

INDEX	Phylum	Clade	Common Name	Sub-Group(s)	Species	Cilia Type: Internal motile cilia IC, External motile cilia EC, Flagellated Sperm S	Organ	Orientation to channel axis: Perpendicular (carpet-style) 1; horizontal (flame-style) 2	Function: unknown/eise 0, pumping/transport 1, ultrafiltration/pre-sure/valve 2	Function	References consulted	H [µm]	h ² /H ² (where applicable)	h/H	References consulted	Cilia length [µm]	References consulted	Duct length [µm]	References consulted	Initial Packing Density (0-1)	Additional comments
1	Annelida	Trochozoa	Ringed or Segmented Worms	Polychaete worm	Aeolosoma bengalensis	IC	Proximal nephridial duct of metanephridia	2	0	Presumed pumping/valve	Bunke 1994	1	0.5	0.71	Bunke 1994, Fig.4	NA	10	Bartolomeaus 1998, Fig. 7E and Fig. 1E (schematic)	0.5	estimated from lower limit (100 of diameter) since Bunke 1994 calls the duct "long" without providing schematic	
2	Annelida	Trochozoa	Ringed or Segmented Worms	Polychaete worm	Anailides mucosa	IC	Ciliated funnel parallel to pronephridial duct in adults	2	0	Potential uptake of gametes from coelum	Bartolomeaus 1998	20	0.84	0.92	Bartolomeaus 1998, Fig.6B	15	Bartolomeaus 1998, Table 4	40	Bartolomeaus 1998, Fig. 7E and Fig. 1E (schematic)	0.84	
3	Annelida	Trochozoa	Ringed or Segmented Worms	Polychaete worm		IC	Duct of pronephridia in adults	2	2	Excretion/ Ultrafiltration	Bartolomeaus 1998	2	0.8	0.89	Bartolomeaus 1998, Fig.4G	20	Bartolomeaus 1998, Table 4	40	Bartolomeaus 1998, Fig. 1E (schematic)	0.8	
4	Annelida	Trochozoa	Ringed or Segmented Worms	Polychaete worm	Nemilidium rogluchaeroides	IC	Foregut	1	1	Transport of food particles and mucus	Purschke & Tzvetlin 1992	20	0.2	0.45	Purschke & Tzvetlin 1992, Fig. 4A	10	Purschke & Tzvetlin 1992, Fig. 4A & text	150	Purschke & Tzvetlin 1992, text	0.5	
5	Annelida	Trochozoa	Ringed or Segmented Worms	Spoon Worm	Thalassema thalassumum	IC	Terminal cell of larvae ("head kidney")	2	2	Excretion/ Ultrafiltration/absorption	Kato 2011	1.5	0.78	0.88	Kato 2011, Fig. 3C;text	15	Kato 2011, Fig. 3C, text	15	Kato 2011, Fig. 3C, text	0.78	
6	Brachiopoda	Trochozoa	Lampshells		Lingula anatina	IC	Ciliated internal epithelium of the mantle	1	1	Transport of particles and mucus	1968, Westbroek 1980	5.0	0.05	0.05	1968, Westbroek 1980, Plate IA; Forchiel 2012	13	Westbroek 1980 Txt, Plate 1, Fig.6E	1000	estimated from Gerold 2018	0.5	
7	Bryozoa	Spiralia			Phylactolaemata	IC	Ciliated trunk coelom	1	0	Presumably nutrient transport (since lack of blood vessels)	Gruhl 2009	10	0.05	0.22	Gruhl 2009, Fig. 4F	3	Gruhl 2009, Fig. 3B	200	estimated entire length of animal, see Gruhl 2009, Fig. 1A	0.5	
8	Bryozoa	Spiralia			Phylactolaemata	IC	Forked canal with a sort of flame cell	2	0	Has been suggested to serve for filtering since no excretory organs are known in Bryozoa	Gruhl 2009	5	0.95	0.97	Gruhl 2009, Fig. 2B, 4C,D	10	Gruhl 2009, Fig. 4C,D	20	estimated forked channel length; Gruhl 2009 2A	0.95	
9	Cephalochordata	Chordata		Lancelets	Branchiostoma virginiae, Branchiostoma lanceolatum	IC	Hatschek's nephridium - filtration cells (cytostolocytes)	2	0	Aiding ultrafiltration of the filtering has been proposed (there is ultrafiltration via diaphragms and blood pressure as well) but the cellular structure suggests otherwise - maybe pumping plus absorption (flagellum is surrounded by microvilli)	Ruppert 1996	2	0.34	0.58	Ruppert 1996, Fig.7	10	Brandenburg 1961, Fig. 25	10	Brandenburg 1961, Fig. 25	0.5	
10	Cephalochordata	Chordata		Lancelets	Branchiostoma virginiae	IC	Intestine and colon	1	1	Transport of food particles and mucus		200	0.10	0.10	Blow 1974, Fig.3A (based on cilia length = 10µm Kucera 2009, Fig.1A)	10	Blow 1974, Fig.3A ; Kucera 2009, Fig.1A	1000	estimated from He 2018	0.5	
11	Chaetognatha	Chaetognatha	Arrow worms		Spadella cephaloptera	IC	Intestine	1	1	Transport of particles and mucus	Perez 2000	15	0.1	0.32	Perez 2000, Fig.5 and Perez 2001 Fig.2F	NA		3000	estimated from Perez 2001 Fig. 2B	0.5	
12	Cnidaria	Cnidaria		Octocorals	acrossota amboinensis	IC	Gastrovascular cavity / stolon: Polyps are long and tubular and are interconnected by horizontal tabulae or stolons which form transverse platforms	1	1	Transport/mixing, possibility of cells	Harmata 2013, Fig.6	600		0.03	Harmata 2013, Fig. 7	10	Harmata 2013, Fig.4E	2000	at least: estimated from Harmata 2013, Fig. 3	0.5	
13	Cranialia	Chordata		Amphibian-Caecilian	Geotrypetes seraphini	IC	Neck segment of mesonephros	2	0	Presumed: excretion/ultrafiltration	Meibjerg 2004, Fig. 5, 8	15.00	0.64	0.80	Meibjerg 2004, Fig. 8A	20.00	estimated from Meibjerg 2004, Fig. 5	300	Meibjerg 2004, text	0.64	
14	Cranialia	Chordata		Mammals (human)	Homo sapiens sapiens	IC	Small airways (Specifically, the epithelial pleats)	1	1	Transports mucus up the respiratory tree (Mucociliary clearance)	Bustamante-Marin 2017	50.00		0.24	Flores-Delgado 2015, Fig.1 and 2	6.00	Flores-Delgado 2015, Fig. 1 and 2	1700	Weibel 1963	0.5	
15	Cranialia	Chordata		Mammals (human)	Homo sapiens sapiens	IC	Fallopian Tube	1	1	Transport of oocytes	Raidt 2015	60.00		0.20	Raidt 2015, Fig. 4 (cilia length); Palek 1974; Varga 2018, Fig. 2 (Duct dimensions)	6.00	Raidt 2015, Fig. 4	70000	7-11cm; Han 2020	0.5	
16	Cranialia	Chordata		Mammals (human)	Homo sapiens sapiens	IC	Tubule of bronchial submucosal gland	1	1	Transport mucus	Meyrick 1969	30		0.40	Meyrick 1969, text and table (cilia length / diameter)	6.00	Meyrick 1969	350	Meyrick 1969, text and table	0.5	
17	Cranialia	Chordata		Mammals (human)	Homo sapiens sapiens	IC	Brain ventricle cilia (ependymal cilia)	1	1	Transport / mixing		1000		0.03	Zhuravlova 2018; Worthington 1963	13	Jiménez 2014; Dempsey 1976	1000	Zhuravlova 2018	0.3	
18	Cranialia	Chordata		Mammals (mouse)	Mus musculus	IC	Brain ventricle cilia (ependymal cilia)	1	1	Transport of cerebrospinal fluid and possibly signals/cells	Faubel 2016	200.00		0.10	Xiong 2014, Fig. 1A	10.00	Xiong 2014, Fig.2B	1000	Xiong 2014, Fig.1A	0.5	
19	Cranialia	Chordata		Mammals (mouse)	Mus musculus	IC	Efferent ductules (male reproductive system)	1	1	Transport of sperm cells; stirring	Lee 2000; Hess 2015	100.00		0.30	average from Lambot 2009 and Yuan 2019, Movie S3, Fig.1	17.00	Yuan 2019, Fig.4A and text	8000	Lambot 2009	0.5	
20	Cranialia	Chordata		Amphibians (Toad)	Rhinella marina (Bufo marina)	IC	Kidney, peritoneal funnels (connects coelom to nephros)	2	2	Blood volume/osmoregulator regulator: Filters particles and pumps protein-rich peritoneal fluid back into the kidney blood vasculature.	Morris 1981	7.00	0.73	0.85	Morris 1981, Fig. 11	10.00	estimated from Morris 1981 Fig. 10	40	estimated from Meibjerg 2000, Fig. 5	0.85	
21	Cranialia	Chordata		Amphibians (Toad)	Bufo bufo / viridis	IC	Kidney, neck segment of the mesonephros	2	0	Presumed: excretion/ultrafiltration	Meibjerg 1997, 2001	25.00		0.76	0.87	Meibjerg 1997, Fig.7C	10.00	Meibjerg 1997, Fig. 7C	90	Meibjerg 1998;text	0.73
22	Cranialia	Chordata		Avians - Bird (Ostrich)	Struthio camelus	IC	Uterus folds	1	1	Presumably transport of mucus	Sharaf 2013	30.00		0.33	Sharaf 2013, Fig.4D	5.00	Sharaf 2013, Fig. 4D	2000	at least: Sharaf 2013, Fig. 4C	0.5	
23	Cranialia	Chordata		Reptile (Lizard)	Podarcis sp.	IC	Urinary bladder Stalk	1	0	Unknown - possibly transport of highly viscous or precipitated urine: out of bladder stalk (Bolton & Beuchat 1991)	Bolton & Beuchat 1991	64.00		0.30	Rheubert 2014, Fig. 6.3 (duct diameter); Bolton & Beuchat 1991, Fig. 1 (cilia)	10.00	estimated from Bolton & Beuchat 1991, Fig. 1	500	Rheubert 2014, Fig.6.3	0.5	
24	Cranialia	Chordata		Osteichthyes (Bony Fish) (Zebrafish)	Danio rerio (72hpf)	IC	Pronephros proximal tubule of metanephridia	2	0	Unknown- Presumed: ultrafiltration	Zhang 2012, Ott 2016, Delaval 2011	3	0.8	0.89	Ott 2016 Fig. 3A-D; Lee 2015, Fig. 4G	9	Kramer-Zucker 2005 Fig.1F and Table	600	Vasilyev 2012, Fig.1G and text	0.85	
25	Cranialia	Chordata		Osteichthyes (Bony Fish) (Zebrafish)		IC	Olfactory pit cilia	1	1	Generating flow to nose for chemical sensing	Reiten 2017	60		0.28	Reiten 2017, Fig.1A	9	Reiten 2017, text	60	circular; Reiten 2017, Fig. 1A	0.5	
26	Ctenophora	Ctenophora	Comb jellies		Beroe abyssicola	IC	Endodermal (gastrovascular) canal	1	1	Absorption and transport of food	Presnell 2016, Norekian 2019, Tamm 2014, Gemmill 1918	300		0.05	Presnell 2016 Movie S4	8	Cilia length ~6-10µm; Presnell 2016, Movie S4	30000	estimate from Presnell 2016 Fig. 1	0.5	
27	Cycliophora	Spiralia			Symbion pandora	IC	Intestine	2	0	Probably absorption and transport	Neves 2009	2	0.5	0.71	Neves 2009, Fig. 5, 4D	NA		50	extremely crude estimate from Neves 2009 Fig.4A	0.5	
28	Dicymera	Spiralia	Rhombozoa		Dicymera acuticephalum	IC	Urn Cavity in Larvae	1	0	Unknown. Hypothesis: Pump fluid to exchange with outside? Furuya 1997	Furuya 1997, 1999, Brescian 1967, Matsubara 1976	3	0.5	0.71	Furuya 1997, Fig. 10	2	estimated from Matsubara 1976 Fig.9C, text; Brescian 1967 Fig.1 & Fig. 4	5	estimated from drawings in Furuya 1999	0.5	
29	Echinodermata	Ambulacraria	Echinoderms		Hemicenturus pulcherrimus, Stongylocentrotus pallidus	IC	Pore canals	1	0	Hypothesis: In relaxed state, pumping of fluid inwards, transport of particles outwards (bi directional transport)	Tamori 1996, Furgusson 1990, 1991, 1996	13.00	0.25	0.50	Tamori 1996; Fig. 7a and text	12	Tamori 1996, Fig. 8	200	Tamori 1996, Fig.5	0.25	
30	Echinodermata	Ambulacraria	Echinoderms		Hemicenturus pulcherrimus	IC	Pore canals	2	0	Hypothesis: in contracted state, maintain hydrostatic pressure (for tube feet), ultrafiltration	Tamori 1996	8.40	0.65	0.81	Tamori 1996	12	Tamori 1996, Fig. 8	200	Tamori 1996, Fig.5	0.65	
31	Entoprocta	Spiralia	Goblet worms			IC	Esophagus	1	1	Presumably transport/mixing	Schwaha 2010	15		0.35	Schwaha 2010, Fig.4c	3.3	Schwaha 2010, Fig. 4c	110	Schwaha 2010, Fig. 4c	0.2	
32	Entoprocta	Spiralia	Goblet worms		Loxosomatoides sirindhornae; Umastella gracilis	IC	Terminal cells of pronephridia	2	2	Excretion/ Ultrafiltration	Schwaha 2010; Kuemmel 1962	2.5	0.75	0.87	Schwaha 2010, Fig. 3e and f (H); Kuemmel Fig 10 (hH)	20	Schwaha 2010, Fig. 3e and f	20	length of filtration zone (estimated from diameter/length ratio in Kuemmel Fig 8)	0.75	
33	Gastrotricha	Spiralia	Hairyback		Chaetonotus maximus	IC	Terminal cells of pronephridia	2	2	Excretion/ Ultrafiltration	Kieneke 2008; Fontaneto 2015	0.5	0.8	0.89	Kieneke 2008, Fig.10c; Fontaneto 2015 Fig.1.30 B	27	Kieneke 2008, text and Fig. 9b	27	Kieneke 2008, text and Fig. 9b	0.8	No evidence of carpet style ducts except potentially in pharynx of Dendrodoxys affinis/gadalis but no imaging data is available (Kieneke 2015)
34	Gnathostomulida	Gnathifera	Jaw worms		Gnathostomula paradoxa	IC	Terminal cells of pronephridia	2	2	Blood volume/osmoregulator regulator: Filters particles and pumps protein-rich peritoneal fluid back into the kidney blood vasculature.	Lammer 1985	0.6	0.65	0.81	Lammer 1985, Fig. 2C	11	Lammer 1985, text	11	Lammer 1985, text	0.65	No evidence of perpendicularly ciliated ducts in this phylum
35	Hemichordata	Ambulacraria	Acorn worm		Meioglossus psammophilus	IC	Mid gut	1	1	Transport of food	Worsaae 2012	50		0.24	Worsaae 2012, Fig. 5A; Movie S2	6	Worsaae 2012, Fig. 5A; Movie S2	100	Worsaae 2012, Fig. 5A	0.5	No evidence of longitudinally ciliated ducts in this phylum except potentially the ciliated canal-hypostome in the larvae but imaging data of cilia are not available (Ruppert 1998)
36	Kinorhyncha	Scalidophora	Mud dragons		Pycnophyes kiellensis	IC	Terminal cells of pronephridia	2	2	Excretion/ Ultrafiltration	Neuhaus 1988	2	0.9	0.95	Neuhaus 1988, Fig.4C, 5C	20	Neuhaus 1988, estimated from Fig.1A	20	Neuhaus 1988, estimated from Fig.1A	0.9	No evidence of perpendicularly ciliated ducts in this phylum
37	Loricifera	Scalidophora	Brush heads		Armorloricus elegans	IC	Terminal cells of pronephridia	2	2	Excretion/ Ultrafiltration	Neuhaus 2007	0.2		0.95	(1 cilium) Neuhaus 2007, Fig. 4B	9	Neuhaus 2007, Fig.3A and text	9	Neuhaus 2007, Fig.3A and text	0.95	No evidence of perpendicularly ciliated ducts in this phylum
38	Micrognathozoa	Gnathifera			Limnognathia maerski	IC	Terminal cells of pronephridia	2	2	Excretion/ Ultrafiltration	Kristensen 2000	0.3	0.7	0.84	Kristensen 2000, Fig.30 & 31 (average of 4 Terminal cells)	6	Kristensen 2000, Fig.30	6	Kristensen 2000, Fig.30	0.7	No evidence of perpendicularly ciliated ducts in this phylum
39	Mollusca	Trochozoa	Mollusks		Blue Mussel	IC	Lateral Gill Cilia	1	1	Fluid pumping for filter feeding (particles of 4µm or more)	Risgard 1996, 2015	40		0.35	Risgard 2015, Fig.4c; Risgard 1969, Fig.2	15	Risgard 2015, text	15	width of ridge; Risgard 2015, text	0.5	
40	Mollusca	Trochozoa	Mollusks		Bobtail squid	IC	Proximal ciliated duct that leads to crypts in light organ	1	0	Potentially interaction with symbionts	Essock-Burns 2020	18		0.55	Essocks-Burns 2020	5	Essocks-Burns 2020	50	Essocks-Burns 2020 Fig. 2A	0.5	
41	Mollusca	Trochozoa	Mollusks		Bobtail squid	IC	Bottleneck of ciliated duct that leads to crypts in light organ	1	0	Potentially interaction with symbionts	Essock-Burns 2020	6		0.90	Essocks-Burns 2020	3	Essocks-Burns 2020	10	Essock-Burns 2020 Fig. 3A/B	0.5	
42	Mollusca	Trochozoa	Mollusks		Chiton	IC	Ciliary flame of pronephridia	2	2	Excretion/ Ultrafiltration	Baemler 2011	4	0.65	0.81	Baemler 2011, Fig.6D	8	Baemler 2011, Fig.6D	8	Baemler 2011, Fig.6D	0.65	
43	Mollusca	Trochozoa	Mollusks		Chiton	IC	Renopercardial duct of metanephridia	2	0	Unknown	Baemler 2012	5	0.61	0.78	Baemler 2012, Fig.6C	NA		200	Baemler 2012, Fig.7G	0.61	
44	Nemertea	Trochozoa	Ribbon worms		Lineus viridis, Carinoma mutabilis	IC	Terminal cells of pronephridia	2	2	Excretion/ Ultrafiltration	Bartolomeaus 1985, 2014	1	0.9	0.95	Bartolomeaus 1985, Fig. 3D; Bartolomeaus 2014, Fig.2B	15	Bartolomeaus 2014 text	15	Bartolomeaus 2014 text	0.9	No evidence of carpet style ducts
45	Oryctophora	Panarthropoda	Velvet worms		Ooperipatellus decoratus, Euperipatoides rowelli	IC	Oviduct	1	0	Probably oocyte and embryo transport	Brockmann 2001, Curach 1999	100		0.10	estimated from Curach 1999, Fig. 1	NA		800	Brockmann 2001, text		

Reference list for survey of analyzed ciliated ducts (in alphabetic order)

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