inhibitor	[7]
Alpha-2-HS-glycoprotein	P02765	Anti-inflammatory effect	[8]
Alpha-2-macroglobulin	P01023	Protease inhibitor	[9]
Alpha-2-macroglobulin-like protein 1	A8K2U0	Protease inhibitor	[10]
Alpha-amylase 1A	P0DUB6	Regulation of biofilm formation	[11]
Alpha-amylase 1B	P0DTE7	Regulation of biofilm formation	[11]
Alpha-amylase 1C	P0DTE8	Regulation of biofilm formation	[11]
Alpha-amylase 2B	P19961	Regulation of biofilm formation	[11]
Aminopeptidase N	P15144	Exopeptidase activity	[13]
Angiogenin	P03950	Antimicrobial activity	[16]
Antileukoproteinase	P03973	Protease inhibitor Immunomodulatory effect	[17,18]
Antithrombin-III	P01008	Protease inhibitor	[19]
Apolipoprotein A-I	P02647	Antimicrobial activity	[20]
Apolipoprotein A-II	P02652	Immunomodulatory effect	[21]
Apolipoprotein A-IV	P06727	Immunomodulatory effect	[22]
Apolipoprotein B-100	P04114	Antimicrobial activity	[23]
Apolipoprotein L1	O14791	Immunomodulatory effect	[28]
Arginase-1	P05089	Antifungal activity Immunomodulatory effect	[30,31]
Azurocidin	P20160	Antimicrobial activity	[33]
Bactericidal permeability-increasing protein	P17213	Antimicrobial activity	[33,34]
Beta-2-glycoprotein 1	P02749	Immunomodulatory effect	[35]
Beta-2-microglobulin	P61769	Antimicrobial activity Immunomodulatory effect	[36,37]
Beta-hexosaminidase subunit beta	P07686	Antimicrobial activity	[39]
BPI fold-containing family A member 1	Q9NP55	Antimicrobial activity	[41]
BPI fold-containing family B member 1	Q8TDL5	Antimicrobial activity	[44]
BPI fold-containing family B member 2	Q8N4F0	Antimicrobial activity	[44]

Calpain-1 catalytic subunit	P07384	Endopeptidase activity Immunomodulatory effect	[49]
Calpastatin	P20810	Protease inhibitor	[50]
Carboxypeptidase A4	Q9UI42	Carboxypeptidase activity	[51]
Carboxypeptidase E	P16870	Carboxypeptidase activity	[53]
Carboxypeptidase M	P14384	Carboxypeptidase activity	[54]
Carcinoembryonic antigen-related cell adhesion molecule 1	P13688	Immunomodulatory effect	[57]
Catalase	P04040	Antimicrobial activity	[59]
Cathelicidin antimicrobial peptide	P49913	Antimicrobial activity	[33]
Cathepsin B	P07858	Endopeptidase activity	[60]
Cathepsin D	P07339	Endopeptidase activity	[60]
Cathepsin G	P08311	Endopeptidase activity	[60]
Cathepsin L2	O60911	Endopeptidase activity	[60]
Cathepsin S	P25774	Endopeptidase activity	[60]
Cathepsin Z	Q9UBR2	Endopeptidase activity	[60]
Ceruloplasmin	P00450	Cu^{2+} sequestering activity	[62]
Chitinase-3-like protein 1	P36222	Antimicrobial activity	[63]
Chitotriosidase-1	Q13231	Antifungal activity	[64]
Chromogranin-A	P10645	Processed forms have anti-microbial activity	[65]
Clusterin	P10909	Immunomodulatory effect	[66]
Collagen alpha-1(XII) chain	Q99715	Immunomodulatory effect	[67]
Core histone macro-H2A.1	O75367	Antimicrobial activity	[68]
Corticosteroid-binding globulin	P08185	Protease inhibitor	[69]
Cystatin-A	P01040	Protease inhibitor	[71]
Cystatin-B	P04080	Protease inhibitor	[71]
Cystatin-C	P01034	Protease inhibitor	[71]
Cystatin-M	Q15828	Protease inhibitor	[71]
Cystatin-S	P01036	Protease inhibitor	[71]
Cystatin-SN	P01037	Protease inhibitor	[71]
Cytosolic non-specific dipeptidase	Q96KP4	Carboxypeptidase activity	[75]
Deleted in malignant brain tumors 1 protein	Q9UGM3	Immunomodulatory effect Antimicrobial activity	[76,77]
Dermcidin	P81605	Antimicrobial activity	[33]
Dipeptidyl peptidase 1	P53634	Carboxypeptidase activity	[81]
Dipeptidyl peptidase 2	Q9UHL4	Carboxypeptidase activity	[82]
Dipeptidyl peptidase 3	Q9NY33	Carboxypeptidase activity	[83]
Dipeptidyl peptidase 4	P27487	Carboxypeptidase activity	[84]
Drebrin-like protein	Q9UJU6	Immunomodulatory effect	[87]
Elafin	P19957	Protease inhibitor	[88]
Eosinophil cationic protein	P12724	Antimicrobial activity	[90]
Eosinophil peroxidase	P11678	Antimicrobial activity	[91]
Fatty acid-binding protein 4	P15090	Immunomodulatory effect	[93]

Fatty acid-binding protein 5	Q01469	Immunomodulatory effect	[94]
Fibrinogen alpha chain	P02671	Immunomodulatory effect	[95]
Fibrinogen beta chain	P02675	Immunomodulatory effect	[95]
Fibrinogen gamma chain	P02679	Immunomodulatory effect	[95]
Fibrocystin-L	Q86WI1	Immunomodulatory effect	[96]
Fibroleukin	Q14314	Immunomodulatory effect	[97]
Galectin-1	P09382	Immunomodulatory effect	[101]
Galectin-10	Q05315	Immunomodulatory effect	[102]
Galectin-3	P17931	Immunomodulatory effect	[103]
Galectin-3-binding protein	Q08380	Antimicrobial activity Immunomodulatory effect	[104,105]
Galectin-7	P47929	Immunomodulatory effect	[106]
Gelsolin	P06396	Processed from has antimicrobial activity	[109]
Glucose-6-phosphate isomerase	P06744	Induces immunoglobulin secretion	[111]
Glutathione S-transferase omega-1	P78417	Immunomodulatory effect	[114]
Glutathione S-transferase P	P09211	Immunomodulatory effect	[115]
Glyceraldehyde-3-phosphate dehydrogenase	P04406	Immunomodulatory effect	[116]
Growth-regulated alpha protein	P09341	Antimicrobial activity	[118]
Guanylate-binding protein 2	P32456	Immunomodulatory effect	[120]
Haptoglobin	P00738	Immunomodulatory effect Iron sequestrating	[122]
Haptoglobin-related protein	P00739	Anti-parasitic effect	[123]
Heme-binding protein 2	Q9Y5Z4	Heme/iron sequestration	[124]
Hemoglobin subunit alpha	P69905	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemoglobin subunit beta	P68871	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemopexin	P02790	Antibacterail effect Anti-inflammatory effect	[126]
Heparin cofactor 2	P05546	Protease inhibitor	[127]
High mobility group protein B1	P09429	Immunomodulatory effect	[130]
High mobility group protein B2	P26583	Antimicrobial activity	[131]
Histidine-rich glycoprotein	P04196	Antimicrobial activity	[133]
Histone H1.0	P07305	Antimicrobial activity	[134]
Histone H1.1	Q02539	Antimicrobial activity	[134]
Histone H1.2	P16403	Antimicrobial activity	[134]
Histone H1.3	P16402	Antimicrobial activity	[134]
Histone H1.4	P10412	Antimicrobial activity	[134]
Histone H1.5	P16401	Antimicrobial activity	[134]
Histone H2A type 1-C	Q93077	Antimicrobial activity	[134]
Histone H2A type 2-C	Q16777	Antimicrobial activity	[134]

Histone H2A.V	Q71UI9	Antimicrobial activity	[134]
Histone H4	P62805	Antimicrobial activity	[134]
Inter-alpha-trypsin inhibitor heavy chain H1	P19827	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H2	P19823	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H4	Q14624	Protease inhibitor	[135]
Interferon-induced 35 kDa protein	P80217	Immunomodulatory effect	[136]
Kallikrein-10	O43240	Serine protease activity	[138]
Kallikrein-11	Q9UBX7	Serine protease activity	[138]
Kallikrein-12	Q9UKR0	Serine protease activity	[138]
Kallikrein-13	Q9UKR3	Serine protease activity	[138]
Kallikrein-3	P07288	Serine protease activity	[138]
Kallikrein-6	Q92876	Serine protease activity	[138]
Kallikrein-7	P49862	Serine protease activity Processing the maturation of LL-37 cathelicidin	[138]
Kallikrein-8	O60259	Serine protease activity	[138]
Kininogen-1	P01042	Antimicrobial activity	[140,141]
Kunitz-type protease inhibitor 1	O43278	Protease inhibitor	[142]
Lactotransferrin	P02788	Antimicrobial activity Iron sequestration	[33]
Legumain	Q99538	Endopeptidase activity	[144]
Leukocyte elastase inhibitor	P30740	Protease inhibitor	[145]
Lipocalin-2	P80188	Immunomodulatory effect Iron sequestration	[146,147]
Lipopolysaccharide-binding protein	P18428	Immunomodulatory effect	[148]
Lysozyme C	P61626	Antimicrobial activity	[33]
Macrophage migration inhibitory factor	P14174	Antimicrobial activity	[151]
Major vault protein	Q14764	Immunomodulatory effect	[152]
Mammaglobin-B	O75556	Immunomodulatory effect	[153]
Matrix metalloproteinase-9	P14780	Metalloprotease activity	[155]
Metalloproteinase inhibitor 1	P01033	Protease Inhibitor	[157]
Metalloproteinase inhibitor 2	P16035	Protease Inhibitor	[157]
Moesin	P26038	Immunomodulatory effect	[159]
Mucin-1	P15941	Antimicrobial activity	[160]
Mucin-16	Q8WXI7	Antimicrobial activity	[160]
Mucin-17	Q685J3	Antimicrobial activity	[160]
Mucin-4	Q99102	Antimicrobial activity	[160]
Mucin-5AC	P98088	Antimicrobial activity	[160]
Mucin-5B	Q9HC84	Antimicrobial activity	[160]
Mucin-6	Q6W4X9	Antimicrobial activity	[160]
Myeloblastin	P24158	Serine protease activity	[161]
Myeloperoxidase	P05164	Antimicrobial activity	[162]
N-acetylmuramoyl-L-alanine amidase	Q96PD5	Antimicrobial activity	[164]
Neprilysin	P08473	Endopeptidase activity	[165]

Neutrophil collagenase	P22894	Endopeptidase activity Immunomodulatory effect	[166]
Neutrophil defensin 3	P59666	Antimicrobial activity	[33]
Neutrophil defensin 4	P12838	Antimicrobial activity	[33]
Neutrophil elastase	P08246	Serine protease activity	[167]
Nicotinamide phosphoribosyltransferase	P43490	Immunomodulatory effect	[168]
Non-secretory ribonuclease	P10153	Ribonuclease activity	[170]
Peptidoglycan recognition protein 1	O75594	Antimicrobial activity	[173]
Phospholipase B-like 1	Q6P4A8	Suggested antimicrobial activity	[175]
Pigment epithelium-derived factor	P36955	Protease inhibitor	[176]
Plasma kallikrein	P03952	Serine protease activity	[138]
Plasma serine protease inhibitor	P05154	Protease inhibitor	[177]
Plastin-2	P13796	Immunomodulatory effect	[178]
Poly(rC)-binding protein 1	Q15365	Antiviral effect	[179]
Pregnancy zone protein	P20742	Protease inhibitor	[181]
Procathepsin L	P07711	Endopeptidase activity	[60]
Progranulin	P28799	Immunomodulatory effect	[184]
Prolactin-inducible protein	P12273	Aspartic-type endopeptidase activity Modulates the activity of Zn-α2 glycoprotein	[185,186]
Prosaposin	P07602	Processed forms has antimicrobial effect	[191]
Prostasin	Q16651	Serine protease activity	[192]
Protein AMBP	P02760	Protease inhibitor	[193]
Protein S100-A10	P60903	Immunomodulatory effect	[196]
Protein S100-A11	P31949	Immunomodulatory effect	[197]
Protein S100-A12	P80511	Immunomodulatory effect	[196]
Protein S100-A13	Q99584	Immunomodulatory effect	[198]
Protein S100-A14	Q9HCY8	Immunomodulatory effect	[199]
Protein S100-A2	P29034	Immunomodulatory effect	[200]
Protein S100-A4	P26447	Immunomodulatory effect	[196]
Protein S100-A7	P31151	Immunomodulatory effect	[196]
Protein S100-A8	P05109	Immunomodulatory effect	[196]
Protein S100-A9	P06702	Immunomodulatory effect	[196]
Protein S100-P	P25815	Immunomodulatory effect	[196]
Puromycin-sensitive aminopeptidase	P55786	Aminopeptidase activity	[203]
RelA-associated inhibitor	Q8WUF5	Antimicrobial activity Immunomodulatory effect	[204]
Retroviral-like aspartic protease 1	Q53RT3	Aspartic-type endopeptidase activity	[205]
Ribonuclease 7	Q9H1E1	Ribonuclease activity	[170]
Ribonuclease pancreatic	P07998	Ribonuclease activity	[170]
Ribonuclease T2	O00584	Ribonuclease activity	[170]
Secreted Ly-6/uPAR domain-containing	P0DP57	Immunomodulatory effect	[247]

protein 2			
Secreted Ly-6/uPAR-related protein 1	P55000	Immunomodulatory effect	[206]
Secretoglobin family 1D member 2	O95969	Immunomodulatory effect	[207]
Semenogelin-1	P04279	Processed forms has antimicrobial activity	[209–211]
Semenogelin-2	Q02383	Processed forms has antimicrobial activity	[209–211]
Serine protease 27	Q9BQR3	Serine protease activity	[212]
Serine protease 57	Q6UWY2	Serine protease activity	[212]
Serine protease HTRA1	Q92743	Serine protease activity	[212]
Serine protease inhibitor Kazal-type 5	Q9NQ38	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 7	P58062	Protease inhibitor	[213]
Serotransferrin	P02787	Iron sequestration	[214]
Serpin B10	P48595	Protease inhibitor	[215]
Serpin B12	Q96P63	Protease inhibitor	[215]
Serpin B13	Q9UIV8	Protease inhibitor	[215]
Serpin B3	P29508	Protease inhibitor	[215]
Serpin B4	P48594	Protease inhibitor	[215]
Serpin B5	P36952	Protease inhibitor	[215]
Serpin B6	P35237	Protease inhibitor	[215]
Serpin B7	O75635	Protease inhibitor	[215]
Serpin B8	P50452	Protease inhibitor	[215]
Serpin B9	P50453	Protease inhibitor	[215]
Serum amyloid A-1 protein	P0DJI8	Immunomodulatory effect	[216]
Serum amyloid P-component	P02743	Antiviral effect	[217]
Small proline-rich protein 3	Q9UBC9	Antimicrobial activity	[187]
Syntenin-1	O00560	Immunomodulatory effect	[219]
Thioredoxin domain-containing protein 17	Q9BRA2	Immunomodulatory effect	[221]
Thymosin beta-10	P63313	Antimicrobial activity	[222]
Thymosin beta-4	P62328	Antimicrobial activity	[222]
Thyroxine-binding globulin	P05543	Protease inhibitor	[223]
Toll-interacting protein	Q9H0E2	Immunomodulatory effect	[224]
Transgelin-2	P37802	Immunomodulatory effect	[226]
Transmembrane protease serine 11A	Q6ZMR5	Serine protease activity	[227]
Transmembrane protease serine 11B	Q86T26	Serine protease activity	[248]
Transmembrane protease serine 11D	O60235	Serine protease activity	[228]
Transmembrane protease serine 11E	Q9UL52	Serine protease activity	[229]
Triokinase/FMN cyclase	Q3LXA3	Immunomodulatory effect	[230]
Tripeptidyl-peptidase 1	O14773	Serine protease activity	[231]
Vitamin D-binding protein	P02774	Immunomodulatory effect	[239]
WAP four-disulfide core domain protein 2	Q14508	Protease inhibitor	[240]
Zinc-alpha-2-glycoprotein	P25311	Immunomodulatory effect	[243]

Table S8. Proteins involved in the first line of host defense in the seminal fluid.

Protein name	UniProt entry	Function	Reference
Acrosin	P10323	Serine protease activity	[1]
Alpha-1-acid glycoprotein 1	P02763	Immunomodulatory effect	[3]
Alpha-1-acid glycoprotein 2	P19652	Immunomodulatory effect	[3]
Alpha-1-antichymotrypsin	P01011	Protease inhibitor	[4]
Alpha-1-antitrypsin	P01009	Protease inhibitor	[5]
Alpha-1B-glycoprotein	P04217	Immunomodulatory effect	[6]
Alpha-2-antiplasmin	P08697	Protease inhibitor	[7]
Alpha-2-macroglobulin	P01023	Protease inhibitor	[9]
Alpha-2-macroglobulin-like protein 1	A8K2U0	Protease inhibitor	[10]
Alpha-amylase 1A	P0DUB6	Regulation of biofilm formation	[11]
Alpha-amylase 1B	P0DTE7	Regulation of biofilm formation	[11]
Alpha-amylase 1C	P0DTE8	Regulation of biofilm formation	[11]
Alpha-amylase 2B	P19961	Regulation of biofilm formation	[11]
Aminopeptidase B	Q9H4A4	Exopeptidase activity	[12]
Aminopeptidase N	P15144	Exopeptidase activity	[13]
Amyloid-beta precursor protein	P05067	Antimicrobial activity	[15]
Angiogenin	P03950	Antimicrobial activity	[16]
Antileukoproteinase	P03973	Protease inhibitor Immunomodulatory effect	[17,18]
Antithrombin-III	P01008	Protease inhibitor	[19]
Apolipoprotein A-I	P02647	Antimicrobial activity	[20]
Apolipoprotein A-II	P02652	Immunomodulatory effect	[21]
Apolipoprotein A-IV	P06727	Immunomodulatory effect	[22]
Apolipoprotein B-100	P04114	Antimicrobial activity	[23]
Apolipoprotein D	P05090	Immunomodulatory effect	[26]
Apolipoprotein E	P02649	Immunomodulatory effect	[27]
Arginase-1	P05089	Antifungal activity Immunomodulatory effect	[30,31]
Aspartyl aminopeptidase	Q9ULA0	Exopeptidase activity	[32]
Azurocidin	P20160	Antimicrobial activity	[33]
Bactericidal permeability-increasing protein	P17213	Antimicrobial activity	[33,34]
Beta-2-glycoprotein 1	P02749	Immunomodulatory effect	[35]
Beta-2-microglobulin	P61769	Antimicrobial activity Immunomodulatory effect	[36,37]
Beta-defensin 105	Q8NG35	Antimicrobial activity	[33]
Beta-defensin 106	Q8N104	Antimicrobial activity	[33]
Beta-defensin 118	Q96PH6	Antimicrobial activity	[33]
Beta-defensin 129	Q9H1M3	Antimicrobial activity	[33]
Beta-defensin 131A	P59861	Antimicrobial activity	[33]
Beta-defensin 132	Q7Z7B7	Antimicrobial activity	[33]

Beta-hexosaminidase subunit alpha	P06865	Antimicrobial activity	[39]
Beta-hexosaminidase subunit beta	P07686	Antimicrobial activity	[39]
BPI fold-containing family A member 3	Q9BQP9	Antimicrobial activity	[43]
BPI fold-containing family B member 2	Q8N4F0	Antimicrobial activity	[44]
Brain-specific serine protease 4	Q9GZN4	Serine protease activity	[47]
Calpain-1 catalytic subunit	P07384	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-11	Q9UMQ6	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-2 catalytic subunit	P17655	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-5	O15484	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-7	Q9Y6W3	Endopeptidase activity Immunomodulatory effect	[49]
Calpastatin	P20810	Protease inhibitor	[50]
Carboxypeptidase A5	Q8WXQ8	Carboxypeptidase activity	[51]
Carboxypeptidase B	P15086	Carboxypeptidase activity	[52]
Carboxypeptidase D	O75976	Carboxypeptidase activity	[53]
Carboxypeptidase E	P16870	Carboxypeptidase activity	[53]
Carboxypeptidase M	P14384	Carboxypeptidase activity	[54]
Carboxypeptidase Q	Q9Y646	Carboxypeptidase activity	[56]
Carboxypeptidase Z	Q66K79	Carboxypeptidase activity	[251]
Catalase	P04040	Antimicrobial activity	[59]
Cathelicidin antimicrobial peptide	P49913	Antimicrobial activity	[33]
Cathepsin B	P07858	Endopeptidase activity	[60]
Cathepsin D	P07339	Endopeptidase activity	[60]
Cathepsin F	Q9UBX1	Endopeptidase activity	[60]
Cathepsin G	P08311	Endopeptidase activity	[60]
Cathepsin L2	O60911	Endopeptidase activity	[60]
Cathepsin O	P43234	Endopeptidase activity	[60]
Cathepsin S	P25774	Endopeptidase activity	[60]
Cathepsin Z	Q9UBR2	Endopeptidase activity	[60]
Ceruloplasmin	P00450	Cu^{2+} sequestering activity	[62]
Chitinase-3-like protein 1	P36222	Antimicrobial activity	[63]
Chromogranin-A	P10645	Processed forms have antimicrobial activity	[65]
Clusterin	P10909	Immunomodulatory effect	[66]
Collagen alpha-1(XII) chain	Q99715	Immunomodulatory effect	[67]
Core histone macro-H2A.1	O75367	Antimicrobial activity	[68]
Corticosteroid-binding globulin	P08185	Protease inhibitor	[69]
C-reactive protein	P02741	Acute phase protein	[70]
Cystatin-A	P01040	Protease inhibitor	[71]
Cystatin-B	P04080	Protease inhibitor	[71]
Cystatin-C	P01034	Protease inhibitor	[71]

Cystatin-S	P01036	Protease inhibitor	[71]
Cystatin-SA	P09228	Protease inhibitor	[71]
Cystatin-SN	P01037	Protease inhibitor	[71]
Cytosol aminopeptidase	P28838	Aminopeptidase activity	[72]
Cytosolic carboxypeptidase 1	Q9UPW5	Carboxypeptidase activity	[73]
Cytosolic non-specific dipeptidase	Q96KP4	Carboxypeptidase activity	[75]
Deoxyribonuclease-1	P24855	Endonuclease activity	[78]
Dermcidin	P81605	Antimicrobial activity	[33]
Dipeptidase 1	P16444	Carboxypeptidase activity	[79]
Dipeptidase 2	Q9H4A9	Carboxypeptidase activity	[80]
Dipeptidase 3	Q9H4B8	Carboxypeptidase activity	[80]
Dipeptidyl peptidase 1	P53634	Carboxypeptidase activity	[81]
Dipeptidyl peptidase 2	Q9UHL4	Carboxypeptidase activity	[82]
Dipeptidyl peptidase 3	Q9NY33	Carboxypeptidase activity	[83]
Dipeptidyl peptidase 4	P27487	Carboxypeptidase activity	[84]
Dipeptidyl peptidase 8	Q6V1X1	Carboxypeptidase activity	[85]
Disintegrin and metalloproteinase domain-containing protein 10	O14672	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 29	Q9UKF5	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 30	Q9UKF2	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 32	Q8TC27	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 7	Q9H2U9	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 9	Q13443	Metalloendopeptidase activity	[86]
Drebrin-like protein	Q9UJU6	Immunomodulatory effect	[87]
Endoplasmic reticulum aminopeptidase 1	Q9NZ08	Aminopeptidase activity	[89]
Eosinophil cationic protein	P12724	Antimicrobial activity	[90]
Eosinophil peroxidase	P11678	Antimicrobial activity	[91]
Fatty acid-binding protein 5	Q01469	Immunomodulatory effect	[94]
Galectin-1	P09382	Immunomodulatory effect	[101]
Galectin-3	P17931	Immunomodulatory effect	[103]
Galectin-3-binding protein	Q08380	Antimicrobial activity Immunomodulatory effect	[104,105]
Galectin-7	P47929	Immunomodulatory effect	[106]
Gastricsin	P20142	Aspartic-type endopeptidase activity	[108]
Gelsolin	P06396	Processed from has antimicrobial activity	[109]
Glucose-6-phosphate isomerase	P06744	Induces immunoglobulin secretion	[111]
Glutamate carboxypeptidase 2	Q04609	Carboxypeptidase activity	[112]

Glutathione S-transferase omega-1	P78417	Immunomodulatory effect	[114]
Glutathione S-transferase P	P09211	Immunomodulatory effect	[115]
Glyceraldehyde-3-phosphate dehydrogenase	P04406	Immunomodulatory effect	[116]
Growth-regulated alpha protein	P09341	Antimicrobial activity	[118]
Haptoglobin	P00738	Immunomodulatory effect Iron sequestrating	[122]
Heme-binding protein 1	Q9NRV9	Heme/iron sequestration	[124]
Heme-binding protein 2	Q9Y5Z4	Heme/iron sequestration	[124]
Hemoglobin subunit alpha	P69905	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemoglobin subunit beta	P68871	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemopexin	P02790	Antibacterail effect Anti-inflammatory effect	[126]
High mobility group protein B1	P09429	Immunomodulatory effect	[130]
High mobility group protein B2	P26583	Antimicrobial activity	[131]
High mobility group protein B4	Q8WW32	Immunomodulatory effect	[132]
Histidine-rich glycoprotein	P04196	Antimicrobial activity	[133]
Histone H1.1	Q02539	Antimicrobial activity	[134]
Histone H1.2	P16403	Antimicrobial activity	[134]
Histone H1.3	P16402	Antimicrobial activity	[134]
Histone H1.4	P10412	Antimicrobial activity	[134]
Histone H1.5	P16401	Antimicrobial activity	[134]
Histone H1t	P22492	Antimicrobial activity	[134]
Histone H2A type 1	P0C0S8	Antimicrobial activity	[134]
Histone H2A type 1-A	Q96QV6	Antimicrobial activity	[134]
Histone H2A type 1-B/E	P04908	Antimicrobial activity	[134]
Histone H2A type 1-C	Q93077	Antimicrobial activity	[134]
Histone H2A type 1-D	P20671	Antimicrobial activity	[134]
Histone H2A type 1-H	Q96KK5	Antimicrobial activity	[134]
Histone H2A type 1-J	Q99878	Antimicrobial activity	[134]
Histone H2A type 2-A	Q6FI13	Antimicrobial activity	[134]
Histone H2A type 2-B	Q8IUE6	Antimicrobial activity	[134]
Histone H2A type 2-C	Q16777	Antimicrobial activity	[134]
Histone H2A type 3	Q7L7L0	Antimicrobial activity	[134]
Histone H2A.J	Q9BTM1	Antimicrobial activity	[134]
Histone H2A.V	Q71UI9	Antimicrobial activity	[134]
Histone H2A.Z	P0C0S5	Antimicrobial activity	[134]
Histone H2A-Bbd type 2/3	P0C5Z0	Antimicrobial activity	[134]
Histone H2AX	P16104	Antimicrobial activity	[134]
Histone H2B type 1-A	Q96A08	Antimicrobial activity	[134]
Histone H2B type 1-B	P33778	Antimicrobial activity	[134]

Histone H2B type 1-C/E/F/G/I	P62807	Antimicrobial activity	[134]
Histone H2B type 1-D	P58876	Antimicrobial activity	[134]
Histone H2B type 1-H	Q93079	Antimicrobial activity	[134]
Histone H2B type 1-J	P06899	Antimicrobial activity	[134]
Histone H2B type 1-K	O60814	Antimicrobial activity	[134]
Histone H2B type 1-L	Q99880	Antimicrobial activity	[134]
Histone H2B type 1-M	Q99879	Antimicrobial activity	[134]
Histone H2B type 1-N	Q99877	Antimicrobial activity	[134]
Histone H2B type 1-O	P23527	Antimicrobial activity	[134]
Histone H2B type 2-E	Q16778	Antimicrobial activity	[134]
Histone H2B type 2-F	Q5QNW6	Antimicrobial activity	[134]
Histone H2B type F-S	P57053	Antimicrobial activity	[134]
Histone H3.1	P68431	Antimicrobial activity	[134]
Histone H3.2	Q71DI3	Antimicrobial activity	[134]
Histone H3.3	P84243	Antimicrobial activity	[134]
Histone H3.3C	Q6NXT2	Antimicrobial activity	[134]
Histone H3-7	Q5TEC6	Antimicrobial activity	[134]
Histone H4	P62805	Antimicrobial activity	[134]
Inter-alpha-trypsin inhibitor heavy chain H5	Q86UX2	Protease inhibitor	[135]
Kallikrein-11	Q9UBX7	Serine protease activity	[138]
Kallikrein-2	P20151	Serine protease activity	[138]
Kallikrein-3	P07288	Serine protease activity	[138]
Kunitz-type protease inhibitor 1	O43278	Protease inhibitor	[142]
Kunitz-type protease inhibitor 2	O43291	Protease inhibitor	[142]
Kunitz-type protease inhibitor 3	P49223	Protease inhibitor	[142]
Kunitz-type protease inhibitor 4	Q6UDR6	Protease inhibitor	[142]
Lactotransferrin	P02788	Antimicrobial activity Iron sequestration	[33]
Legumain	Q99538	Endopeptidase activity	[144]
Leukocyte elastase inhibitor	P30740	Protease inhibitor	[145]
Lipocalin-1	P31025	Immunomodulatory effect Iron sequestration	[146,147]
Lipocalin-2	P80188	Immunomodulatory effect Iron sequestration	[146,147]
Lysozyme C	P61626	Antimicrobial activity	[33]
Macrophage migration inhibitory factor	P14174	Antimicrobial activity	[151]
Major vault protein	Q14764	Immunomodulatory effect	[152]
Mammaglobin-B	O75556	Immunomodulatory effect	[153]
Matrix metalloproteinase-9	P14780	Metalloprotease activity	[155]
Metalloproteinase inhibitor 1	P01033	Protease Inhibitor	[157]
Metalloproteinase inhibitor 2	P16035	Protease Inhibitor	[157]
Metalloproteinase inhibitor 3	P35625	Protease Inhibitor	[157]
Midkine	P21741	Immunomodulatory effect	[158]
Moesin	P26038	Immunomodulatory effect	[159]

Mucin-15	Q8N387	Antimicrobial activity	[160]
Mucin-4	Q99102	Antimicrobial activity	[160]
Mucin-5AC	P98088	Antimicrobial activity	[160]
Mucin-5B	Q9HC84	Antimicrobial activity	[160]
Mucin-6	Q6W4X9	Antimicrobial activity	[160]
Myeloblastin	P24158	Serine protease activity	[161]
Myeloperoxidase	P05164	Antimicrobial activity	[162]
Myoglobin	P02144	Processed forms (hemocidins) have antimicrobial activity	[163]
Neprilysin	P08473	Endopeptidase activity	[165]
Neutrophil collagenase	P22894	Endopeptidase activity Immunomodulatory effect	[166]
Neutrophil defensin 1	P59665	Antimicrobial activity	[33]
Neutrophil defensin 3	P59666	Antimicrobial activity	[33]
Neutrophil elastase	P08246	Serine protease activity	[167]
Nicotinamide phosphoribosyltransferase	P43490	Immunomodulatory effect	[168]
Non-secretory ribonuclease	P10153	Ribonuclease activity	[170]
Peptidase inhibitor 16	Q6UXB8	Protease inhibitor	[172]
Phospholipase B-like 1	Q6P4A8	Suggested antimicrobial activity	[175]
Pigment epithelium-derived factor	P36955	Protease inhibitor	[176]
Plasma serine protease inhibitor	P05154	Protease inhibitor	[177]
Plastin-2	P13796	Immunomodulatory effect	[178]
Poly(rC)-binding protein 1	Q15365	Antiviral effect	[179]
Poly(rC)-binding protein 2	Q15366	Antiviral effect	[180]
Pro-cathepsin H	P09668	Endopeptidase activity	[60]
Procathepsin L	P07711	Endopeptidase activity	[60]
Progranulin	P28799	Immunomodulatory effect	[184]
Prolactin-inducible protein	P12273	Aspartic-type endopeptidase activity Modulates the activity of Zn-α2 glycoprotein	[185,186]
Proline-rich protein 30	Q53SZ7	Antimicrobial activity	[187]
Prolyl endopeptidase	P48147	Endopeptidase activity	[188]
Prosaposin	P07602	Processed forms has antimicrobial effect	[191]
Prostasin	Q16651	Serine protease activity	[192]
Protein AMBP	P02760	Protease inhibitor	[193]
Protein S100-A10	P60903	Immunomodulatory effect	[196]
Protein S100-A11	P31949	Immunomodulatory effect	[197]
Protein S100-A12	P80511	Immunomodulatory effect	[196]
Protein S100-A14	Q9HCY8	Immunomodulatory effect	[199]
Protein S100-A2	P29034	Immunomodulatory effect	[200]
Protein S100-A7	P31151	Immunomodulatory effect	[196]
Protein S100-A8	P05109	Immunomodulatory effect	[196]

Protein S100-A9	P06702	Immunomodulatory effect	[196]
Protein S100-P	P25815	Immunomodulatory effect	[196]
Protein WFDC9	Q8NEX5	Protease inhibitor	[202]
Puromycin-sensitive aminopeptidase	P55786	Aminopeptidase activity	[203]
RelA-associated inhibitor	Q8WUF5	Antiviral effect Immunomodulatory effect	[204]
Ribonuclease 4	P34096	Ribonuclease activity	[170]
Ribonuclease pancreatic	P07998	Ribonuclease activity	[170]
Ribonuclease T2	O00584	Ribonuclease activity	[170]
Secretoglobin family 1D member 2	O95969	Immunomodulatory effect	[207]
Semenogelin-1	P04279	Processed forms has antimicrobial activity	[209–211]
Semenogelin-2	Q02383	Processed forms has antimicrobial activity	[209–211]
Serine protease 1	P07477	Serine protease activity	[212]
Serine protease 23	O95084	Serine protease activity	[212]
Serine protease 55	Q6UWB4	Serine protease activity	[212]
Serine protease 58	Q8IYP2	Serine protease activity	[212]
Serine protease HTRA1	Q92743	Serine protease activity	[212]
Serine protease HTRA2	O43464	Serine protease activity	[212]
Serine protease inhibitor Kazal-type 2	P20155	Protease inhibitor	[213]
Serotransferrin	P02787	Iron sequestration	[214]
Serpin B10	P48595	Protease inhibitor	[215]
Serpin B12	Q96P63	Protease inhibitor	[215]
Serpin B3	P29508	Protease inhibitor	[215]
Serpin B4	P48594	Protease inhibitor	[215]
Serpin B5	P36952	Protease inhibitor	[215]
Serpin B6	P35237	Protease inhibitor	[215]
Serpin B7	O75635	Protease inhibitor	[215]
Serpin B8	P50452	Protease inhibitor	[215]
Serpin B9	P50453	Protease inhibitor	[215]
Serum amyloid A-1 protein	P0DJI8	Immunomodulatory effect	[216]
Serum amyloid A-2 protein	P0DJI9	Immunomodulatory effect	[216]
Serum amyloid P-component	P02743	Antiviral effect	[217]
Small proline-rich protein 3	Q9UBC9	Antimicrobial effect	[187]
Sperm-associated antigen 11B	Q08648	Antimicrobial activity	[255]
Syntenin-1	O00560	Immunomodulatory effect	[219]
T-cell immunomodulatory protein	Q8TB96	Immunomodulatory effect	[220]
Testis-specific H1 histone	Q75WM6	Antimicrobial activity	[134]
Thioredoxin domain-containing protein 17	Q9BRA2	Immunomodulatory effect	[221]
Thymosin beta-10	P63313	Antimicrobial activity	[222]
Thymosin beta-4	P62328	Antimicrobial activity	[222]
Thyroxine-binding globulin	P05543	Protease inhibitor	[223]
Toll-interacting protein	Q9H0E2	Immunomodulatory effect	[224]

Transgelin-2	P37802	Immunomodulatory effect	[226]
Triokinase/FMN cyclase	Q3LXA3	Immunomodulatory effect	[230]
Tripeptidyl-peptidase 1	O14773	Serine protease activity	[231]
Tripeptidyl-peptidase 2	P29144	Serine protease activity	[232]
Trypsin-3	P35030	Serine protease activity	[234]
Uromodulin	P07911	Antimicrobial activity	[236,237]
Vitamin D-binding protein	P02774	Immunomodulatory effect	[239]
WAP four-disulfide core domain protein 2	Q14508	Protease inhibitor	[240]
WAP four-disulfide core domain protein 8	Q8IUA0	Protease inhibitor	[240]
Xaa-Pro aminopeptidase 1	Q9NQW7	Aminopeptidase activity	[241]
Xaa-Pro aminopeptidase 3	Q9NQH7	Aminopeptidase activity	[241]
Xaa-Pro dipeptidase	P12955	Carboxypeptidase activity	[242]
Zinc-alpha-2-glycoprotein	P25311	Immunomodulatory effect	[243]
Zymogen granule membrane protein 16	O60844	Antimicrobial activity	[244]
Zymogen granule protein 16 homolog B	Q96DA0	Antimicrobial activity	[245]

Table S9. Proteins involved in the first line of host defense in CSF.

Protein name	UniProt entry	Function	Reference
ADAM DEC1	O15204	Immunomodulatory effect	[2]
Alpha-1-acid glycoprotein 1	P02763	Immunomodulatory effect	[3]
Alpha-1-acid glycoprotein 2	P19652	Immunomodulatory effect	[3]
Alpha-1-antichymotrypsin	P01011	Protease inhibitor	[4]
Alpha-1-antitrypsin	P01009	Protease inhibitor	[5]
Alpha-1B-glycoprotein	P04217	Immunomodulatory effect	[6]
Alpha-2-antiplasmin	P08697	Protease inhibitor	[7]
Alpha-2-HS-glycoprotein	P02765	Anti-inflammatory effect	[8]
Alpha-2-macroglobulin	P01023	Protease inhibitor	[9]
Alpha-amylase 1A	P0DUB6	Regulation of biofilm formation	[11]
Alpha-amylase 1B	P0DTE7	Regulation of biofilm formation	[11]
Alpha-amylase 1C	P0DTE8	Regulation of biofilm formation	[11]
Alpha-amylase 2B	P19961	Regulation of biofilm formation	[11]
Aminopeptidase B	Q9H4A4	Exopeptidase activity	[12]
Aminopeptidase N	P15144	Exopeptidase activity	[13]
Amyloid-beta precursor protein	P05067	Antimicrobial activity	[15]
Angiogenin	P03950	Antimicrobial activity	[16]
Antileukoproteinase	P03973	Protease inhibitor Immunomodulatory effect	[17,18]
Antithrombin-III	P01008	Protease inhibitor	[19]
Apolipoprotein A-I	P02647	Antimicrobial activity	[20]
Apolipoprotein A-II	P02652	Immunomodulatory effect	[21]

Apolipoprotein A-IV	P06727	Immunomodulatory effect	[22]
Apolipoprotein B-100	P04114	Antimicrobial activity	[23]
Apolipoprotein C-III	P02656	Immunomodulatory effect	[24]
Apolipoprotein D	P05090	Immunomodulatory effect	[26]
Apolipoprotein E	P02649	Immunomodulatory effect	[27]
Apolipoprotein L1	O14791	Immunomodulatory effect	[28]
Apolipoprotein M	O95445	Immunomodulatory effect	[29]
Arginase-1	P05089	Antifungal activity Immunomodulatory effect	[30,31]
Aspartyl aminopeptidase	Q9ULA0	Exopeptidase activity	[32]
Azurocidin	P20160	Antimicrobial activity	[33]
Bactericidal permeability-increasing protein	P17213	Antimicrobial activity	[33,34]
Beta-2-glycoprotein 1	P02749	Immunomodulatory effect	[35]
Beta-2-microglobulin	P61769	Antimicrobial activity Immunomodulatory effect	[36,37]
Beta-Ala-His dipeptidase	Q96KN2	Carboxypeptidase activity	[38]
Beta-defensin 1	P60022	Antimicrobial activity	[33]
Beta-defensin 103	P81534	Antimicrobial activity	[33]
Beta-hexosaminidase subunit alpha	P06865	Antimicrobial activity	[39]
Beta-hexosaminidase subunit beta	P07686	Antimicrobial activity	[39]
Bone marrow stromal antigen 2	Q10589	Antiviral effect	[40]
Calcitonin gene-related peptide 1	P06881	Antimicrobial activity	[48]
Calpain-1 catalytic subunit	P07384	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-2 catalytic subunit	P17655	Endopeptidase activity Immunomodulatory effect	[49]
Calpain-5	O15484	Endopeptidase activity Immunomodulatory effect	[49]
Calpastatin	P20810	Protease inhibitor	[50]
Carboxypeptidase A1	P15085	Carboxypeptidase activity	[51]
Carboxypeptidase A2	P48052	Carboxypeptidase activity	[51]
Carboxypeptidase A4	Q9UI42	Carboxypeptidase activity	[51]
Carboxypeptidase A5	Q8WXQ8	Carboxypeptidase activity	[51]
Carboxypeptidase B	P15086	Carboxypeptidase activity	[52]
Carboxypeptidase B2	Q96IY4	Carboxypeptidase activity	[52]
Carboxypeptidase D	O75976	Carboxypeptidase activity	[53]
Carboxypeptidase E	P16870	Carboxypeptidase activity	[53]
Carboxypeptidase M	P14384	Carboxypeptidase activity	[54]
Carboxypeptidase N catalytic chain	P15169	Carboxypeptidase activity	[55]
Carboxypeptidase Q	Q9Y646	Carboxypeptidase activity	[56]
Carboxypeptidase Z	Q66K79	Carboxypeptidase activity	[251]
Carcinoembryonic antigen-related cell adhesion molecule 1	P13688	Immunomodulatory effect	[57]
Catalase	P04040	Antimicrobial activity	[59]
Cathelicidin antimicrobial peptide	P49913	Antimicrobial activity	[33]

Cathepsin B	P07858	Endopeptidase activity	[60]
Cathepsin D	P07339	Endopeptidase activity	[60]
Cathepsin F	Q9UBX1	Endopeptidase activity	[60]
Cathepsin G	P08311	Endopeptidase activity	[60]
Cathepsin L2	O60911	Endopeptidase activity	[60]
Cathepsin O	P43234	Endopeptidase activity	[60]
Cathepsin S	P25774	Endopeptidase activity	[60]
Cathepsin Z	Q9UBR2	Endopeptidase activity	[60]
Cell surface glycoprotein MUC18	P43121	Immunomodulatory effect	[61]
Ceruloplasmin	P00450	Cu^{2+} sequestering activity	[62]
Chitinase-3-like protein 1	P36222	Antimicrobial activity	[63]
Chitotriosidase-1	Q13231	Antifungal activity	[64]
Chromogranin-A	P10645	Processed forms have antimicrobial activity	[65]
Clusterin	P10909	Immunomodulatory effect	[66]
Collagen alpha-1(XII) chain	Q99715	Immunomodulatory effect	[67]
Core histone macro-H2A.1	O75367	Antimicrobial activity	[68]
Corticosteroid-binding globulin	P08185	Protease inhibitor	[69]
C-reactive protein	P02741	Acute phase protein	[70]
Cystatin-A	P01040	Protease inhibitor	[71]
Cystatin-B	P04080	Protease inhibitor	[71]
Cystatin-C	P01034	Protease inhibitor	[71]
Cystatin-F	O76096	Protease inhibitor	[71]
Cystatin-M	Q15828	Protease inhibitor	[71]
Cystatin-S	P01036	Protease inhibitor	[71]
Cystatin-SA	P09228	Protease inhibitor	[71]
Cystatin-SN	P01037	Protease inhibitor	[71]
Cytosol aminopeptidase	P28838	Aminopeptidase activity	[72]
Cytosolic non-specific dipeptidase	Q96KP4	Carboxypeptidase activity	[75]
Deoxyribonuclease-1	P24855	Endonuclease activity	[78]
Dermcidin	P81605	Antimicrobial activity	[33]
Dipeptidase 2	Q9H4A9	Carboxypeptidase activity	[80]
Dipeptidase 3	Q9H4B8	Carboxypeptidase activity	[80]
Dipeptidyl peptidase 1	P53634	Carboxypeptidase activity	[81]
Dipeptidyl peptidase 2	Q9UHL4	Carboxypeptidase activity	[82]
Dipeptidyl peptidase 3	Q9NY33	Carboxypeptidase activity	[83]
Dipeptidyl peptidase 4	P27487	Carboxypeptidase activity	[84]
Dipeptidyl peptidase 9	Q86TI2	Carboxypeptidase activity	[85]
Disintegrin and metalloproteinase domain-containing protein 10	O14672	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 11	O75078	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 12	O43184	Metalloendopeptidase activity	[86]

Disintegrin and metalloproteinase domain-containing protein 15	Q13444	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 17	P78536	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 22	Q9P0K1	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 23	O75077	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 28	Q9UKQ2	Metalloendopeptidase activity	[86]
Disintegrin and metalloproteinase domain-containing protein 9	Q13443	Metalloendopeptidase activity	[86]
Drebrin-like protein	Q9UJU6	Immunomodulatory effect	[87]
Elafin	P19957	Protease inhibitor	[88]
Endoplasmic reticulum aminopeptidase 1	Q9NZ08	Aminopeptidase activity	[89]
Endoplasmic reticulum aminopeptidase 2	Q6P179	Aminopeptidase activity	[89]
Eosinophil cationic protein	P12724	Antimicrobial activity	[90]
Extracellular glycoprotein lacritin	Q9GZZ8	Antimicrobial activity	[92]
Fatty acid-binding protein 4	P15090	Immunomodulatory effect	[93]
Fatty acid-binding protein 5	Q01469	Immunomodulatory effect	[94]
Fibrinogen alpha chain	P02671	Immunomodulatory effect	[95]
Fibrinogen beta chain	P02675	Immunomodulatory effect	[95]
Fibrinogen gamma chain	P02679	Immunomodulatory effect	[95]
Fibroleukin	Q14314	Immunomodulatory effect	[97]
Folliculin-interacting protein 1	Q8TF40	Immunomodulatory effect	[98]
Furin	P09958	Serine protease activity	[99]
Galectin-1	P09382	Immunomodulatory effect	[101]
Galectin-3	P17931	Immunomodulatory effect	[103]
Galectin-3-binding protein	Q08380	Antimicrobial activity Immunomodulatory effect	[104,105]
Galectin-7	P47929	Immunomodulatory effect	[106]
Gelsolin	P06396	Processed from has antimicrobial activity	[109]
Glia-derived nexin	P07093	Protease inhibitor	[110]
Glucose-6-phosphate isomerase	P06744	Induces immunoglobulin secretion	[111]
Glutamate carboxypeptidase 2	Q04609	Carboxypeptidase activity	[112]
Glutamyl aminopeptidase	Q07075	Aminopeptidase activity	[113]
Glutathione S-transferase omega-1	P78417	Immunomodulatory effect	[114]
Glutathione S-transferase P	P09211	Immunomodulatory effect	[115]
Glyceraldehyde-3-phosphate dehydrogenase	P04406	Immunomodulatory effect	[116]
Growth-regulated alpha protein	P09341	Antimicrobial activity	[118]
Guanylate-binding protein 1	P32455	Immunomodulatory effect	[119]

Haptoglobin	P00738	Immunomodulatory effect Iron sequestrating	[122]
Haptoglobin-related protein	P00739	Anti-parasitic effect	[123]
Heme-binding protein 1	Q9NRV9	Heme/iron sequestration	[124]
Heme-binding protein 2	Q9Y5Z4	Heme/iron sequestration	[124]
Hemoglobin subunit alpha	P69905	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemoglobin subunit beta	P68871	Processed forms (hemocidins) have antimicrobial activity	[125]
Hemopexin	P02790	Antibacterail effect Anti-inflammatory effect	[126]
Heparin cofactor 2	P05546	Protease inhibitor	[127]
Hepcidin	P81172	Antimicrobial activity Iron sequestration	[128,129]
High mobility group protein B1	P09429	Immunomodulatory effect	[130]
High mobility group protein B2	P26583	Antimicrobial activity	[131]
High mobility group protein B3	O15347	Immunomodulatory effect	[132]
Histidine-rich glycoprotein	P04196	Antimicrobial activity	[133]
Histone H1.0	P07305	Antimicrobial activity	[134]
Histone H1.1	Q02539	Antimicrobial activity	[134]
Histone H1.10	Q92522	Antimicrobial activity	[134]
Histone H1.2	P16403	Antimicrobial activity	[134]
Histone H1.3	P16402	Antimicrobial activity	[134]
Histone H1.4	P10412	Antimicrobial activity	[134]
Histone H1.5	P16401	Antimicrobial activity	[134]
Histone H2A type 1	P0C0S8	Antimicrobial activity	[134]
Histone H2A type 1-B/E	P04908	Antimicrobial activity	[134]
Histone H2A type 1-C	Q93077	Antimicrobial activity	[134]
Histone H2A type 1-D	P20671	Antimicrobial activity	[134]
Histone H2A type 1-H	Q96KK5	Antimicrobial activity	[134]
Histone H2A type 1-J	Q99878	Antimicrobial activity	[134]
Histone H2A type 2-A	Q6FI13	Antimicrobial activity	[134]
Histone H2A type 2-B	Q8IUE6	Antimicrobial activity	[134]
Histone H2A type 2-C	Q16777	Antimicrobial activity	[134]
Histone H2A type 3	Q7L7L0	Antimicrobial activity	[134]
Histone H2A.J	Q9BTM1	Antimicrobial activity	[134]
Histone H2A.V	Q71UI9	Antimicrobial activity	[134]
Histone H2A.Z	P0C0S5	Antimicrobial activity	[134]
Histone H2AX	P16104	Antimicrobial activity	[134]
Histone H2B type 1-A	Q96A08	Antimicrobial activity	[134]
Histone H2B type 1-B	P33778	Antimicrobial activity	[134]
Histone H2B type 1-C/E/F/G/I	P62807	Antimicrobial activity	[134]
Histone H2B type 1-D	P58876	Antimicrobial activity	[134]

Histone H2B type 1-H	Q93079	Antimicrobial activity	[134]
Histone H2B type 1-J	P06899	Antimicrobial activity	[134]
Histone H2B type 1-K	O60814	Antimicrobial activity	[134]
Histone H2B type 1-L	Q99880	Antimicrobial activity	[134]
Histone H2B type 1-M	Q99879	Antimicrobial activity	[134]
Histone H2B type 1-N	Q99877	Antimicrobial activity	[134]
Histone H2B type 1-O	P23527	Antimicrobial activity	[134]
Histone H2B type 2-E	Q16778	Antimicrobial activity	[134]
Histone H2B type 2-F	Q5QNW6	Antimicrobial activity	[134]
Histone H2B type 3-B	Q8N257	Antimicrobial activity	[134]
Histone H2B type F-S	P57053	Antimicrobial activity	[134]
Histone H3.1	P68431	Antimicrobial activity	[134]
Histone H3.1t	Q16695	Antimicrobial activity	[134]
Histone H3.2	Q71DI3	Antimicrobial activity	[134]
Histone H3.3	P84243	Antimicrobial activity	[134]
Histone H4	P62805	Antimicrobial activity	[134]
Inter-alpha-trypsin inhibitor heavy chain H1	P19827	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H2	P19823	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H3	Q06033	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H4	Q14624	Protease inhibitor	[135]
Inter-alpha-trypsin inhibitor heavy chain H5	Q86UX2	Protease inhibitor	[135]
Kallikrein-10	O43240	Serine protease activity	[138]
Kallikrein-11	Q9UBX7	Serine protease activity	[138]
Kallikrein-13	Q9UKR3	Serine protease activity	[138]
Kallikrein-3	P07288	Serine protease activity	[138]
Kallikrein-6	Q92876	Serine protease activity	[138]
Kallikrein-7	P49862	Serine protease activity Processing the maturation of LL-37 cathelicidin	[138]
Kallikrein-8	O60259	Serine protease activity	[138]
Kininogen-1	P01042	Antimicrobial activity	[140,141]
Kunitz-type protease inhibitor 1	O43278	Protease inhibitor	[142]
Kunitz-type protease inhibitor 2	O43291	Protease inhibitor	[142]
Lactotransferrin	P02788	Antimicrobial activity Iron sequestration	[33]
Legumain	Q99538	Endopeptidase activity	[144]
Leukocyte elastase inhibitor	P30740	Protease inhibitor	[145]
Lipocalin-1	P31025	Immunomodulatory effect Iron sequestration	[146,147]
Lipocalin-2	P80188	Immunomodulatory effect Iron sequestration	[146,147]
Lipopolysaccharide-binding protein	P18428	Immunomodulatory effect	[148]
Liver-expressed antimicrobial peptide 2	Q969E1	Antimicrobial activity	[149]
Lymphotactin	P47992	Antimicrobial activity	[150]

Lysozyme C	P61626	Antimicrobial activity	[33]
Macrophage migration inhibitory factor	P14174	Antimicrobial activity	[151]
Mammaglobin-B	O75556	Immunomodulatory effect	[153]
Matrix metalloproteinase-9	P14780	Metalloprotease activity	[155]
Melanotransferrin	P08582	Iron sequestration	[156]
Metalloproteinase inhibitor 1	P01033	Protease Inhibitor	[157]
Metalloproteinase inhibitor 2	P16035	Protease Inhibitor	[157]
Metalloproteinase inhibitor 3	P35625	Protease Inhibitor	[157]
Metalloproteinase inhibitor 4	Q99727	Protease Inhibitor	[157]
Midkine	P21741	Immunomodulatory effect	[158]
Moesin	P26038	Immunomodulatory effect	[159]
Mucin-16	Q8WXI7	Antimicrobial activity	[160]
Mucin-3A	Q02505	Antimicrobial activity	[160]
Myeloperoxidase	P05164	Antimicrobial activity	[162]
Myoglobin	P02144	Processed forms (hemocidins) have antimicrobial activity	[163]
N-acetylmuramoyl-L-alanine amidase	Q96PD5	Antimicrobial activity	[164]
Neprilysin	P08473	Endopeptidase activity	[165]
Neutrophil collagenase	P22894	Endopeptidase activity Immunomodulatory effect	[166]
Neutrophil defensin 1	P59665	Antimicrobial activity	[33]
Neutrophil defensin 3	P59666	Antimicrobial activity	[33]
Neutrophil elastase	P08246	Serine protease activity	[167]
Nicotinamide phosphoribosyltransferase	P43490	Immunomodulatory effect	[168]
Non-histone chromosomal protein HMG-17	P05204	Antimicrobial activity	[169]
Non-secretory ribonuclease	P10153	Ribonuclease activity	[170]
Peptidase inhibitor 16	Q6UXB8	Protease inhibitor	[172]
Peptidoglycan recognition protein 1	O75594	Antimicrobial activity	[173]
Phospholipase B-like 1	Q6P4A8	Suggested antimicrobial activity	[175]
Pigment epithelium-derived factor	P36955	Protease inhibitor	[176]
Plasma kallikrein	P03952	Serine protease activity	[138]
Plasma serine protease inhibitor	P05154	Protease inhibitor	[177]
Plastin-2	P13796	Immunomodulatory effect	[178]
Poly(rC)-binding protein 1	Q15365	Antiviral effect	[179]
Poly(rC)-binding protein 2	Q15366	Antiviral effect	[180]
Pregnancy zone protein	P20742	Protease inhibitor	[181]
Pro-adrenomedullin	P35318	Antimicrobial activity Immunomodulatory effect	[182,183]
Pro-cathepsin H	P09668	Endopeptidase activity	[60]
Procathepsin L	P07711	Endopeptidase activity	[60]
Progranulin	P28799	Immunomodulatory effect	[184]
Prolactin-inducible protein	P12273	Aspartic-type endopeptidase activity	[185,186]

		Modulates the activity of Zn-α2 glycoprotein	
Proline-rich protein 14	Q9BWN1	Antimicrobial activity	[187]
Proline-rich protein 15	Q8IV56	Antimicrobial activity	[187]
Proline-rich protein 20A	P86496	Antimicrobial activity	[187]
Proline-rich protein 20B	P86481	Antimicrobial activity	[187]
Proline-rich protein 20C	P86479	Antimicrobial activity	[187]
Proline-rich protein 20D	P86480	Antimicrobial activity	[187]
Proline-rich protein 20E	P86478	Antimicrobial activity	[187]
Prolyl endopeptidase	P48147	Endopeptidase activity	[188]
Pro-opiomelanocortin	P01189	Antimicrobial activity	[189]
Prosaposin	P07602	Processed forms has antimicrobial effect	[191]
Prostasin	Q16651	Serine protease activity	[192]
Protachykinin-1	P20366	Antimicrobial activity	[254]
Protein AMBP	P02760	Protease inhibitor	[193]
Protein FAM3A	P98173	Antifungal effect	[194]
Protein S100-A1	P23297	Immunomodulatory effect	[195]
Protein S100-A10	P60903	Immunomodulatory effect	[196]
Protein S100-A11	P31949	Immunomodulatory effect	[197]
Protein S100-A12	P80511	Immunomodulatory effect	[196]
Protein S100-A13	Q99584	Immunomodulatory effect	[198]
Protein S100-A14	Q9HCY8	Immunomodulatory effect	[199]
Protein S100-A4	P26447	Immunomodulatory effect	[196]
Protein S100-A6	P06703	Immunomodulatory effect	[201]
Protein S100-A7	P31151	Immunomodulatory effect	[196]
Protein S100-A8	P05109	Immunomodulatory effect	[196]
Protein S100-A9	P06702	Immunomodulatory effect	[196]
Protein S100-B	P04271	Immunomodulatory effect	[196]
Protein S100-P	P25815	Immunomodulatory effect	[196]
Puromycin-sensitive aminopeptidase	P55786	Aminopeptidase activity	[203]
Retroviral-like aspartic protease 1	Q53RT3	Aspartic-type endopeptidase activity	[205]
Ribonuclease 4	P34096	Ribonuclease activity	[170]
Ribonuclease 7	Q9H1E1	Ribonuclease activity	[170]
Ribonuclease K6	Q93091	Ribonuclease activity	[170]
Ribonuclease pancreatic	P07998	Ribonuclease activity	[170]
Ribonuclease T2	O00584	Ribonuclease activity	[170]
Secreted Ly-6/uPAR domain-containing protein 2	P0DP57	Immunomodulatory effect	[247]
Secreted Ly-6/uPAR-related protein 1	P55000	Immunomodulatory effect	[206]
Semenogelin-1	P04279	Processed forms has antimicrobial activity	[209–211]
Serine protease 1	P07477	Serine protease activity	[212]
Serine protease 23	O95084	Serine protease activity	[212]

Serine protease 27	Q9BQR3	Serine protease activity	[212]
Serine protease HTRA1	Q92743	Serine protease activity	[212]
Serine protease HTRA2	O43464	Serine protease activity	[212]
Serine protease HTRA3	P83110	Serine protease activity	[212]
Serine protease inhibitor Kazal-type 1	P00995	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 2	P20155	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 5	Q9NQ38	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 6	Q6UWN8	Protease inhibitor	[213]
Serine protease inhibitor Kazal-type 7	P58062	Protease inhibitor	[213]
Serotransferrin	P02787	Iron sequestration	[214]
Serpin B10	P48595	Protease inhibitor	[215]
Serpin B11	Q96P15	Protease inhibitor	[215]
Serpin B3	P29508	Protease inhibitor	[215]
Serpin B4	P48594	Protease inhibitor	[215]
Serpin B6	P35237	Protease inhibitor	[215]
Serpin B8	P50452	Protease inhibitor	[215]
Serpin B9	P50453	Protease inhibitor	[215]
Serum amyloid A-1 protein	P0DJI8	Immunomodulatory effect	[216]
Serum amyloid A-2 protein	P0DJI9	Immunomodulatory effect	[216]
Serum amyloid A-4 protein	P35542	Immunomodulatory effect	[216]
Serum amyloid P-component	P02743	Antiviral effect	[217]
Small proline-rich protein 3	Q9UBC9	Antimicrobial activity	[187]
Sperm-associated antigen 11B	Q08648	Antimicrobial activity	[255]
Syntenin-1	O00560	Immunomodulatory effect	[219]
T-cell immunomodulatory protein	Q8TB96	Immunomodulatory effect	[220]
Thioredoxin domain-containing protein 17	Q9BRA2	Immunomodulatory effect	[221]
Thymosin beta-10	P63313	Antimicrobial activity	[222]
Thymosin beta-4	P62328	Antimicrobial activity	[222]
Thyroxine-binding globulin	P05543	Protease inhibitor	[223]
Toll-interacting protein	Q9H0E2	Immunomodulatory effect	[224]
Transgelin	Q01995	Immunomodulatory effect	[225]
Transgelin-2	P37802	Immunomodulatory effect	[226]
Triokinase/FMN cyclase	Q3LXA3	Immunomodulatory effect	[230]
Tripeptidyl-peptidase 1	O14773	Serine protease activity	[231]
Trypsin-2	P07478	Serine protease activity	[233]
Trypsin-3	P35030	Serine protease activity	[234]
Tryptase alpha/beta-1	Q15661	Serine protease activity	[234]
Tryptase beta-2	P20231	Serine protease activity	[234]
Uromodulin	P07911	Antimicrobial activity	[236,237]
Uteroglobin	P11684	Immunomodulatory effect	[238]
Vitamin D-binding protein	P02774	Immunomodulatory effect	[239]
WAP four-disulfide core domain protein 1	Q9HC57	Protease inhibitor	[240]
WAP four-disulfide core domain protein 2	Q14508	Protease inhibitor	[240]

WAP, Kazal, immunoglobulin, Kunitz and NTR domain-containing protein 2	Q8TEU8	Protease inhibitor	[240]
Xaa-Pro aminopeptidase 1	Q9NQW7	Aminopeptidase activity	[241]
Xaa-Pro dipeptidase	P12955	Carboxypeptidase activity	[242]
Zinc-alpha-2-glycoprotein	P25311	Immunomodulatory effect	[243]
Zymogen granule membrane protein 16	O60844	Antimicrobial activity	[244]
Zymogen granule protein 16 homolog B	Q96DA0	Antimicrobial activity	[245]

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