

## Supporting Text

### Putative Lamprey Lymphocyte Immune Molecules

**Lymphocyte Clusters of Differentiation ( $n = 9$ ):** TCR-like; CD4-like; CD9/CD81; CD29; CD33 (Myeloid cell surface antigen); CD38 (ADP-ribosyl cyclase); CD45; CD63; CD111.

**Chemokines, Cytokines and Interleukins, Receptors, and Ligands ( $n = 13$ ):** Chemokine receptor 4a (CXCR4); CXC chemokine K60 (*Gallus gallus*); Granulin (possible cytokine-like activity); Cytokine subfamily E member 1 (endothelial monocyte-activating); Cytokine receptor related protein 4; IL-8; IL-8 receptor A (neutrophils chemotactic factor); IL-17 receptor; MIF (macrophage migration inhibitory factor); IL-6 signal transducing molecule (gp130); VEGF-C (vascular endothelial growth factor C); VEGFR-2 (vascular endothelial growth factor receptor 2); Chondromodulin II (Leukocyte cell-derived chemotaxin 2 precursor).

**Inflammatory and Interferon-Regulated Transcripts ( $n = 16$ ):** RNase L inhibitor (IFN-regulated 2-5A pathway); Mx protein (IFN-induced nuclear GTPase); Allograft inflammatory factor-1 (IFN- $\gamma$  responsive); Syntenin 1 (IFN- $\gamma$  responsive); 14-kDa transmembrane protein (IFN-induced); Lysosomal thiol reductase IP30 (IFN- $\gamma$  responsive); Interferon induced protein 2 (*Ictalurus punctatus*); A possible PSMB7 proteasome subunit (IFN- $\gamma$  responsive); VHSV-induced protein-10 (IFN-responsive ADP-ribosylase); TNF- $\alpha$  induced transmembrane protein; GRIM19 (mitochondrial cell death-regulatory protein induced by IFN- $\beta$  and retinoic acid); Cytosolic phospholipase A2 (*Laticauda semifasciata* sea snake venom); Calcium-independent phospholipase A2; Phospholipase D3; Phospholipase C- $\gamma$ -2 (transmembrane signaling from immune and growth factor receptors).

**Putative Immune-Defense Molecules ( $n = 18$ ):** Galectin like protein ( $\beta$ -galactoside binding lectin); Collectin subfamily member 10; Natural killer cell enhancement factor (thioredoxin peroxidase 2); Neutrophil cytosolic factor 2 (activates superoxide production); Cystatin (egg-white inhibitor of thiol proteases); Hepatitis B virus X interacting protein (inhibits viral replication); Hemagglutinin (*Limulus polyphemus* amoebocyte aggregation factor); Lysozyme C 1 precursor; Cysteine-rich intestinal protein (*Hirudo medicinalis*); Secretory glutathione peroxidase precursor; FLAP (5-lipoxygenase activating protein); Ribonuclease Ok2 (*Oncorhynchus keta*); LRR-containing F-box protein (*Arabidopsis thaliana* bacterial resistance); **Proteases and inhibitors:** 2 serine proteases, one cysteine protease and one secreted zinc endopeptidase; Metalloproteinase inhibitor 3 precursor (TIMP-3).

**Complement and Coagulation ( $n = 4$ ):** Adiponectin (adipocyte complement-related protein; regulator immune and system hematopoiesis); Coagulation factor II receptor 1; Factor H; Serpin (plasminogen activator inhibitor-1); C4bp/Cremp-like protein (*Lethenteron japonicum*).

**Transcription Factors and Related Proteins ( $n = 14$ ):** **Components of the NF $\kappa$ B signaling cascade** (regulate immune and proinflammatory responses, cell adhesion, differentiation, growth and apoptosis): C-Rel; NF $\kappa$ B p105; I $\kappa$ B- $\alpha$  (NF $\kappa$ B inhibitor alpha); I $\kappa$ B- $\epsilon$  (NF $\kappa$ B inhibitor epsilon); IKK- $\gamma$  (NF $\kappa$ B essential modulator); **Components of the STAT signaling cascade** (activate acute-phase proteins): STAT3; N-myc and STAT interactor (augments cytokine-mediated STAT transcription); Protein inhibitor of activated STAT- $\gamma$  (binds p53); **Others:** NF-AT (ubiquitous regulator of adaptational genes and development); NF-E2 (erythroid cell transcription factor); Sox4; Ets domain

transcription factor; Pax transcription-activation domain interacting protein; Sp1 transcriptional co-activator (vitamin D3 receptor interacting protein).

**Surface Molecules and Receptors ( $n = 38$ ):** **TNF receptor superfamily** (immunoregulation, cell proliferation, cell survival, and cell death): TNFR2 and TR14 (TNF receptor superfamily member 14); **Ig-like superfamily**: Papilin (extracellular matrix glycoprotein); Opioid-binding cell adhesion molecule; Plasma membrane protein 1B3; Stromal cell derived factor receptor 1 (membrane glycoprotein); **Tetraspanin receptors** (regulate cell adhesion, migration, proliferation and differentiation): Tetraspanin3 (T4S8) and Tetraspanin 5 (T4S9); **Others**: Receptor tyrosine kinase; DMBT1/gp-340 (receptor for lung surfactant protein D); Peripheral myelin protein 22 (neural integral membrane protein); Saliva (Drosophila embryonic salivary gland receptor and vertebrate receptor involved in induction of RAG-1); Minor histocompatibility antigen; Protein tyrosine phosphatase A (regulation of integrin signaling, cell adhesion and proliferation); Bone morphogenetic protein receptor II (Ser/Thr Protein kinase); G protein-coupled receptor 12A, and GPI-anchored protein p137 (putative nutrient transporter).

**Kinase and Adaptor Molecules ( $n = 9$ ):** **Cytoplasmic tyrosine-protein kinases**: BMX (bone marrow kinase); HCK (hemopoietic cell kinase); SYK (spleen tyrosine kinase); **Adaptors**: HS1 (hematopoietic cell specific Lyn substrate 1); Cortactin (p80/p85 Src substrate); Phosphotyrosine independent ligand p62B for the Lck SH2 domain; FAS-associated factor 1 (specifically interacts with FAS cytoplasmic domain); TRUSS (TNF-receptor ubiquitous scaffolding/signaling protein); MAP kinase-activating death domain protein (interacts with TNFR1).

**Markers of CD34<sup>+</sup> Hematopoietic Stem/Progenitor Cells ( $n = 35$ ):** HSPC014 (Voltage-gated K channel); HSPC021 (eukaryotic translation initiation factor 3); HSPC029; HSPC033 (microsomal signal peptidase); HSPC038 (apoptosis/differentiation protein); HSPC039 (immediate early response interacting protein); HSPC040 (apoptosis-regulator); HSPC058; HSPC108; HSPC117; HSPC123; HSPC129; HSPC130 (homolog of the human ataxia telangiectasia); HSPC133 (putative RNA methylase); HSPC136 (huntingtin interacting protein); HSPC152; HSPC154; HSPC172 (vesicular transport); HSPC175 (putative splicing factor); HSPC194; HSPC213; HSPC223 ( $\alpha$ -amino adipic semialdehyde dehydrogenase-phosphopantetheinyl transferase); HSPC253; HSPC264; HSPC266; HSPC276; HSPC280; HSPC300; HSPC304; HSPC305; HSPC307; HSPC313; HSPC332 (spliceosome assembly); SKD1 protein (vacuolar sorting protein 4b); A KDEL containing protein 1.

**Miscellaneous ( $n = 10$ ):** **Recombinases**: SWAP-70 (B lymphocyte specific immunoglobulin switch regions recombinase); Artemis (DNA repair and V(D)J recombination); **Other putative immune related molecules**: BCAP37 (IgM B-cell receptor associated protein); B-cell translocation gene 1 (anti-proliferative protein); Hematological and neurological expressed sequence 1; Mast cell maturation inducible protein 1; MCL-1 (regulator of programmed cell death in the Bursa of Fabricius); RACK1 (anchors activated protein kinase C to the cytoskeleton); SMAP1B (stromal membrane-associated protein with erythropoietic stimulatory activity).