

SUPPLEMENTARY MATERIAL

**Insights into the skin of caecilian amphibians from gene
expression profiles**

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Table S1. Summary of variation in ecology and skin morphology for the five sampled caecilian species. Dermal fold (annulation) system categories as follows: primary = borders between folds aligned with those between underlying somites and vertebrae; secondary = folds midway between borders underlying somites and vertebrae; “tertiary” = many folds, not aligned with underlying somites and vertebrae (see Gower and Wilkinson [2007], and Wilkinson and Nussbaum [2006]). Degree of fossoriality (see Bardua et al. [2019]) and habitat is based on observation in the field (DJG, DSM, MW pers. obs.). See San Mauro et al. (2014), Taylor (1968), and Wilkinson, Sherratt, Starace, and Gower (2013) for more information on morphology and maternal dermatophagy.

| | <i>Rhinatrema bivittatum</i> | <i>Caecilia tentaculata</i> | <i>Typhlonectes compressicauda</i> | <i>Microcaecilia unicolor</i> | <i>Microcaecilia dermatophaga</i> |
|-------------------------------|------------------------------|-----------------------------|------------------------------------|-------------------------------|-----------------------------------|
| Habitat | soil/litter | soil/litter | water | soil | soil |
| Degree of fossoriality | moderate | moderate | low | high | high |
| Dermal fold system | “tertiary” | primary & secondary | primary | primary & secondary | primary & secondary |
| Dermal scales | extensive | posteriorly | none | posteriorly | posteriorly |
| Maternal dermatophagy | - | likely present | - | likely present | document |

Table S2. Tissue sample information and experimental design for the differential expression analysis.

| Species | Number of individuals | Sex | Tissue | Sample name | SRA database number | Experimental design condition |
|-----------------------------------|-----------------------|--------------------|------------------------------------|-----------------|---------------------|-------------------------------|
| <i>Rhinatrema bivittatum</i> | 2 | Male | Kidney | Kidney9 | SRR5591443 | Non-skin |
| | | | Liver | Liver9 | SRR5591420 | Non-skin |
| | | | Skin | Skin9 | SRR5591419 | Skin |
| | | | Testis | Testis9 | SRR5591432 | Non-skin |
| | | Female | Foregut | Foregut79 | SRR5591438 | Non-skin |
| | | | Liver | Liver79 | SRR5591435 | Non-skin |
| | | | Lung | Lung79 | SRR5591436 | Non-skin |
| | | | Muscle | Muscle79 | SRR5591433 | Non-skin |
| | | | Skin | Skin79 | SRR5591434 | Skin |
| Spleen | Spleen79 | SRR5591442 | Non-skin | | | |
| <i>Caecilia tentaculata</i> | 1 | Male | Foregut | Foregut81 | SRR5591452 | Non-skin |
| | | | Heart | Heart81 | SRR5591451 | Non-skin |
| | | | Kidney | Kidney81 | SRR5591454 | Non-skin |
| | | | Liver | Liver81 | SRR5591453 | Non-skin |
| | | | Lung | Lung81 | SRR5591448 | Non-skin |
| | | | Muscle | Muscle81 | SRR5591447 | Non-skin |
| | | | Posterior skin | PosteriorSkin81 | SRR5591450 | Skin |
| | | | Skin | Skin81 | SRR5591449 | Skin |
| | | | Spleen | Spleen81 | SRR5591446 | Non-skin |
| | | | Testis | Testis81 | SRR5591445 | Non-skin |
| | | | <i>Typhlonectes compressicauda</i> | 1 | Male | Foregut |
| Heart | Heart83 | SRR5591416 | | | | Non-skin |
| Kidney | Kidney83 | SRR5591415 | | | | Non-skin |
| Liver | Liver83 | SRR5591418 | | | | Non-skin |
| Lung | Lung83 | SRR5591417 | | | | Non-skin |
| Posterior skin | PosteriorSkin83 | SRR5591444 | | | | Skin |
| Skin | Skin83 | SRR5591441 | | | | Skin |
| <i>Microcaecilia unicolor</i> | 2 | Female | Foregut | Foregut82 | SRR5591426 | Non-skin |
| | | | Liver | Liver82 | SRR5591425 | Non-skin |
| | | | Lung | Lung82 | SRR5591424 | Non-skin |
| | | | Muscle | Muscle82 | SRR5591423 | Non-skin |
| | | | Posterior skin | PosteriorSkin82 | SRR5591422 | Skin |
| | | Female | Skin | Skin82 | SRR5591421 | Skin |
| | | | Kidney | Kidney8 | SRR5591439 | Non-skin |
| | | | Liver | Liver8 | SRR5591440 | Non-skin |
| Skin | Skin8 | SRR5591437 | Skin | | | |
| <i>Microcaecilia dermatophaga</i> | 1 | Unknown (juvenile) | Kidney | Kidney80 | SRR5591430 | Non-skin |
| | | | Liver | Liver80 | SRR5591429 | Non-skin |
| | | | Posterior skin | PosteriorSkin80 | SRR5591428 | Skin |
| | | | Skin | Skin80 | SRR5591427 | Skin |

Table S3. Characterisation of significantly up-regulated sequences in the caecilian skin transcriptomes.

| Uniprot ID | Gene name | Protein description | GO terms | Tissue enhanced in the Human Protein Atlas dataset | Adjusted p-value | Log ₂ Fold Change |
|------------|-----------------|--|---|--|------------------|------------------------------|
| A2VE13 | <i>mal2</i> | Multispan transmembrane protein | GO:0001766; GO:0008104; GO:0016021; GO:0016324; GO:0019911; GO:0042552; GO:0045056; GO:0045121; GO:0070062 | Expressed generally | 0.046814558 | 2.152141712 |
| O15231 | <i>znf185</i> | Zinc finger protein 185 | GO:0005737; GO:0005856; GO:0005925; GO:0008270 | Epididymis, esophagus, and seminal vesicle | 0.000606255 | 3.325495301 |
| O94919 | <i>endod1</i> | Endonuclease domain-containing 1 protein | GO:0002576; GO:0003676; GO:0004519; GO:0005576; GO:0005829; GO:0016020; GO:0046872; GO:0070062 | Expressed generally | 0.027163336 | 1.882290321 |
| O94967 | <i>wdr47</i> | WD repeat-containing protein 47 | GO:0005737; GO:0005874; GO:0007275 | Expressed generally | 0.004348627 | 1.346953179 |
| O95171 | <i>scel</i> | Sciellin | GO:0001533; GO:0005737; GO:0008544; GO:0009790; GO:0030216; GO:0046872; GO:0070062 | Esophagus and skin | 0.036957689 | 2.367525528 |
| O95377 | <i>gjb5</i> | Gap junction beta-5 protein | GO:0005922; GO:0007154; GO:0008544; GO:0016021; GO:0060707; GO:0060708; GO:0060713; GO:1905867 | Esophagus and skin | 0.000736441 | 2.818280184 |
| O95678 | <i>krt75</i> | Keratin, type II cytoskeletal 75 | GO:0002244; GO:0005198; GO:0005829; GO:0005882; GO:0031424; GO:0045095; GO:0070062; GO:0070268 | - | 8.31E-05 | 4.739755569 |
| P18519 | <i>tnfrsf16</i> | Nerve growth factor receptor | GO:0005031; GO:0005516; GO:0005634; GO:0005886; GO:0005887; GO:0006919; GO:0006954; GO:0006955; GO:0007266; GO:0007411; GO:0010977; GO:0015026; GO:0031625; GO:0032496; GO:0032922; GO:0042127; GO:0042981; GO:0043005; | Expressed generally | 0.001402807 | 1.981215918 |

| | | | | | | |
|---------------|----------------|---|--|------------------------|-------------|-------------|
| | | | GO:0043121; GO:0048406; GO:0097190; GO:1900182; GO:1902895; GO:1903588 | | | |
| P31363 | <i>pou3fl</i> | POU domain, class 3, transcription factor 1- A | GO:0003700; GO:0005634; GO:0006351; GO:0006357; GO:0007420; GO:0043565 | Skin | 9.16E-08 | 4.697728521 |
| P34024 | <i>plca</i> | Phosphatidylinositol diacylglycerol-lyase | GO:0004436; GO:0005576; GO:0005737; GO:0008081; GO:0009405; GO:0016042 | - | 3.15E-07 | 5.946929132 |
| P53770 | <i>dlx3</i> | Homeobox protein DLX-3 | GO:0005634; GO:0006355; GO:0007275; GO:0043565 | Placenta and skin | 1.48E-24 | 7.390548223 |
| P55849 | <i>dsc1</i> | Desmocollin-1 | GO:0005509; GO:0005886; GO:0007156; GO:0016021; GO:0030057; GO:0070062 | Skin | 7.37E-05 | 2.948641112 |
| Q05004 | <i>nxe1</i> | Brush border protein | GO:0005576 | Colon, rectum | 0.011153655 | 2.588884021 |
| Q09666 | <i>ahnak</i> | Desmoyokin | GO:0003723; GO:0005634; GO:0005737; GO:0005765; GO:0005829; GO:0005886; GO:0005925; GO:0015629; GO:0016020; GO:0030315; GO:0031982; GO:0042383; GO:0043034; GO:0043484; GO:0044291; GO:0044548; GO:0045296; GO:0051259; GO:0070062; GO:0097493; GO:1901385 | Expressed generally | 0.032811518 | 1.244850455 |
| Q10586 | <i>dbp</i> | D site-binding protein | GO:0000977; GO:0001077; GO:0001889; GO:0005634; GO:0006357; GO:0007275; GO:0007623; GO:0045944 | Expressed generally | 0.000636255 | 2.886685174 |
| Q1JQA4 | <i>tspan15</i> | Tetraspanin-15 | GO:0005887; GO:0007166; GO:0009986; GO:0019899; GO:0031902; GO:0051604; GO:0070062; GO:0090002; GO:0097197 | Expressed generally | 0.002730037 | 1.498620555 |
| Q1LVW0 | <i>btbd11a</i> | Ankyrin repeat and BTB/POZ domain- containing protein BTBD11-A | GO:0000786; GO:0003677; GO:0005634; GO:0005737; GO:0016021; GO:0019005; GO:0030162; GO:0031625; GO:0042787; GO:0043161; GO:0046982; GO:0060395 | Parathyroid gland | 0.045919504 | 1.723118039 |
| Q2KNA0 | <i>specc11</i> | Cytospin-A | GO:0005737; GO:0005815; GO:0005819; GO:0005921; GO:0007026; GO:0007049; | Expressed generally | 0.019297852 | 1.798481517 |

| | | | | | | |
|---------------|----------------|---|--|--|-------------|-------------|
| | | | GO:0016477; GO:0030036; GO:0030835; GO:0031941; GO:0051301 | | | |
| Q2T9K2 | <i>tfap2e</i> | Transcription factor AP-2-epsilon | GO:0003677; GO:0003700; GO:0005634; GO:0006351 | Skin | 6.02E-06 | 4.440094364 |
| Q32MQ0 | <i>znf750</i> | Zinc finger protein 750 | GO:0001046; GO:0001077; GO:0005634; GO:0005730; GO:0008544; GO:0030154; GO:0043231; GO:0045944; GO:0046872; GO:1990841 | Esophagus and skin | 2.44E-07 | 5.442262925 |
| Q3L254 | <i>wnt7b</i> | Protein Wnt-7b | GO:0005109; GO:0005578; GO:0005615; GO:0016055; GO:0030182; GO:0045165; GO:0070307 | Skin | 0.033257584 | 2.361343934 |
| Q3SWY4 | <i>lrrn4cl</i> | LRRN4 C-terminal-like protein | GO:0016021 | Expressed generally | 0.000121558 | 2.545750467 |
| Q3V5L5 | <i>mgat5b</i> | Alpha-1,6-mannosylglycoprotein 6-beta-N-acetylglucosaminyltransferase B | GO:0000139; GO:0005794; GO:0006487; GO:0016021; GO:0030144; GO:0046872 | Cerebral cortex | 0.008455543 | 2.979659158 |
| Q4VAE3 | <i>tmem65</i> | Transmembrane protein 65 | GO:0003231; GO:0005739; GO:0005743; GO:0005886; GO:0014704; GO:0016021; GO:1903779 | Expressed generally | 0.011779563 | 1.036585843 |
| Q4VC05 | <i>bcl7a</i> | B-cell CLL/lymphoma 7 protein family member A | GO:0045892 | Expressed generally | 0.003519799 | 1.479851356 |
| Q4VNC1 | <i>atp13a4</i> | Probable cation-transporting ATPase 13A4 | GO:0005388; GO:0005524; GO:0005886; GO:0005887; GO:0006874; GO:0019829; GO:0034220; GO:0043231; GO:0046872 | Epididymis, parathyroid gland, thyroid gland | 6.78E-06 | 4.677358853 |
| Q58DL7 | <i>arhgef9</i> | Collybistin | GO:0005089; GO:0005829; GO:0035023 | Expressed generally | 0.001172687 | 2.827209183 |
| Q5JW98 | <i>fam26d</i> | Protein FAM26D | GO:0005261; GO:0005887; GO:0034220 | Placenta | 0.001990421 | 3.279102681 |
| Q5M7N9 | <i>esy13</i> | Extended synaptotagmin-3 | GO:0005886; GO:0006869; GO:0008289; GO:0016021; GO:0031227; GO:0044232; GO:0046872 | Lung, skin, thyroid gland | 0.031547858 | 2.026833989 |
| Q5ZHQ2 | <i>lgalsl</i> | Galectin-related protein | GO:0005737; GO:0030246 | Expressed generally | 0.012470091 | 2.355960573 |
| Q66KX2 | <i>cadm4</i> | Cell adhesion molecule 4 | GO:0007155; GO:0016021 | Cerebral cortex | 0.017628461 | 2.067869795 |

| | | | | | | |
|---------------|----------------|--|---|---------------------|-------------|-------------|
| Q6AZM3 | <i>reep4</i> | Receptor expression-enhancing protein 4 | GO:0005783; GO:0005789; GO:0005874; GO:0006998; GO:0007084; GO:0008017; GO:0016021; GO:0051301 | Expressed generally | 0.02797932 | 1.629959292 |
| Q6BBL6 | <i>cldn4</i> | Claudin-4 | GO:0005198; GO:0005887; GO:0005923; GO:0016327; GO:0016338; GO:0042802; GO:0061436 | Expressed generally | 3.08E-06 | 5.037737827 |
| Q6GR45 | <i>eif6</i> | Eukaryotic translation initiation factor 6 (eIF-6) | GO:0003743; GO:0005730; GO:0005737; GO:0042256; GO:0043022 | Expressed generally | 0.00028972 | 1.017060671 |
| Q6KB66 | <i>krt80</i> | Keratin, type II cytoskeletal 80 | GO:0005198; GO:0005737; GO:0005829; GO:0005882; GO:0031424; GO:0045095; GO:0045111; GO:0070268 | Skin | 2.60E-06 | 4.646101698 |
| Q6XQH0 | <i>gal3st2</i> | Galactose-3-O-sulfotransferase 2 | GO:0001733; GO:0008146; GO:0009101; GO:0009247; GO:0016020; GO:0016021; GO:0032580; GO:0050694; GO:0051923 | Colon and rectum | 0.046814558 | 2.676687744 |
| Q7ZYQ0 | <i>foxi1e</i> | Forkhead box protein I1-ema | GO:0003700; GO:0005634; GO:0006351; GO:0007275; GO:0042664; GO:0043565; GO:0045893; GO:0048335 | - | 0.015743687 | 2.981023402 |
| Q86SQ4 | <i>adgrg6</i> | Adhesion G-protein coupled receptor G6 | GO:0004930; GO:0005518; GO:0005622; GO:0005886; GO:0007005; GO:0007166; GO:0007186; GO:0010579; GO:0014037; GO:0016021; GO:0019933; GO:0022011; GO:0042552; GO:0043236; GO:0050840; GO:0060347 | Placenta | 0.00639498 | 1.965019155 |
| Q86UK0 | <i>abca12</i> | ATP-binding cassette sub-family A member 12 | GO:0005102; GO:0005319; GO:0005524; GO:0005737; GO:0005743; GO:0005829; GO:0005886; GO:0006869; GO:0010875; GO:0016021; GO:0019725; GO:0031424; GO:0032940; GO:0033700; GO:0034040; GO:0034191; GO:0035627; GO:0042626; GO:0043129; GO:0043231; GO:0045055; GO:0048286; GO:0055085; GO:0055088; GO:0061436; GO:0072659; | Breast and skin | 4.05E-05 | 3.848213513 |

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|---------------|----------------|---|--|----------------------------|-------------|-------------|
| | | | GO:0097209; GO:2000010 | | | |
| Q8BW74 | <i>hlf</i> | Hepatic leukemia factor | GO:0000977; GO:0001077; GO:0001228; GO:0005634; GO:0035914; GO:0043565; GO:0045944; GO:0048511 | Expressed generally | 0.047379797 | 1.730771243 |
| Q8IWB1 | <i>itrip</i> | Inositol 1,4,5-trisphosphate receptor-interacting protein | GO:0005886; GO:0016020 | Expressed generally | 0.033439292 | 2.114786378 |
| Q8NFD2 | <i>ankk1</i> | Ankyrin repeat and protein kinase domain-containing protein 1 | GO:0004674; GO:0005524 | Skin | 6.69E-05 | 3.265571376 |
| Q8NFK6 | <i>bpifc</i> | BPI fold-containing family C protein | GO:0001530; GO:0005543; GO:0005615 | Skin | 1.62E-12 | 7.212949827 |
| Q8TCA0 | <i>lrre20</i> | Leucine-rich repeat-containing protein 20 | - | Skeletal muscle | 0.013581506 | 2.642562647 |
| Q8TD16 | <i>bicd2</i> | Protein bicaudal D homolog 2 | GO:0000042; GO:0005635; GO:0005642; GO:0005643; GO:0005794; GO:0005829; GO:0005856; GO:0005886; GO:0006890; GO:0017137; GO:0031410; GO:0034452; GO:0051028; GO:0051642; GO:0051959; GO:0070840; GO:0072385; GO:0072393 | Expressed generally | 0.00639498 | 1.830649916 |
| Q8VCA5 | <i>tmprss4</i> | Transmembrane protease serine 4 | GO:0004252; GO:0005044; GO:0016021 | Rectum and urinary bladder | 3.42E-05 | 3.261649905 |
| Q90372 | <i>qnr-71</i> | Protein QNR-71 | GO:0016021 | - | 0.012470091 | 1.830499398 |
| Q92754 | <i>tfap2c</i> | Transcription factor AP-2 gamma | GO:0000122; GO:0000977; GO:0001047; GO:0001077; GO:0001078; GO:0003677; GO:0003700; GO:0005634; GO:0005654; GO:0005739; GO:0005829; GO:0006357; GO:0007267; GO:0008584; GO:0040029; GO:0042127; GO:0045944; GO:0046983 | Skin | 7.35E-06 | 4.975393316 |
| Q96EL1 | <i>fam212a</i> | PAK4-inhibitor INKA1 | GO:0005634; GO:0005737; GO:0019901; GO:0021915; GO:0030291; GO:0070062 | Skin | 0.036957689 | 2.001293676 |
| Q96RD7 | <i>panx1</i> | Pannexin-1 | GO:0002020; GO:0002931; GO:0005102; GO:0005262; | Expressed generally | 0.000615936 | 1.751947004 |

| | | | | | | |
|---------------|----------------|---|--|--|-------------|-------------|
| | | | GO:0005783; GO:0005789; GO:0005886; GO:0005921; GO:0006812; GO:0006816; GO:0007267; GO:0016020; GO:0016021; GO:0022840; GO:0032059; GO:0033198; GO:0034214; GO:0043234; GO:0044325; GO:0046982; GO:0050717; GO:0050718; GO:0051015; GO:0055077; GO:0097110 | | | |
| Q9BVG8 | <i>kifc3</i> | Kinesin-like protein KIFC3 | GO:0003777; GO:0005524; GO:0005794; GO:0005813; GO:0005871; GO:0005874; GO:0005915; GO:0007018; GO:0007030; GO:0007601; GO:0008017; GO:0008569; GO:0016887; GO:0030659; GO:0045218; GO:0070062; GO:0090136 | Expressed generally | 0.011153655 | 2.86600906 |
| Q9BXI3 | <i>nt5c1a</i> | Cytosolic 5'- nucleotidase 1A | GO:0000166; GO:0000287; GO:0005829; GO:0006195; GO:0008253; GO:0009116; GO:0009128; GO:0046085; GO:0046135 | Heart muscle and skeletal muscle | 2.70E-06 | 1.709244848 |
| Q9D7I9 | <i>tgm5</i> | Transglutaminase-5 | GO:0003810; GO:0005737; GO:0018149; GO:0046872 | Esophagus and skin | 0.005268197 | 3.591491589 |
| Q9I9M5 | <i>fd1</i> | Frizzled-1 | GO:0004930; GO:0005886; GO:0007275; GO:0016021; GO:0042813 | Expressed generally | 0.015121931 | 1.108554378 |
| Q9NUC0 | <i>sertad4</i> | SERTA domain- containing protein 4 | GO:0005634 | Expressed generally | 0.048330757 | 2.326310075 |
| Q9NYQ8 | <i>fat2</i> | Protocadherin Fat 2 | GO:0005509; GO:0005634; GO:0005886; GO:0005913; GO:0007156; GO:0010631; GO:0016021; GO:0070062 | Skin | 4.54E-10 | 5.281769654 |
| Q9UNA3 | <i>a4gnt</i> | Alpha-1,4-N- acetylglucosaminyltr ansferase | GO:0000139; GO:0005975; GO:0006493; GO:0008375; GO:0009101; GO:0016020; GO:0016021; GO:0016266; GO:0050680 | Stomach | 0.00168146 | 3.961880549 |
| Q9Y5F6 | <i>pcdhgc5</i> | Protocadherin gamma-C5 | GO:0005509; GO:0005887; GO:0007155; GO:0007156; GO:0007267; GO:0007399; GO:0070062 | Cerebral cortex | 0.042191149 | 1.458789538 |

| | | | | | | |
|---------------|--------------|-----------------------|------------|-------|-------------|-------------|
| Q9Y6R7 | <i>fcgfp</i> | IgGFc-binding protein | GO:0070062 | Colon | 0.002961722 | 3.951361199 |
|---------------|--------------|-----------------------|------------|-------|-------------|-------------|

Table S4. Antimicrobial peptide annotation (APD3¹, DADP², Uniprot terms: Andersonin³, Cathelicidin⁴, Cecropin⁵ and Magainin⁶) and occurrence (indicated by an X) in skin transcriptomes of the five sampled caecilian species.

| AMP ID | Gene name | Protein description | <i>Rhinatrema bivittatum</i> | <i>Caecilia tentaculata</i> | <i>Typhlonectes compressicauda</i> | <i>Microcaecilia unicolor</i> | <i>Microcaecilia dermatophaga</i> |
|----------------------|-----------------|--|------------------------------|-----------------------------|------------------------------------|-------------------------------|-----------------------------------|
| AP00140 ¹ | SK84 | Glycine-rich AMP | | X | X | X | X |
| AP00208 ¹ | P80230 | Inhibitory polypeptide | X | X | X | X | X |
| AP00294 ¹ | eNAP-1 | Alpha defesin | X | X | X | X | X |
| AP00400 ¹ | P80952 | Skin peptide tyrosine-tyrosine | | | X | X | |
| AP00429 ¹ | NK-lysin | Effector peptide of cytotoxic T/NK cells | | X | X | X | |
| AP00481 ¹ | Kaliocin-1 | Lactoferrin | X | X | | | |
| AP00489 ¹ | Hipposin | Histone-derived AMP | X | X | X | X | X |
| AP00536 ¹ | Luxoriosin | AMP with Kunitz domain | | | | X | X |
| AP00612 ¹ | Chrombacin | Sulfated phosphorylated peptide | X | X | | X | X |
| AP00630 ¹ | Amoebapore A | Saposin-like protein | X | | | | X |
| AP00812 ¹ | Enkelytin | Proenkephalin-A neuropeptide | | X | | X | |
| AP01157 ¹ | Ixodidin | Cys-rich AMP | X | X | X | X | X |
| AP01339 ¹ | BHP | Hemoglobin peptide | | X | X | X | |
| AP01340 ¹ | Naegleriapore A | Saposin-like protein | X | X | X | | X |
| AP01372 ¹ | CXCL14 | Chemokine | | | X | | X |
| AP01373 ¹ | Thrombocidin1 | Chemokine | | X | X | | |
| AP01374 ¹ | Thrombocidin2 | Chemokine | | | X | X | |
| AP01474 ¹ | NPY | Neuropeptide Y | X | X | | | |
| AP01476 ¹ | CGRP | Calcitonin gene-related neuropeptide | | X | X | | |
| AP01477 ¹ | VIP | Vasoactive neuropeptide | X | X | X | X | X |
| AP01479 ¹ | Adrenomedullin | Neuropeptide | X | X | X | X | X |
| AP01522 ¹ | Ap | Antifungal peptide | | X | X | X | |
| AP01540 ¹ | SP-BN | N-terminal region of surfactant protein B saposin-like | X | X | X | X | X |
| AP01575 ¹ | TCP | Thrombin-derived C-terminal peptide | X | X | X | X | X |
| AP01580 ¹ | Elafin | Elastase-specific inhibitor | X | | | | |
| AP01646 ¹ | gcLEAP-2 | Grass carp liver-expressed antimicrobial peptide-2 | | X | | | |
| AP01676 ¹ | Abeta42 | Beta-amyloid | X | X | X | X | X |

| | | | | | | | |
|----------------------|-----------------------|--|---|---|---|---|---|
| AP02012 ¹ | YFGAP | peptide Yellowfin tuna GAPDH-related AMP | X | X | X | X | X |
| AP02017 ¹ | hGAPDH(2-32) | Fragment of glyceraldehyde- 3-phosphate dehydrogenase | | X | | | |
| AP02030 ¹ | cgUbiquitin | Hemolytic peptide | X | X | X | X | X |
| AP02068 ¹ | Ang1 | Murine angiogenin 1 | | | X | | |
| AP02069 ¹ | Ang4 | Murine angiogenin 4 | X | | | | |
| AP02070 ¹ | RegIIgamma | Secreted C-type lectin AMP | X | X | X | X | X |
| AP02071 ¹ | RegIIalpha | Secreted C-type lectin AMP | X | X | X | X | X |
| AP02075 ¹ | CCL20 | Macrophage inflammatory protein-3alpha | X | | | | |
| AP02076 ¹ | CXCL1 | Chemokine | | X | X | X | |
| AP02078 ¹ | CXCL3 | Chemokine | X | X | X | X | X |
| AP02080 ¹ | CXCL10 | Chemokine | | X | X | X | X |
| AP02081 ¹ | CXCL11 | Chemokine | | X | | | |
| AP02082 ¹ | CXCL12 | Chemokine | | | X | | |
| AP02083 ¹ | CXCL13 | Chemokine | | X | X | X | |
| AP02084 ¹ | XCL1 | Lymphotactin chemokine | X | X | X | | |
| AP02087 ¹ | CCL11 | Eotaxin | X | | | | |
| AP02088 ¹ | CCL13 | Chemokine | X | | | | |
| AP02090 ¹ | CCL18 | Chemokine | | | | X | X |
| AP02091 ¹ | CCL19 | Chemokine | X | | X | | X |
| AP02092 ¹ | CCL25 | Chemokine | X | X | | | |
| AP02095 ¹ | SLPI | Secretory leukocyte protease inhibitor | X | X | X | X | X |
| AP02096 ¹ | UBI | Murine peptide | X | X | X | X | X |
| AP02122 ¹ | pCM1 | Fragment of hglyrichin | X | | | | |
| AP02185 ¹ | CXCL6 | Chemokine | X | X | | | X |
| AP02186 ¹ | CCL28 | Chemokine | X | X | X | X | |
| AP02188 ¹ | mCCL28 | Chemokine | X | X | | | X |
| AP02195 ¹ | Chemerin | Retinoic acid receptor responder protein 2 | X | X | X | X | X |
| AP02230 ¹ | HMGN2 | High mobility group nucleosomal binding domain 2 | X | X | X | | X |
| AP02257 ¹ | Lysozyme | Lectin-binding enzyme | X | X | X | X | X |
| 2965 ² | Buforin 2 | Histone H2A derived AMP | X | X | X | X | X |
| P80952 ² | - | Skin peptide tyrosine- tyrosine | X | X | X | X | |
| P83578 ² | - | Proteinase inhibitor PSKP- 1 | | X | | | |
| P86282 ² | Phylloseptin Bu- 1 | - | X | | X | X | X |
| D2K819 ³ | - | Andersonin-9 AMP | X | X | X | X | X |
| E3SZM1 ³ | - | Andersonin-8a | | X | | | |

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| | | | | | | | |
|-------------------------|--------------|---|---|---|---|---|---|
| E3SZM2 ³ | - | peptide Andersonin-8b peptide | X | | X | X | X |
| E3SZM5 ³ | - | Andersonin-11 peptide | X | X | X | X | X |
| E3SZM6 ³ | - | Andersonin-7 peptide | | | X | X | |
| K7GIB1 ⁴ | - | Uncharacterized protein cathelicidin-like | | | X | | |
| A0A067QGP8 ⁴ | L798_02828 | Cathelicidin-B1 | X | | | | X |
| A0A096N3S1 ⁴ | - | Uncharacterized protein cathelicidin-like | X | X | X | X | X |
| D3ZMP7 ⁴ | LOC689081 | Cystatin | X | | | | |
| F7C0D9 ⁴ | KNG1 | Kininogen 1 | X | | X | | X |
| F7C0Z0 ⁴ | KNG1 | Kininogen 1 | | | | X | |
| G1PML8 ⁴ | KNG1 | Kininogen 1 | | | | X | |
| G3VCA4 ⁴ | CST7 | Cystatin | | | | | X |
| G3VCA5 ⁴ | CST7 | Cystatin | | | X | X | |
| H3A036 ⁴ | CST7 | Cystatin | X | X | X | X | X |
| I3IVB6 ⁴ | - | Uncharacterized protein cathelicidin-like | X | | | | |
| I3JY77 ⁴ | LOC100708655 | Fetuin B | X | X | | X | X |
| K7FKZ8 ⁴ | - | Uncharacterized protein cathelicidin-like | | | | | X |
| K7FPA2 ⁴ | - | Uncharacterized protein cathelicidin-like | | | | X | |
| K7GI21 ⁴ | - | Uncharacterized protein cathelicidin-like | X | | X | X | X |
| K7GID5 ⁴ | - | Uncharacterized protein cathelicidin-like | X | | X | X | X |
| M7BBJ0 ⁴ | UY3_13360 | Uncharacterized protein cathelicidin-like | X | | | X | X |
| Q5M8F3 ⁴ | cst7 | Cystatin | | X | | X | X |
| R0LBE5 ⁴ | Anapl_03194 | Kininogen 1 | | | | X | |
| P82115 ⁵ | prtA | Serralysin | X | X | X | | X |
| Q94527 ⁵ | Rel CG11992 | Nuclear factor NF-kappa-B p110 subunit | X | X | X | X | X |
| B4R1J7 ⁵ | Anp | Andropin | X | X | X | X | X |
| Q589Y5 ⁵ | ohsp1 | Serine protease | X | X | X | X | X |
| Q7PT80 ⁵ | REL2_1270310 | AGAP006747-PA | X | X | X | X | X |
| P05223 ⁶ | - | Preprocaerulein type I | X | | | | |
| Q45TR8 ⁶ | - | Ubiquitin | X | X | X | X | X |

Table S5. Peptide pheromones annotation and occurrence (indicated by an X) in skin transcriptomes of the five sampled caecilian species

| Pheromone ID | Gene name | Protein description | <i>Rhinatrema bivittatum</i> | <i>Caecilia tentaculata</i> | <i>Typhlonectes compressicauda</i> | <i>Microcaecilia unicolor</i> | <i>Microcaecilia dermatophaga</i> |
|--------------|-----------|--|------------------------------|-----------------------------|------------------------------------|-------------------------------|-----------------------------------|
| A0A0A0QT03 | Cloa_05 | Sodeftrin-like factor beta isoform 05 | X | | | | |
| A0A0A0QTC2 | Cloa_19 | Sodeftrin-like factor alpha isoform 19 | | | | X | |
| A0A0A0QTD8 | Cloa_02 | Sodeftrin-like factor beta isoform 02 | | X | | | |
| A0A0A0QU60 | Cloa_08 | Sodeftrin-like factor beta isoform 07 | X | | | | |
| A0A0A0QU84 | Cloa_26 | Sodeftrin-like factor beta isoform 24 | | | | X | |
| A0A0A0QUZ5 | Cloa_10 | Sodeftrin-like factor beta isoform 10 | | X | | | |
| A0A0A0QVR4 | Cloa_09 | Sodeftrin-like factor alpha isoform 09 | X | X | | X | |
| A0A0A0QVU0 | Cloa_05 | Sodeftrin-like factor beta isoform 04 | | X | | | |
| A0A0A0QVV1 | Cloa_30 | Sodeftrin-like factor alpha isoform 28 | | | | | X |
| A0A0A0QVV6 | Cloa_01 | Sodeftrin-like factor beta isoform 01 | X | | | | X |
| A0A0B5GR37 | - | Sodeftrin-like factor 9 | X | | | | |
| A0A0B5H1E4 | - | Sodeftrin-like factor 1 | X | | | | |
| A0A0B5H3N9 | - | Sodeftrin-like factor 20 | | X | | | |
| A0A0B5H6P8 | - | Sodeftrin-like factor 15 | | | | X | X |
| A0A0E3KK02 | SPF | Sodeftrin-like factor | X | | X | X | X |
| A0A0E3KK06 | SPF | Sodeftrin-like factor | | | | | X |
| A0A0E3N0I6 | SPF | Sodeftrin-like factor | | | X | | |
| A0A0E3N2L5 | SPF | Sodeftrin-like factor | X | X | | X | |
| A0A0E3N2L9 | SPF | Sodeftrin-like factor | | X | | | |
| A0A0E3N3L3 | SPF | Sodeftrin-like factor | | X | | | |
| A0A0E3N4Q2 | SPF | Sodeftrin-like factor | | X | | | |
| A0A0F7JG78 | - | Sodeftrin-like factor | | | X | | |
| A0A0F7JHQ7 | - | Sodeftrin-like factor | | | X | | |
| A0A0F7JHR5 | - | Sodeftrin-like factor | | | | | X |

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| | | | | | | | |
|------------|------------|-----------------------|---|---|---|---|---|
| A0A0F7JJU1 | - | Sodeftrin-like factor | | | | X | |
| A0A125S9K3 | SPF1 | Sodeftrin-like factor | X | | | | |
| A0A125S9K5 | SPF8 | Sodeftrin-like factor | | | X | X | X |
| A0A125S9K7 | SPF2 | Sodeftrin-like factor | | | | X | X |
| A0A125S9K8 | SPF7 | Sodeftrin-like factor | | | | X | |
| A0A125S9L0 | SPF4 | Sodeftrin-like factor | X | | | | |
| A0A125S9L4 | SPF10 | Sodeftrin-like factor | | | X | | |
| A0A125S9L5 | SPF11 | Sodeftrin-like factor | | | | | X |
| A0A140IHG1 | - | Sodeftrin-like factor | | | | | X |
| A0A140IHG6 | - | Sodeftrin-like factor | | | X | | X |
| A0A140IHH1 | - | Sodeftrin-like factor | | | X | | |
| A0A140IHH2 | - | Sodeftrin-like factor | | X | | | |
| A0A172AZC5 | - | Sodeftrin-like factor | | | X | | |
| B2CM93 | - | Sodeftrin-like factor | | | X | | |
| G3IMK8 | I79_025148 | Aphrodisin | | X | | | |
| Q2EFD2 | - | Sodeftrin-like factor | X | | | | |
| Q4FAD1 | SPF1 | Sodeftrin-like factor | | | | X | |
| Q4FAE1 | SPF1 | Sodeftrin-like factor | | | | X | |
| Q4FAG1 | SPF1 | Sodeftrin-like factor | | | | | X |

Table S6. Annotated AMPs and p-values for Wilcoxon signed-rank test of differences between AMP expression levels in midbody and posterior skin samples. * indicates self-built databases for subset of entries for these UniProt terms (see Materials and Methods). For *R. bivittatum*, data were available only for midbody skin.

| Database | <i>Rhinatrema bivittatum</i> | <i>Caecilia tentaculata</i> | <i>Typhlonectes compressicauda</i> | <i>Microcaecilia unicolor</i> | <i>Microcaecilia dermatophaga</i> |
|---------------|------------------------------|-----------------------------|------------------------------------|-------------------------------|-----------------------------------|
| APD3 | 36 | 41 | 37 | 32 | 30 |
| DADP | 3 | 3 | 3 | 3 | 2 |
| Andersonin* | 3 | 3 | 4 | 4 | 3 |
| Cathelicidin* | 10 | 4 | 7 | 12 | 11 |
| Cecropin* | 5 | 5 | 5 | 4 | 5 |
| Magainin* | 2 | 1 | 1 | 1 | 1 |
| p-value | - | 1.31e-14 | 1.551e-12 | < 2.2e-16 | < 2.2e-16 |

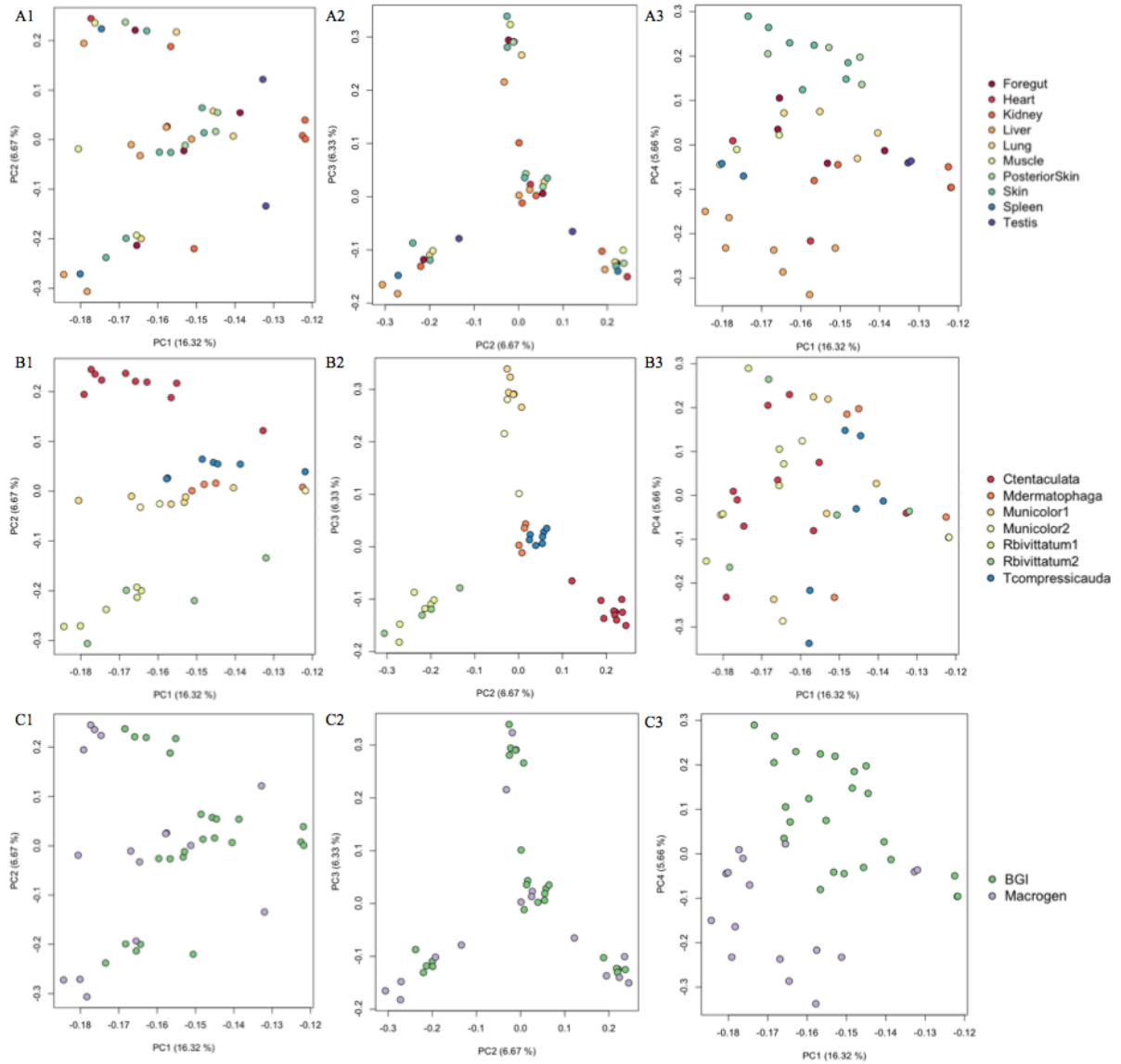


Figure S1. PCA plots of PC1 versus PC2 (first column), PC2 versus PC3 (second column), and PC1 versus PC4 (third column) showing variance among gene expression levels in various tissue types across the five sampled caecilian species. Samples were color coded by tissue type (first row), species (second row), and sequencing company (third row).



Figure S2. Network graphs for GO domains (A: biological process, B: molecular function and C: cellular component) of skin up-regulated genes. Greater colour intensity indicates higher fold change in expression in caecilian skin, and circle size is positively correlated with number of genes with the same GO in the UniProt database.

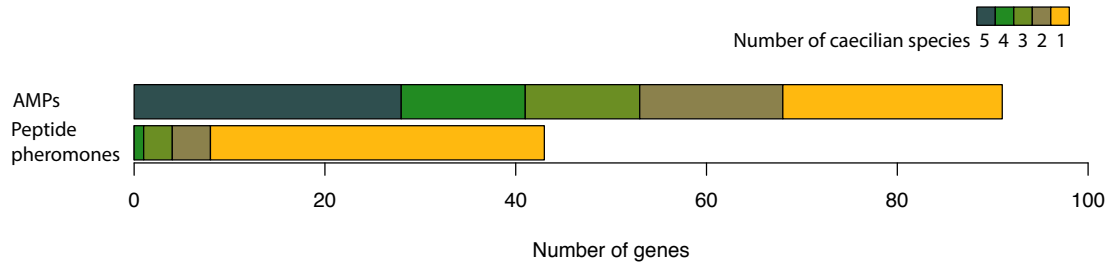


Figure S3. Expressed sequences annotated as encoding peptides and their presence in the skin of the five sampled caecilian species.