

Nephrin/Kirre* *Cd2ap/Cin8* *Zo1* *Slipins* *Aquaporins

Arthropoda	nephrocytes [1], eye [2], muscle [5], CNS [8]	nephrocytes [1], eye [3], germline [6], epithelial sheet [9]	nephrocytes [1], eye [4], germline, adult wing [10], epithelia [11]	nephrocytes [1]	malpighian tubules, fat body, pharynx, epidermis, ovaries, gut (sum. in [7])
Platyhelminthes	terminal cells [12], stem cells [13]	?	?	?	ubiquitous, brain [14]
Mollusca	rhogocytes [15]	?	?	?	?
Annelida	?	?	?	?	?
Nematoda	neural axons, vulval muscle [16]	?	?	melanosensory neurons [17]	excretory cell, neurons, intestine, pharynx, muscle, hypodermis [18]
Acoela	neurons, brain, gonadal domain	neurons	brain, neurons, mouth	digestive syncytium, brain	brain, digestive syncytium, gut wrapping cells, parenchyme
Nemertodermatida	neurons	subepidermis, posterior lateral rows of cells anterior domain, mouth	gut epithelium, mouth	neurons, mouth, subepidermis	subepidermal cells, epidermis gut wrapping cells, brain
Cnidaria	absent	?	ectoderm [19]	?	?
Vertebrata	podocytes, muscles, CNS, testis, pancreatic cells, cardiovascular development, spleen, lymph node (sum. in [24])	podocytes [20], brain, heart, pancreas, salivary gland [23]	podocytes [21], eye [22], epithelial sheet, notochord, vascular development, neural tube [27]	podocytes, erythrocyte membranes, dorsal root ganglia, sensory neurons, skin (sum. in [25])	blood, kidney, brain, testis, oocyte oocyte eyes, pancreas, muscle, lung, digestive tract (sum. in [26]),
Eubacteria/Archaea	absent	absent	absent [28]	? [29]	osmoregulation [30]
Filisterea/ Choanoflagellata	absent	?	? [28]	? ([29], this study)	? [30]
Holomycota	absent	absent	absent [28]	? [29]	spores/ endoplasmic reticulum plasma membrane (sum. in [31])

Arthropoda	branchiae [32], brain, salivary glands [34], head, thorax [38], fat body, head, midgut, hindgut, eye malpighian tubules, ganglia, trachea, [44, 45]	malpighian tubules, rectum, midgut, hindgut, anal papillae [35], Johnston's organ of hearing [39], Crusalis organs [41] testis, eye, brain [43], [34], branchiae [45, 48]	midgut and hindgut (sum. in [33]), malpighian tubules, branchiae (sum. in [40]), epidermis [42]	malpighian tubules, fat body, midgut, hindgut, ganglia, trachea, antennal gland [36, 37], anal papilla [35], branchiae (sum. in [40]), Crusalis organs [41], neurons, [46, 47] brain, testis, ovarioles, duct [49]
Platyzoa	epidermis [50], duct of protonophridia [12]	epidermis [50], protonophridia [51]	epidermis [50], protonophridia [51]	epidermis [50]
Mollusca	epidermis [52], branchiae [55]	foot muscle, hepatopancreas [56], branchiae, pancreatic appendages, nerves, nephridia [58, 59] mantle [57]	mantle [53], branchiae [54]	branchiae [54], mantle [57]
Annelida	epidermis [60], branchiae [61]	branchiae [61], epidermis (sum. in [62])	epidermal glands [53], branchiae [61], epidermis [60]	branchiae [61], epidermis [60]
Nematoda	hypodermis	hypodermis [64]	intestine [64]	hypodermis, intestine, neurons [63]
Acoela	gut wrapping cells, neurons, brain, parenchyme, mouth, epidermis	gut wrapping cells	mouth, parenchyme, neurons brain, posterior cells, gut wrapping cells	digestive syncytium
Nemertodermatida	gut wrapping cells, brain, epidermis	gut epithelium	gut wrapping cells, gut epithelium, epidermis, neurons	gut epithelium, subepidermis, nerve cords
Cnidaria	tentacular ectodermal cells, gastroderm, mesenteries, pharynx	pharyngeal endoderm, mesenteries, neurons, septal filament, pharynx	tentacular ectoderm, mesenteries, gastroderm (this study), oral and aboral endoderm, calcoblastic cells, ectoderm (sum. in [65])	gastroderm, mesenteries, pharynx, septal filaments
Vertebrata	blood, esophageal epithelia, brain, kidney duct, liver, gastrointestinal tract testis (sum. in [70]), gills [74, 75], muscle [77], skin [71]	kidney tubule and duct [67, 68], skin [71], intestine, gut, eye, heart, testis, liver, brain [78, 79], gills [83, 84]	brain, bones, muscle, intestine, kidney intercalated cells, tubule, duct, eye, erythrocytes, liver, urinary bladder, teeth, inner ear (sum. in [80]), gills [44, 74]	pancreas [66], kidney tubule and duct [69], eye [72, 73], osteoclast [76], skin [81], testis [82], brain [85], gills [44, 74]
Eubacteria/Archaea	NH ₃ transport [86]	osmoregulation [88, 89]	photosynthesis, CO ₂ fixation [90]	proton pump [87]
Filastera/ Choanoflagellata	NH ₃ transporter [91]	osmoregulation [88, 89]	?	?
Holomycota	NH ₃ transport [93, 94]	osmoregulation [92]	CO ₂ sensing system [95]	vacuole, Golgi/endosome [96]

Arthropoda	eye, central nervous system [102], [98, 99] glia cells [105]	alimentary canal [97], malpighian tubules [103], heart [106], neurons [108]	malpighian tubules [100], glia cells [109] intestine [104], hepatopancreas [107], glia cells [109]	retina, brain [101]
Platyzoa	protonephridia [12]	protonephridia [12]	protonephridia [12]	protonephridia [12]
Mollusca	nervous system [111]	branchiae [54], heart, neurons, optic lobe, testis [113]	hepatopancreas [110], gills, mantle edge [114]	muscle, neurons [112] [115]
Annelida	central nervous system, glia cells [116]	mesoderm, epidermis muscle, mesenchyme [117], neurons [118]	bacteriocytes [117]	?
Nematoda	muscle, pharynx, head neurons, excretory canal [120]	neurons, hypodermis, muscle [121]	neurons [119]	neurons, muscle, intestine [122]
Acoela	brain, gonadal domain	parenchyme, brain anterior tip	parenchyme, brain gonadal domain	anterior tip
Nemertodermatida	neurons	nerve cords, mouth, female gonads, subepidermis, gut wrapping cells	posterior lateral rows of cells, subepidermis	gut epithelium, mouth, posterior lateral rows of cells
Cnidaria	?	oral/aboral endoderm and ectoderm, calicoblastic ectoderm [123]	?	?
Vertebrata	kidney, intestine, brain (sum. in [124])	brain, kidney duct and tubule, ovary, testis, salivary gland, erythrocytes, heart, intestine, heart, pancreas, liver, smooth muscle, lung, retina, spleen (sum. in [126]), gill [128]	kidney, intestine, salivary glands, brain, retina, muscle, heart, uterus, testis, lung, placenta, liver (sum. in [127])	brain, heart, kidney, pancreas, muscle, liver (sum. in [125])
Eubacteria/Archaea	glytamate transport [130]	NO ₂ /NO ₃ exchange, Cl ⁻ influx [131]	absent [129]	Na ⁺ /Ca ²⁺ exchange [132]
Filasterea/ Choanoflagellata	absent ([129], this study)	?	absent ([129], this study)	([133], this study)
Holomycota	absent [129]	borate transport (Jennings et al 2007) [131]	absent [129]	absent [134] [135]

Arthropoda	midgut [37], gill [136], malpighian tubules [141]	salivary gland, ventral nerve cord, gut, anal pad [137], malpighian tubules [142], glia cells [143]	fat body, oenocytes, midgut [138]	gut epithelial cells, malpighian tubules ((139)), auditory organs [140]
Platyzoa	protonephridia [12]	protonephridia [12]	protonephridia [12]	protonephridia [12]
Mollusca	mantle [57]	?	?	mantle [57]
Annelida	?	?	root epidermis [117]	?
Nematoda	hypodermis, intestine, excretory cell, neurons [146]	muscle, neurons, intestine, excretory cell [144] [147]	intestinal tract [145]	muscle, neurons, midgut, intestine, body wall, pharynx, excretory cell [121]
Acoela	mouth	parenchyme, brain	brain, parenchyme	no expression revealed
Nemertodermatida	nerve cords	female gonads, testis	neurons	female gonads, gut-wrapping cells
Cnidaria	?	?	?	oral tissues [123]
Vertebrata	gill [148], intestine stomach, endothelial cells, distal tubule of kidney, cardiac myocytes, gall bladder, epididymis, ovary, thymus, brain, pancreas, salivary gland, skin, sperm, osteoclasts, skeletal muscle (sum. in [152])	gill [148], intestine [84], ubiquitous, tubules of kidney, neurons, brain, bone (sum. in [151])	kidney, small intestine, liver, placenta, brain (sum. in [149])	hepatocytes, proximal tubule, intestine, testis, cardiac myocytes, brain, endothelial cells, hair cells, cochlear hair cells, pancreatic duct, thyrocytes (sum. in [150], gill [148], auditory organs [140])
Eubacteria/Archaea	ph regulation, metabolism, salt tolerance [153]	? [129] [154]	carbon dicarboxylate substrate transport [155]	HCO ₃ ⁻ ; C ⁴ -dicarboxylic acid metabolism [156]
Filisterea/ Choanoflagellata	? ([129], this study))	? [129] [154]	absent ([129], this study)	? ([129], this study)
Holomycota	vacuole trafficking, regulation of cytosolic pH [153]	? [129]	? [157] [129]	? [131]

HCN

Arthropoda	gills [158], olfactory neurons [159], chemo-sensitivity [160]
Platyzoa	?
Mollusca	?
Annelida	?
Nematoda	hypodermis
Acoela	brain
Nemertodermatida	gut epithelium
Cnidaria	?
Vertebrata	kidney [161, 162], liver [163], ovary [164], pancreatic cells [165], heart [166], brain [167]
Eubacteria/Archaea	intracellular cAMP, pH sensor, osmoregulation [168, 169]
Filisterea/ Choanoflagellata	?
Holomycota	?

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