

**Table S1.** Proteins present in epididymal sperm intracellular (SIPs) fraction of dog (*Canis lupus familiaris*), evaluated by SDS PAGE and mass spectrometry (NanoUPLC-Q-TOF/MS). Proteins were identified by UniProt (Swiss-Prot accession number) and NCBI (NCBI accession number). DAPs—differentially abundant proteins in SIP fraction. Range 1–8 means protein fraction range on SDS PAGE gel.

| Range | DAPs | Protein Name   | Swiss-Prot Accession Number | Gene Symbol     | Sequence Coverage (%) | Molecular Weight (kDa) | Peptide Counts (Unique) | Peptide Counts (all) | Protein Score |
|-------|------|--|-----------------------------|-----------------|-----------------------|------------------------|-------------------------|----------------------|---------------|
| 1     |      | Mediator of RNA polymerase II transcription subunit 13 | F1PTF4                      | <i>MED13L</i>   | 0.3                   | 230.5                  | 1                       | 4                    | 44            |
|       |      | Actin filament associated protein 1 like 2             | A0A5F4CGB4                  | <i>AFAP1L2</i>  | 0.4                   | 109.4                  | 1                       | 7                    | 44            |
|       |      | FIP1-like 1 protein                                    | A0A5F4CZG5                  | <i>FIP1L1</i>   | 1.0                   | 65.5                   | 1                       | 1                    | 46            |
| 2     | a    | Lactotransferrin                                       | F1PR54                      | <i>LTF</i>      | 34.6                  | 77.3                   | 21                      | 72                   | 440           |
|       | b    | Albumin  | P49822                      | <i>ALB</i>      | 9.5                   | 68.6                   | 4                       | 25                   | 337           |
|       | b    | Olfactomedin 4   | F1PB68                      | <i>OLFM4</i>    | 4.6                   | 54.4                   | 1                       | 6                    | 236           |
|       | a    | Carboxylesterase 5A                                    | Q6AW47                      | <i>CES5A</i>    | 15.1                  | 63.6                   | 6                       | 44                   | 226           |
|       |      | Argonaute RISC component 1                             | F1PGP5                      | <i>AGO1</i>     | 1.3                   | 115.9                  | 1                       | 2                    | 133           |
|       |      | 1,4-alpha-glucan branching enzyme                      | F1PX32                      | <i>GBE1</i>     | 1.6                   | 80.1                   | 1                       | 1                    | 124           |
|       |      | Chondroitin sulfate proteoglycan 5                     | F1P744                      | <i>CSPG5</i>    | 3.0                   | 43.9                   | 1                       | 1                    | 110           |
|       |      | Olfactory receptor                                     | F1PIK8                      | <i>OR7C1</i>    | 4.1                   | 34.9                   | 1                       | 1                    | 101           |
|       |      | PX domain containing serine/threonine kinase like      | E2QWJ5                      | <i>PXK</i>      | 2.1                   | 63.4                   | 1                       | 1                    | 96            |
|       |      | Tubulin polymerization promoting protein               | J9NYH4                      | <i>TPPP</i>     | 1.8                   | 65.3                   | 1                       | 1                    | 96            |
|       |      | NEDD4 binding protein 2                                | A0A5F4CIQ4                  | <i>N4BP2</i>    | 0.6                   | 189.1                  | 1                       | 1                    | 90            |
|       |      | Non-specific serine/threonine protein kinase           | A0A5F4D7J3                  | <i>CDC42BPA</i> | 0.5                   | 204.1                  | 1                       | 1                    | 87            |
|       |      | RHEB like 1  | E2QTC6                      | <i>RHEBL1</i>   | 3.7                   | 21.0                   | 1                       | 6                    | 83            |
|       |      | Growth differentiation factor 5                        | E2R0W8                      | <i>GDF5</i>     | 2.6                   | 55.1                   | 1                       | 1                    | 83            |
|       |      | Nuclear receptor binding SET domain protein            | J9NUG7                      | <i>NSD2</i>     | 1.0                   | 149.9                  | 1                       | 1                    | 71            |
| 3     |      | Beta-N-acetylhexosaminidase                            | F1Q1M8                      | <i>HEXB</i>     | 15.8                  | 38.1                   | 3                       | 8                    | 325           |
|       |      | 2-phospho-D-glycerate hydro-lyase                      | F1PCH3                      | <i>ENO1</i>     | 6.3                   | 21.2                   | 1                       | 1                    | 167           |
|       |      | Aldehyde dehydrogenase 1 family member A1              | J9P9J4                      | <i>ALDH1A1</i>  | 9.7                   | 53.0                   | 3                       | 6                    | 163           |
|       |      | Hyaluronidase  | E2RCK6                      | <i>SPAM1</i>    | 8.3                   | 61.7                   | 3                       | 5                    | 120           |
|       |      | Lactotransferrin                                       | A0A5F4BVF3                  | <i>LTF</i>      | 3.0                   | 68.8                   | 1                       | 1                    | 95            |
|       |      | Glucose-6-phosphate isomerase                          | E2R2C3                      | <i>GPI</i>      | 3.0                   | 63.0                   | 1                       | 2                    | 89            |

|   |   |   |            |         |      |       |   |    |     |
|---|---|---|------------|---------|------|-------|---|----|-----|
| 4 |   | Acrosin   | A0A5F4C1D8 | ACR     | 4.7  | 46.0  | 1 | 1  | 69  |
|   |   | ArfGAP with RhoGAP domain, ankyrin repeat and PH domain 1 | A0A5F4CQA6 | ARAP1   | 0.5  | 154.0 | 1 | 3  | 67  |
| 5 | c | Glutathione peroxidase                                    | F1PJ71     | GPX5    | 16.7 | 25.3  | 3 | 20 | 282 |
|   |   | Cysteine rich secretory protein 2                         | A0A5F4CCD0 | CRISP2  | 10.6 | 35.4  | 2 | 14 | 250 |
|   | c | Prostaglandin-H2 D-isomerase                              | Q9XS65     | PTGDS   | 28.3 | 21.1  | 5 | 25 | 212 |
|   |   | X-prolyl aminopeptidase 3                                 | A0A5F4DFA0 | XPNPEP3 | 2.1  | 52.6  | 1 | 1  | 82  |
| 6 |   | Prostaglandin-H2 D-isomerase                              | Q9XS65     | PTGDS   | 28.3 | 21.1  | 6 | 69 | 368 |
|   |   | tRNA-yW synthesizing protein 5                            | E2R278     | TYW5    | 2.2  | 36.6  | 1 | 1  | 85  |
| 7 | e | NPC intracellular cholesterol transporter 2               | Q28895     | NPC2    | 12.1 | 16.1  | 1 | 33 | 247 |
|   | d | Lipocln_cytosolic_FA-bd_dom domain-containing protein     | E2R6E0     | LCNL1   | 3.7  | 32.6  | 1 | 7  | 229 |
|   | d | Peptidyl-prolyl cis-trans isomerase                       | F1PLV2     | CSNK1G1 | 5.4  | 26.6  | 1 | 1  | 147 |
|   | e | Leucine rich repeat neuronal 3                            | F1PYL2     | LRRN3   | 1.6  | 79.6  | 1 | 2  | 135 |
| 8 |   | Acrosin-binding protein                                   | E2RNS8     | ACRBP   | 1.9  | 61.3  | 1 | 18 | 375 |
|   |   | Glutathione peroxidase                                    | F1PJ71     | GPX5    | 5.4  | 25.3  | 1 | 2  | 171 |
|   |   | Piezo-type mechanosensitive ion channel component         | A0A5F4BUL6 | PIEZO2  | 0.3  | 311.4 | 1 | 2  | 166 |
|   |   | Ubiquitin-60S ribosomal protein L40                       | P63050     | UBA52   | 12.5 | 14.7  | 1 | 1  | 124 |
|   |   | GTPase activating Rap/RanGAP domain like 3                | A0A5F4CW91 | GARNL3  | 0.9  | 110.6 | 1 | 2  | 122 |
|   |   | Activator of HSP90 ATPase activity 1                      | E2RSU7     | AHSA1   | 4.7  | 38.3  | 1 | 1  | 120 |
|   |   | Cone-rod homeobox protein                                 | Q8SQ03     | CRX     | 6.4  | 32.3  | 1 | 1  | 115 |
|   |   | Taste receptor type 2                                     | Q2ABC9     | TAS2R41 | 2.6  | 35.5  | 1 | 1  | 109 |
|   |   | Angiotensin like 1  | A0A5F4D0L1 | AMOTL1  | 3.7  | 100.7 | 2 | 2  | 102 |
|   |   | Calbindin   | F6UNU8     | CALB1   | 3.5  | 29.9  | 1 | 2  | 101 |
|   |   | Collagen type IV alpha 4 chain                            | A0A5F4C7V5 | COL4A4  | 1.1  | 159.4 | 1 | 1  | 91  |
|   |   | Glycine cleavage system P protein                         | A0A5F4C8B1 | GLDC    | 1.1  | 113.3 | 1 | 1  | 86  |
|   |   | Integrator complex subunit 10                             | E2RI21     | INTS10  | 1.3  | 82.3  | 1 | 2  | 82  |
|   |   | Glycerol-3-phosphate acyltransferase 2, mitochondrial     | A0A5F4CIW1 | GPAT2   | 2.1  | 89.5  | 1 | 1  | 79  |