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| **Table S12.** Gene ontology enrichment of gained genes under genome of other species. |
| Reference | Category | Group\_ID | Group\_Names | Genes\_Bg | Genes\_Tg | P (Fisher) | Odds Ratio |
| Human | Chemotaxis | GO:0042379 | chemokine receptor binding | 19 | 7 | 1.69E-03 | 4.88 |
| GO:0008009 | chemokine activity | 18 | 6 | 5.38E-03 | 4.42 |
| Heparin Production | GO:0047464 | heparosan-N-sulfate-glucuronate 5-epime | 2 | 2 | 2.69E-02 | 13.25 |
| Immune System | GO:0005125 | cytokine activity | 38 | 10 | 1.63E-03 | 3.49 |
| GO:0042611 | MHC protein complex | 16 | 8 | 1.58E-04 | 6.63 |
| GO:0042613 | MHC class II protein complex | 10 | 6 | 5.22E-04 | 7.95 |
| GO:0006956 | complement activation | 6 | 3 | 2.11E-02 | 6.63 |
| Stimulation | GO:0071482 | cellular response to light stimulus | 16 | 4 | 4.76E-02 | 3.31 |
| Zebrafish | Chemotaxis | GO:0042379 | chemokine receptor binding | 19 | 11 | 9.17E-05 | 5.21 |
| GO:0008009 | chemokine activity | 18 | 11 | 6.39E-05 | 5.50 |
| Immune System | GO:0002376 | immune system process | 188 | 32 | 3.16E-02 | 1.53 |
| GO:0006955 | immune response | 106 | 26 | 7.30E-04 | 2.21 |
| GO:0005126 | cytokine receptor binding | 70 | 23 | 3.69E-05 | 2.96 |
| GO:0005125 | cytokine activity | 38 | 15 | 1.60E-04 | 3.55 |
| GO:0004896 | cytokine receptor activity | 34 | 10 | 1.04E-02 | 2.65 |
| GO:0060337 | type I interferon signaling pathway | 6 | 6 | 5.48E-04 | 8.99 |
| GO:0004904 | interferon receptor activity | 4 | 4 | 5.06E-03 | 8.99 |
| GO:0004905 | type I interferon receptor activity | 4 | 4 | 5.06E-03 | 8.99 |
| GO:0001530 | lipopolysaccharide binding | 3 | 3 | 1.59E-02 | 8.99 |
| Salmon | Chemotaxis | GO:0042379 | chemokine receptor binding | 19 | 3 | 4.36E-03 | 10.31 |
| GO:0008009 | chemokine activity | 18 | 3 | 3.81E-03 | 10.88 |
| Immune System | GO:0006955 | immune response | 106 | 5 | 2.78E-02 | 3.08 |
| GO:0005126 | cytokine receptor binding | 70 | 4 | 2.65E-02 | 3.73 |
| GO:0005125 | cytokine activity | 38 | 4 | 3.79E-03 | 6.87 |