LA SIMMETRIA NEGLI ANIMALI

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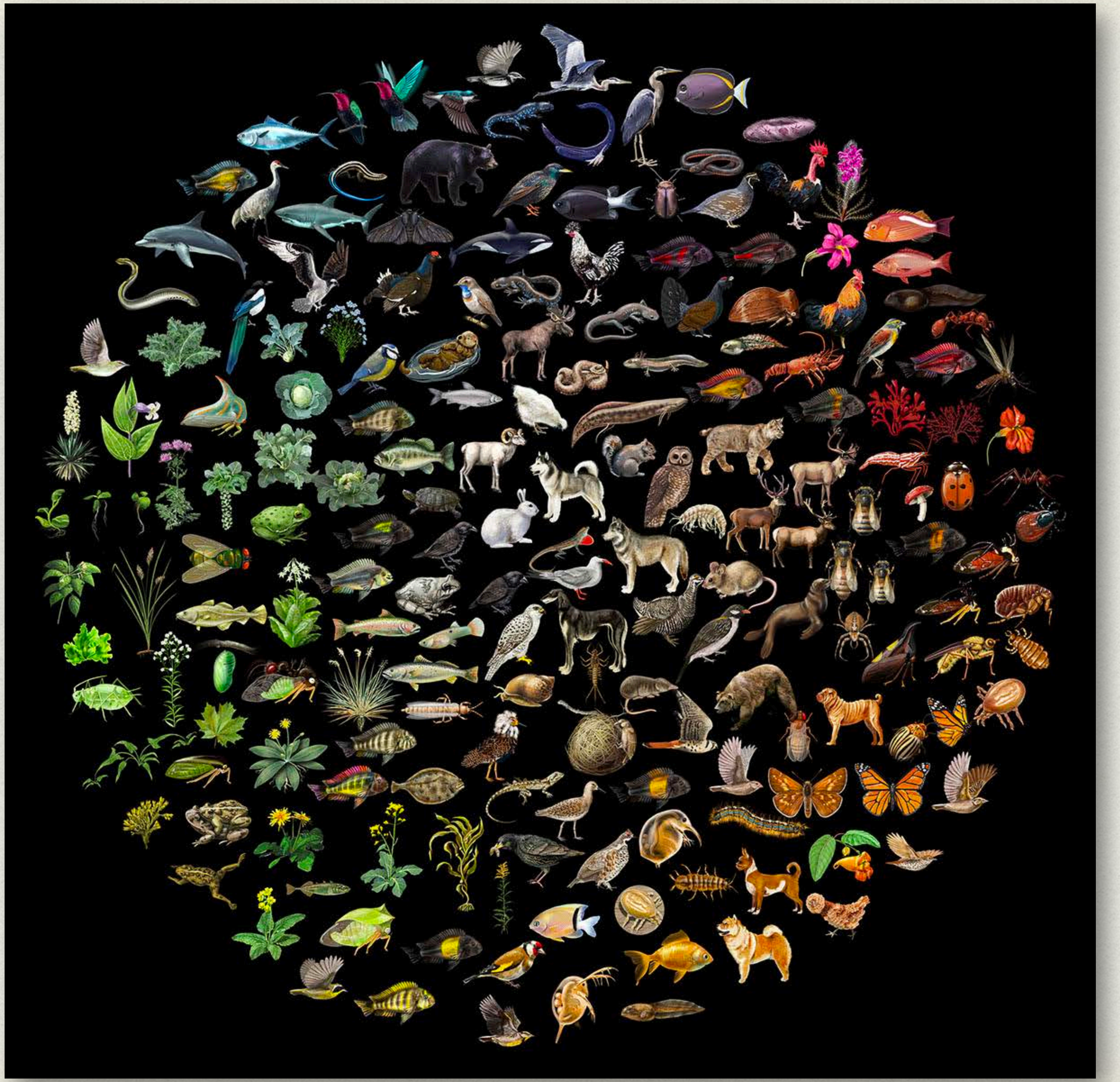
MOLTE FORME



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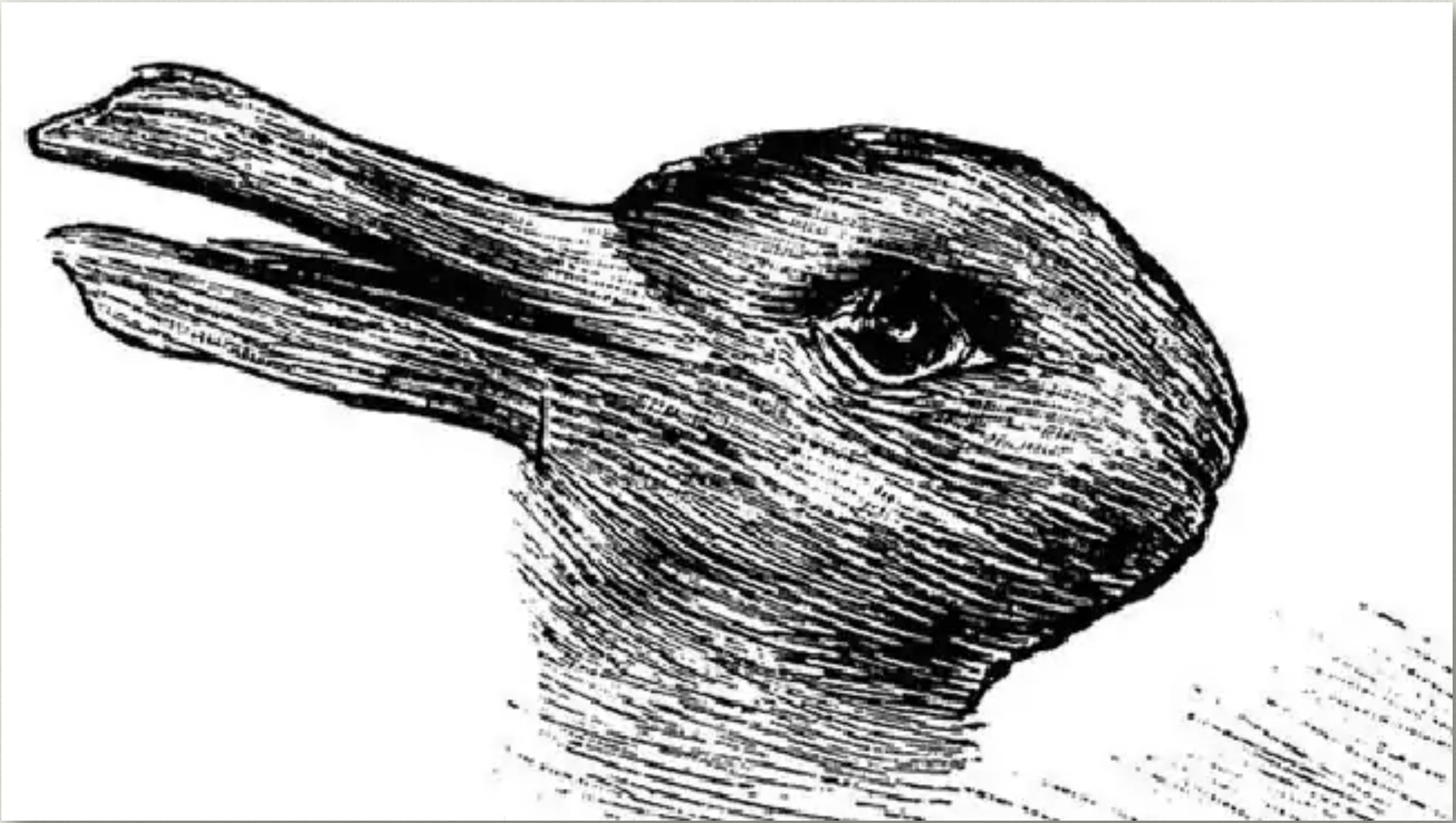

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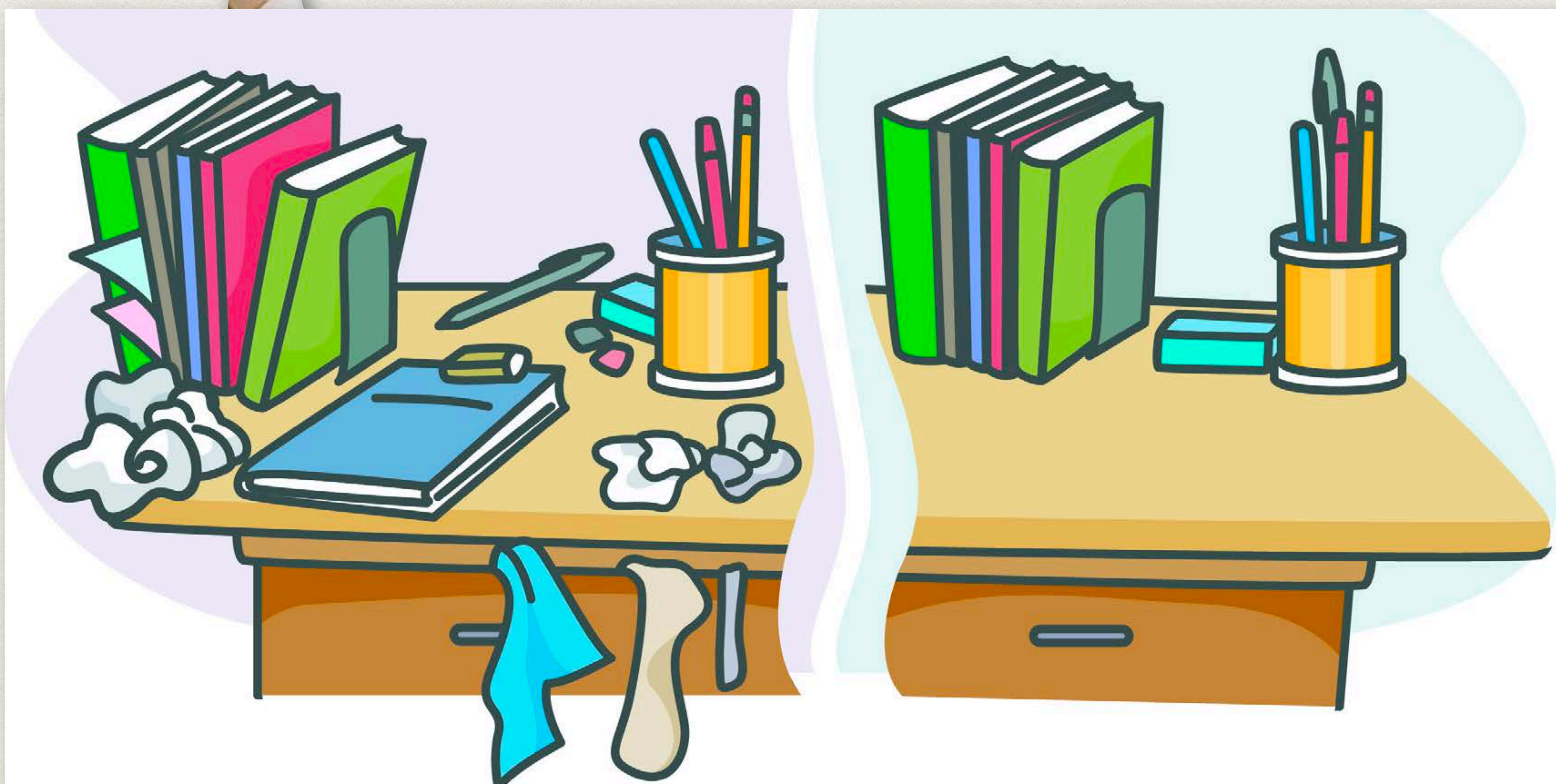
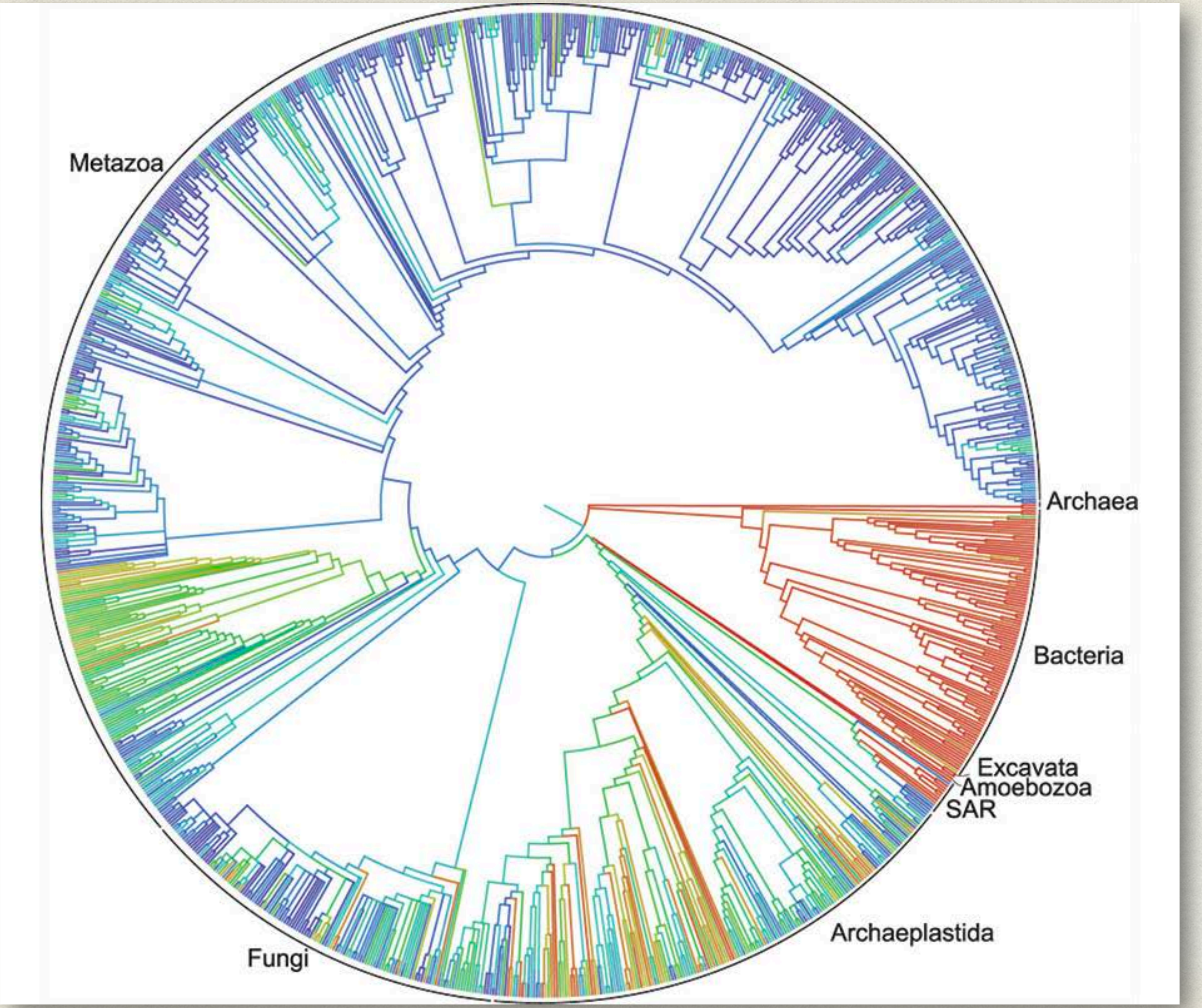


MOLTE FORME... MA UNA SOLA STORIA



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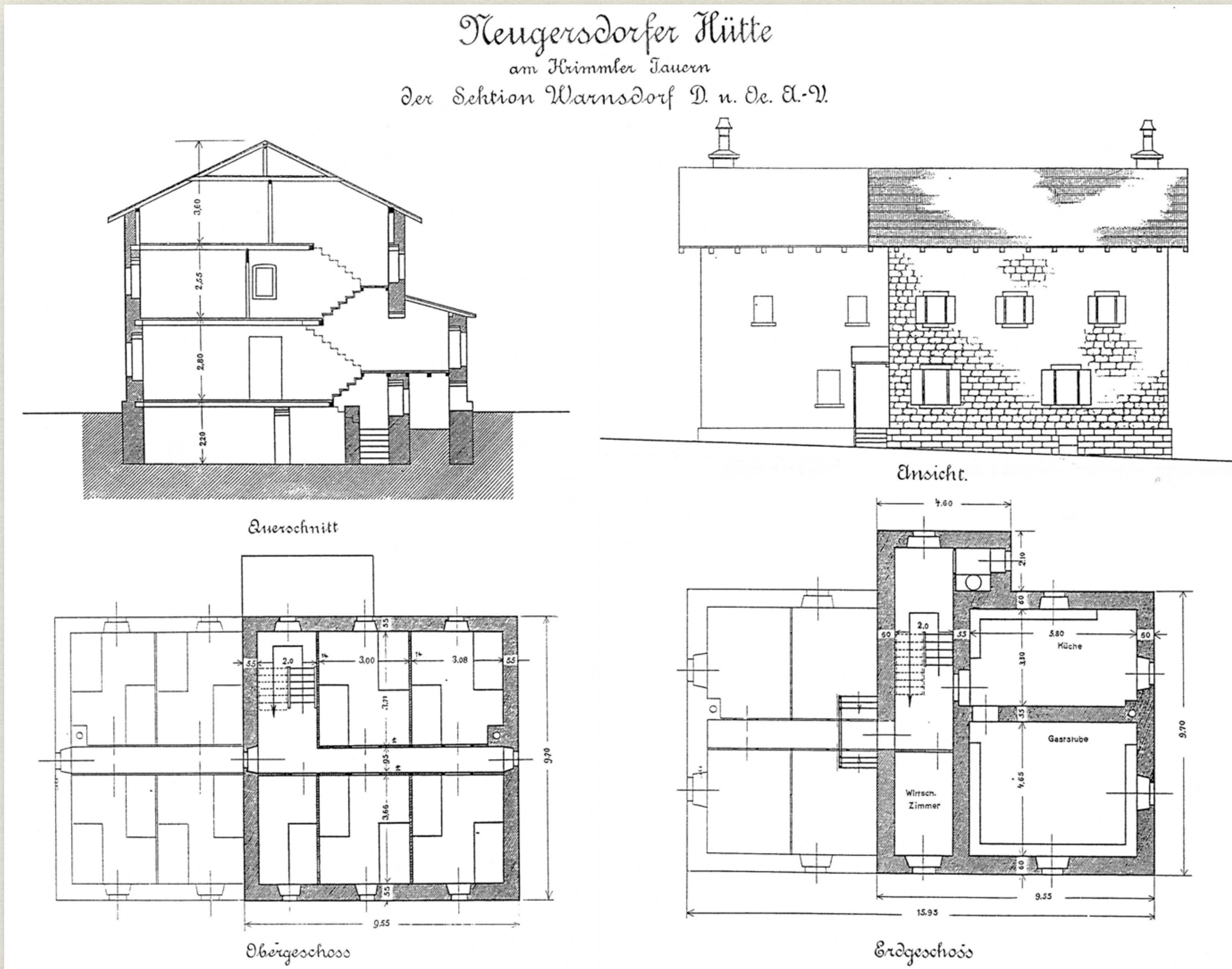
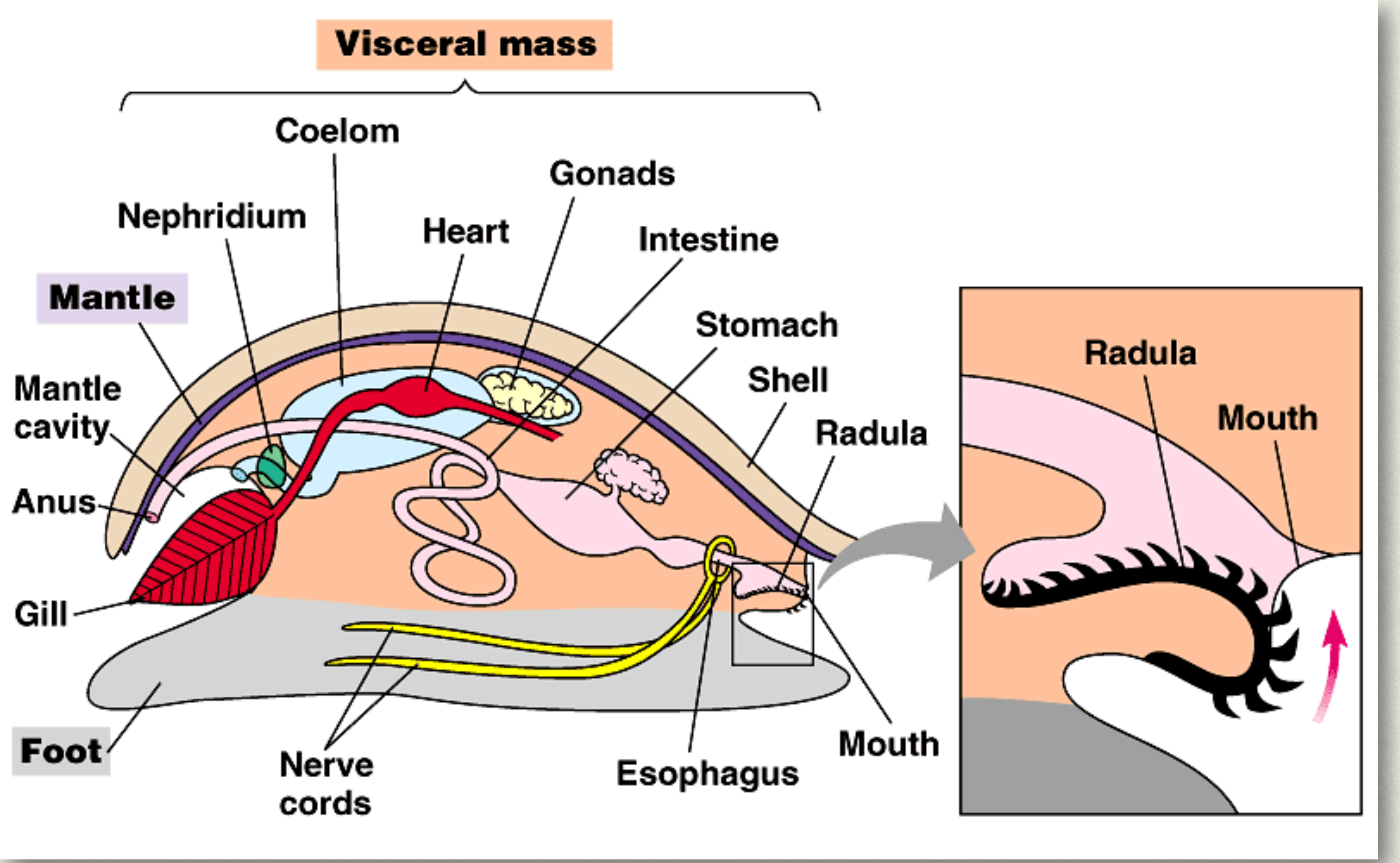

Neugersdorfer Hütte
am Krimmler Tauern
der Sektion Warnsdorf D. u. Oe. A.-V.
Querschnitt
Ansicht.
Obergeschoss
Erdgeschoss
Küche
Gaststube
Wirtsch. Zimmer

Phylum	Meaning	Common name	Distinguishing characteristic	Species described
Arthropoda	Jointed foot	Arthropods	Chitin exoskeleton	1,134,000+
Mollusca	Soft	Mollusks / molluscs	Muscular foot and mantle round shell	112,000[11]
Chordata	With a cord	Chordates	Hollow dorsal nerve cord, notochord, pharyngeal slits, endostyle, post-anal tail	100,000+
Nematoda	Thread like	Round worms	Round cross section, keratin cuticle	80,000–1,000,000
Platyhelminthes	Flat worms	Flat worms		25,000[12]
Annelida	Little ring	Segmented worms	Multiple circular segment	17,000+ extant
Cnidaria	Stinging nettle	Coelenterates	Nematocysts (stinging cells)	11,000
Echinodermata	Spiny skin	Echinoderms	Fivefold radial symmetry in living forms, mesodermal calcified spines	7,000 extant; approx. 13,000 extinct
Porifera•	Pore bearer	Sponges	Perforated interior wall	5,000+ extant
Bryozoa	Moss animals	Moss animals, sea mats	Lophophore, no pedicle, ciliated tentacles	5,000 extant
Rotifera	Wheel bearer	Rotifers	crown of cilia at front	2,000
Nemertea	A sea nymph	Ribbon worms		1,200
Tardigrada	Slow step	Water bears	Four segmented body and head	1,000+
Acanthocephala	Thorny headed worms	Thorny-headed worms	Reversible spiny proboscis. Now usually included in Rotifera.	756 extant (= living)
Gastrotricha	Hair stomach	Meiofauna	Two terminal adhesive tubes	690
Nematomorpha	Thread form	Horsehair worms		320
Brachiopoda	Arm foot	Lamp shells	Lophophore and pedicle	300-500 extant
Onychophora	Claw bearer	Velvet worms	Legs tipped by chitinous claws	200 extant
Entoprocta	Inside anus	Goblet worm	Anus inside ring of cilia	150
Kinorhyncha	Motion snout	Mud dragons	Eleven segments, each with a dorsal plate	150
Sipuncula	Small tube	Peanut worms	Mouth surrounded by invertible tentacles	144–320
Loricifera	Corset bearer	Brush heads	Umbrella-like scales at each end	122
Chaetognatha	Longhair jaw	Arrow worms	Chitinous spines either side of head, fins	100 extant
Ctenophora	Comb bearer	Comb jellies	Eight "comb rows" of fused cilia	100 extant
Hemichordata	Half cord	Acorn worms, pterobranchs	Stomochord in collar, pharyngeal slits	100 extant
Gnathostomulida	Jaw orifice	Jaw worms		100
Rhombozoa	Lozenge animal	—	Single axial cell form front to bak, surrounded by ciliated cells	75
Orthonectida	Straight swim		Single layer of ciliated cells surrounding a mass of sex cells	20
Priapulida	Little Priapus			16
Phoronida	Zeus's mistress	Horseshoe worms	U-shaped gut	11
Cycliophora	Wheel carrying	Symbion	Circular mouth surrounded by small cilia	3+
Xenoturbellida	Strange flatworm	—	Ciliated deuterostome	2
Micrognathozoa	Tiny jaw animals	—	Accordion-like extensible thorax. Newly discovered; close to Rotifers.	1
Placozoa	Plate animals			1
Acoelomorpha	Without gut	Acoels	No mouth or alimentary canal (alimentary canal = digestive tract in digestive system)	
Total: 35				**2,000,000+**

BAUPLAN

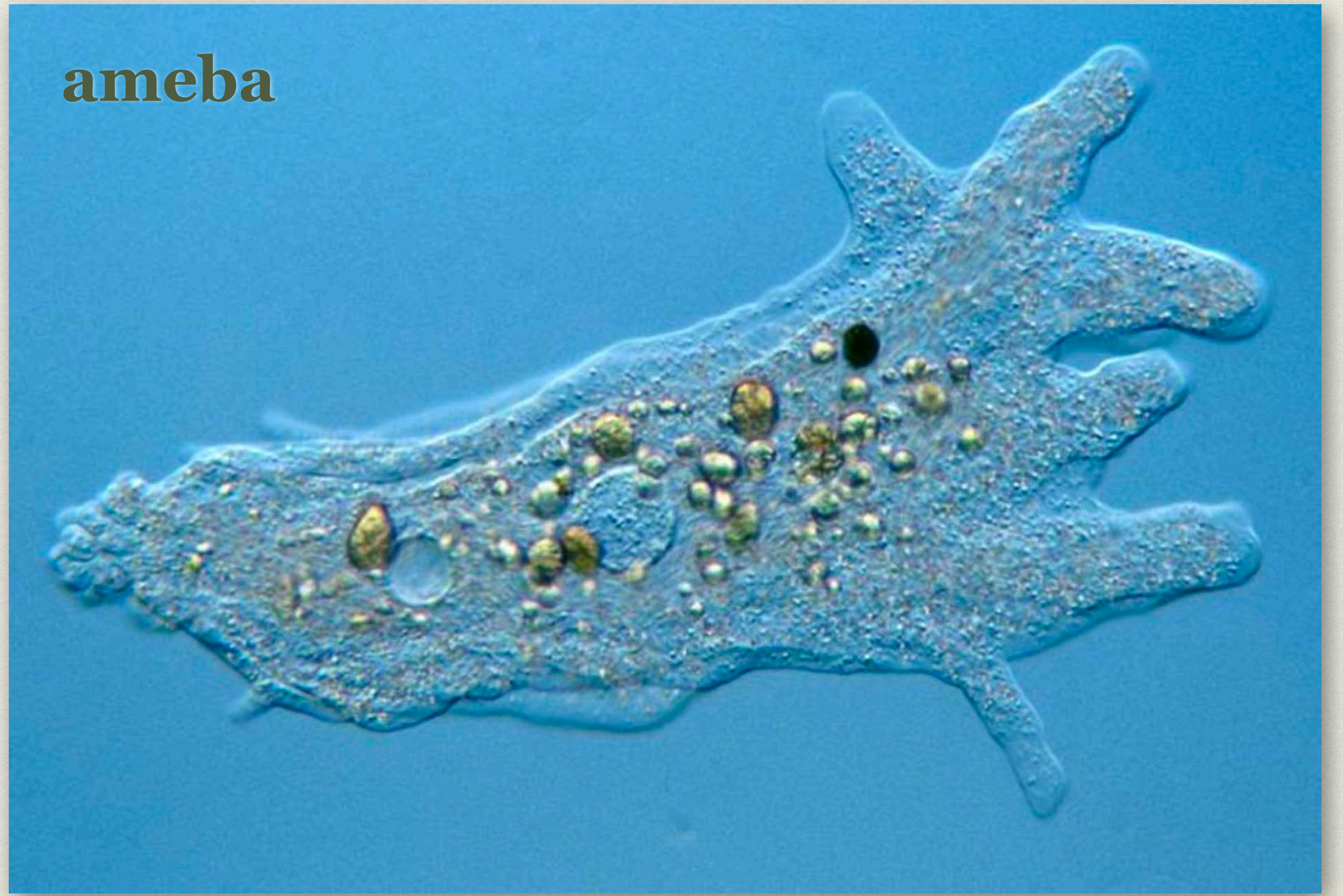


Visceral mass
Coelom
Gonads
Nephridium
Heart
Intestine
Mantle
Stomach
Mantle cavity
Shell
Radula
Anus
Gill
Foot
Nerve cords
Esophagus
Mouth
Radula
Mouth

BAUPLAN E SIMMETRIA

BAUPLAN E SIMMETRIA

ASIMMETRIA

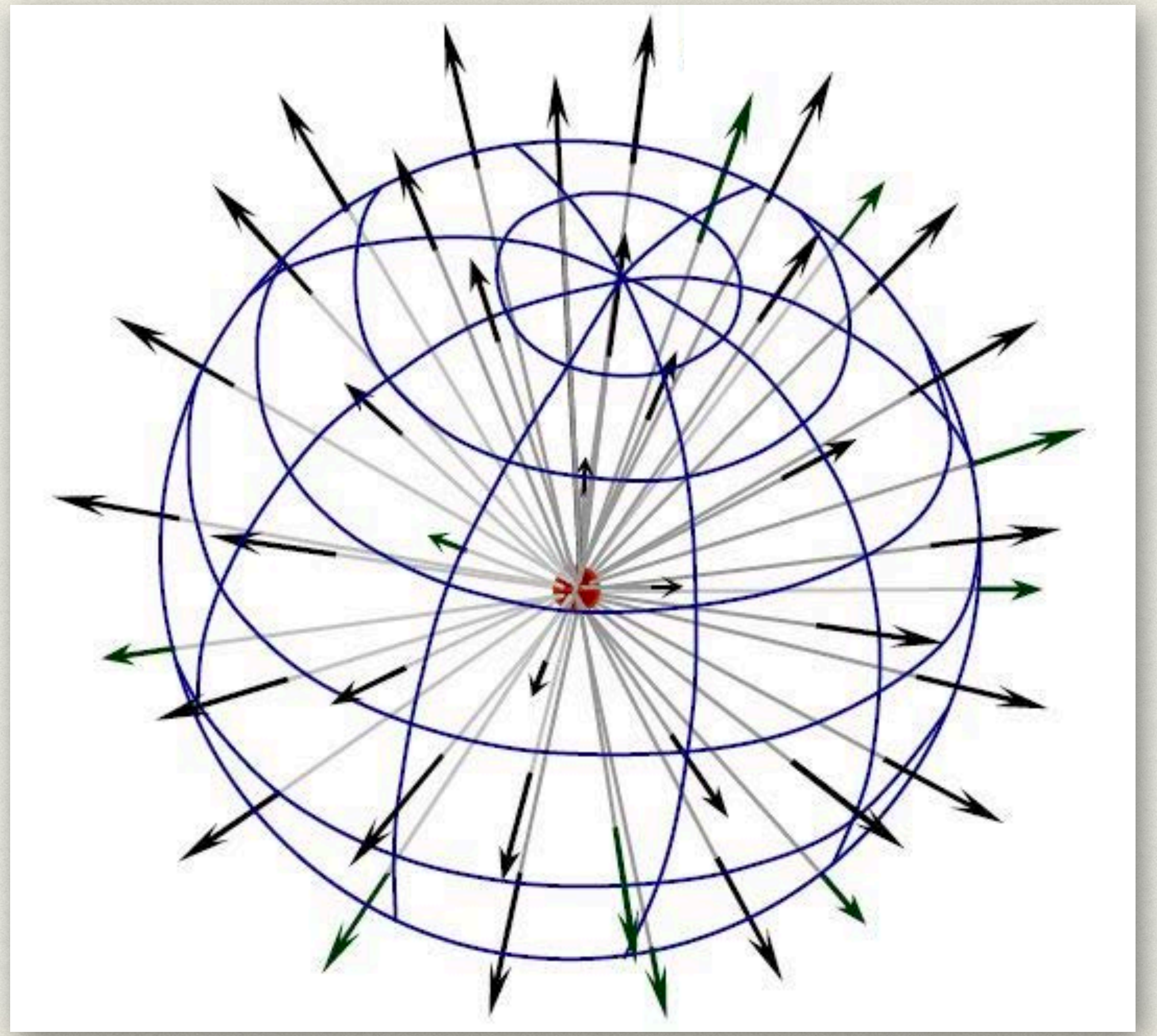


ASIMMETRIA

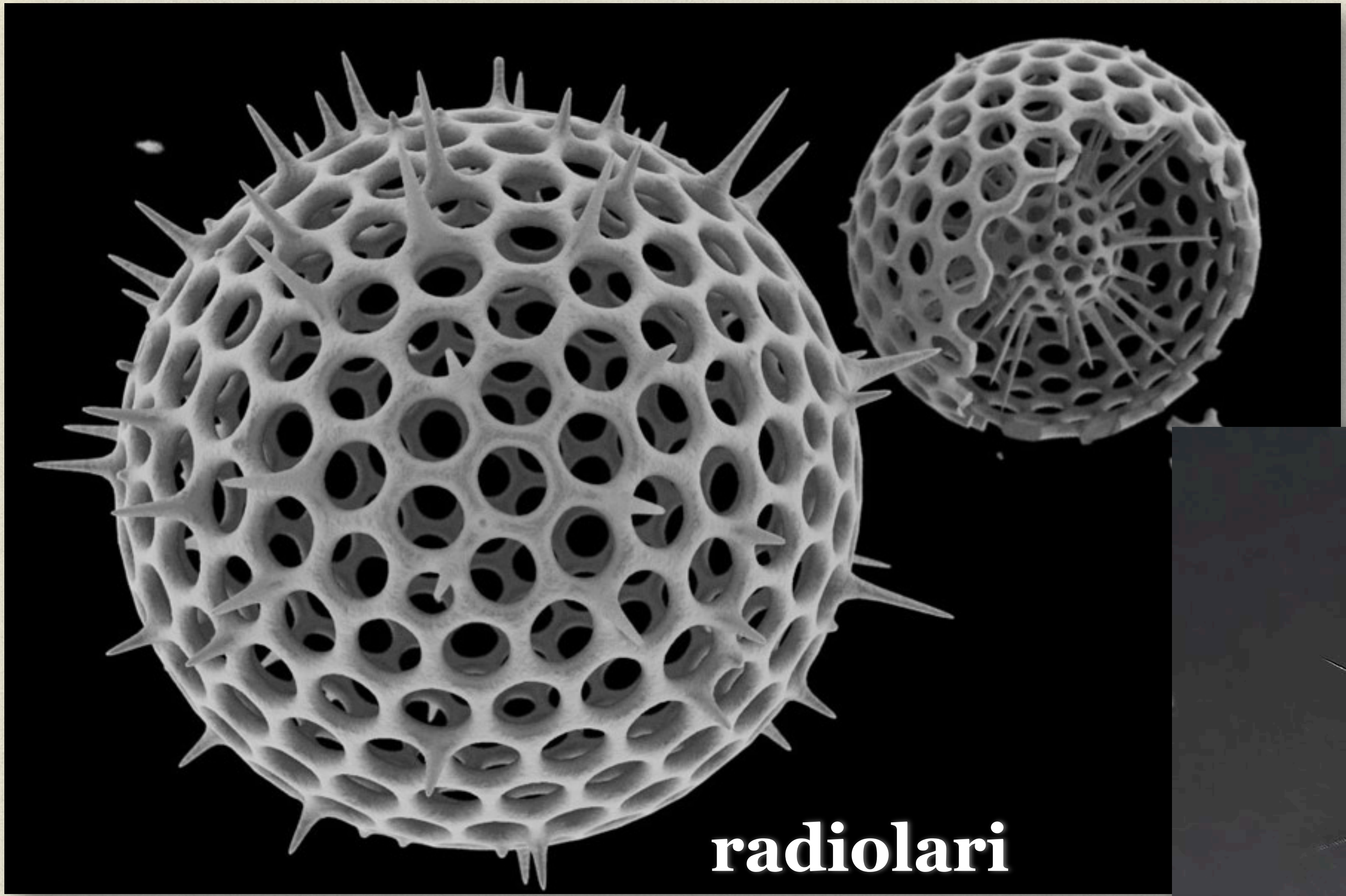
ASIMMETRIA

ASIMMETRIA

SIMMETRIA SFERICA



SIMMETRIA SFERICA



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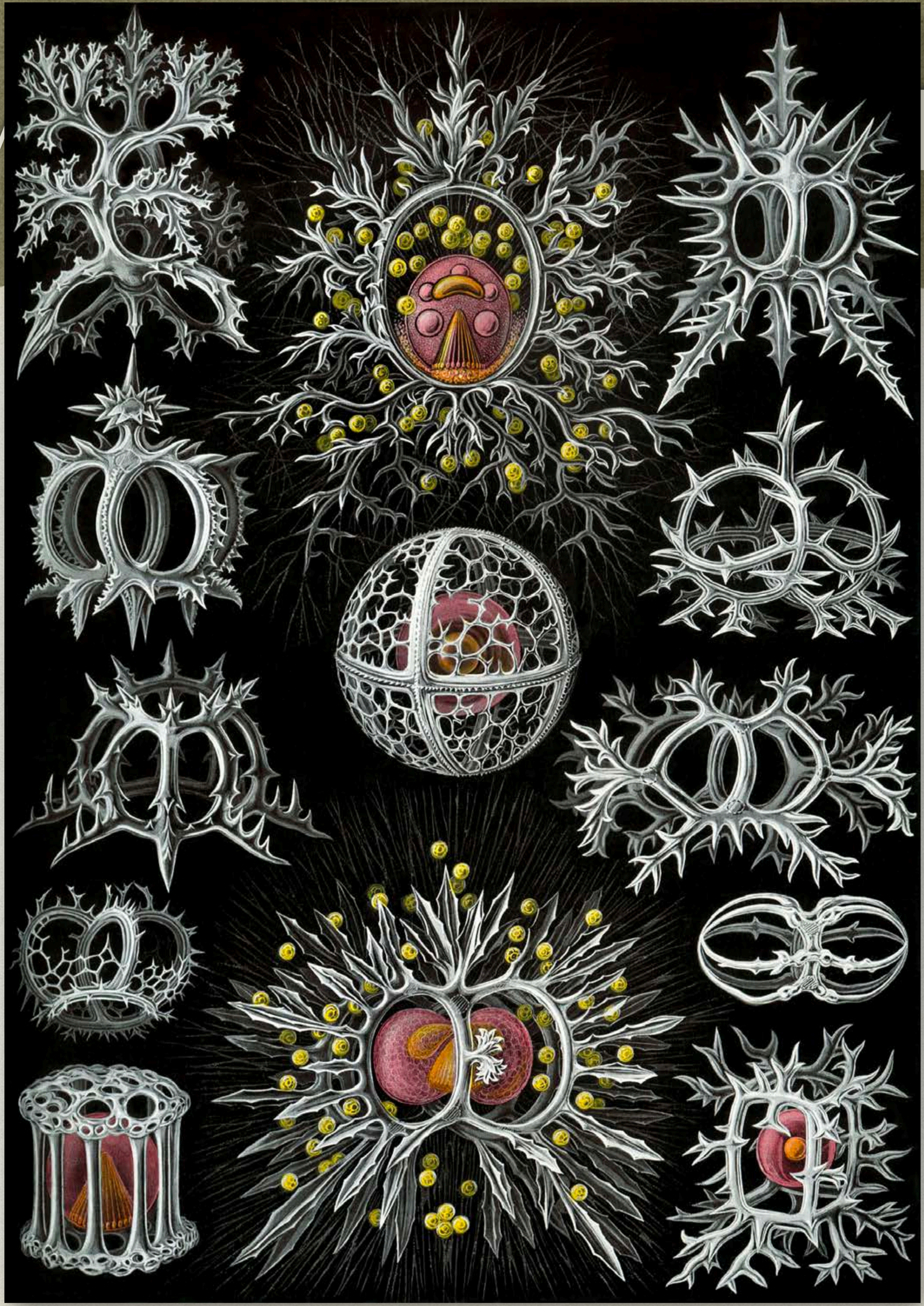
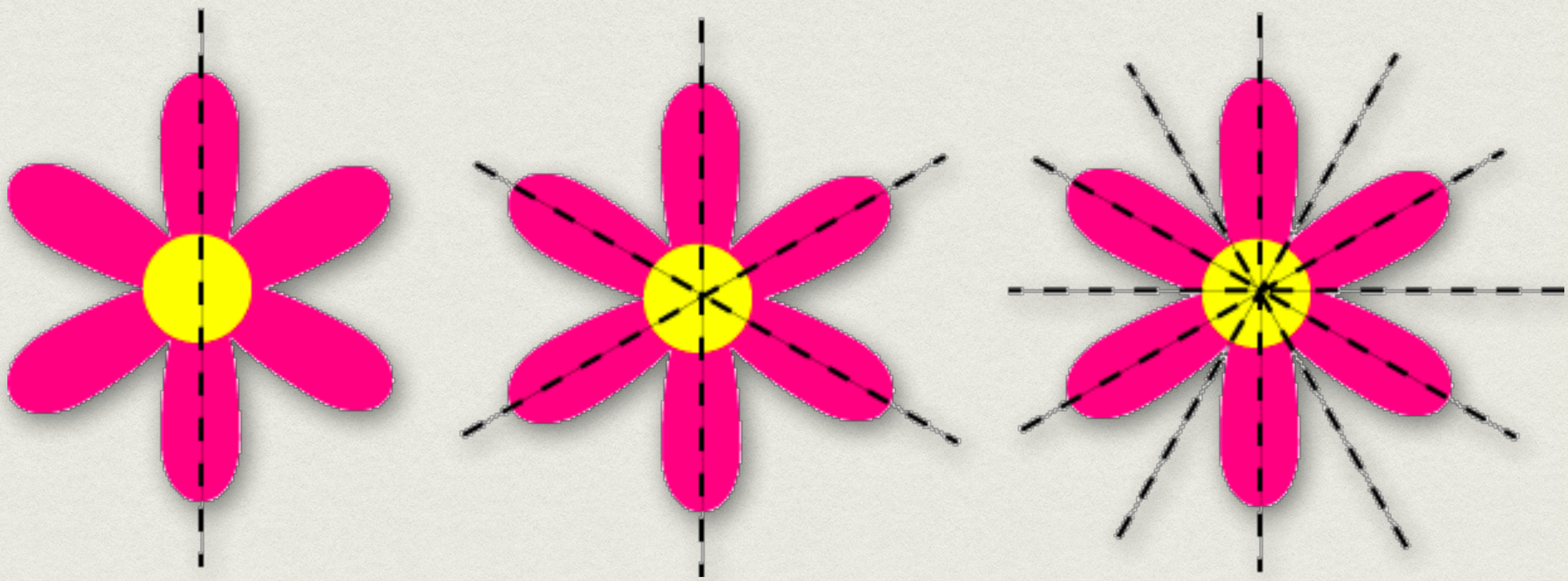


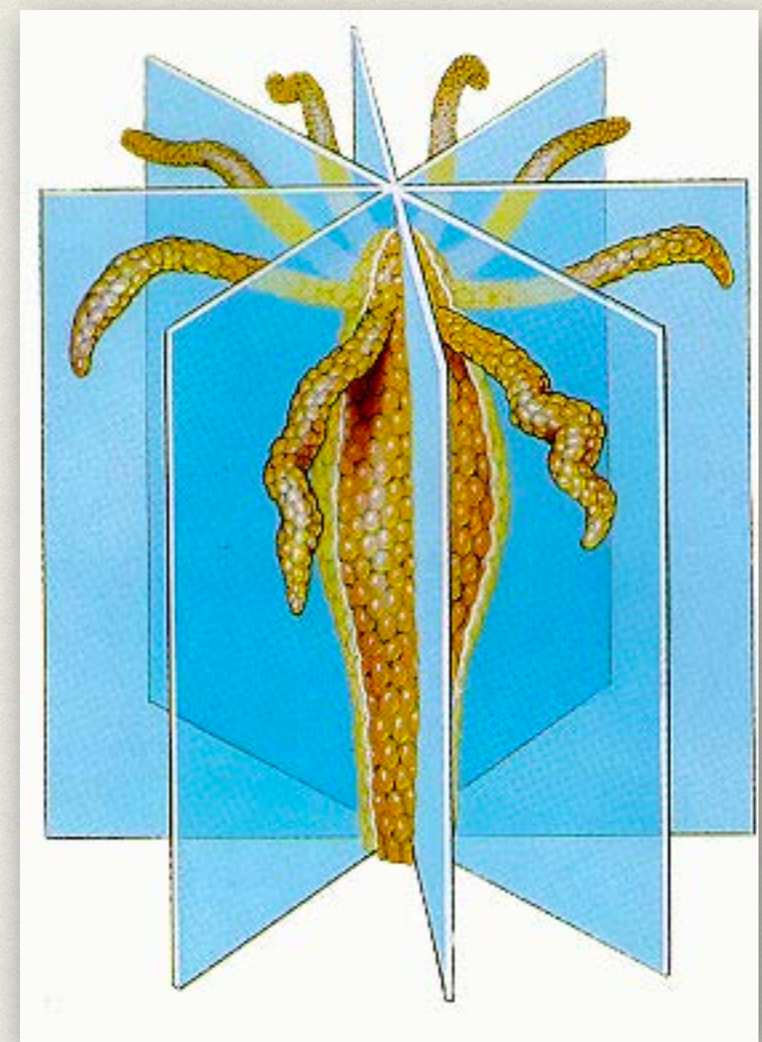
Ernst Haeckel

SIMMETRIA RADIALE



SIMMETRIA RADIALE

Polipi di cnidari



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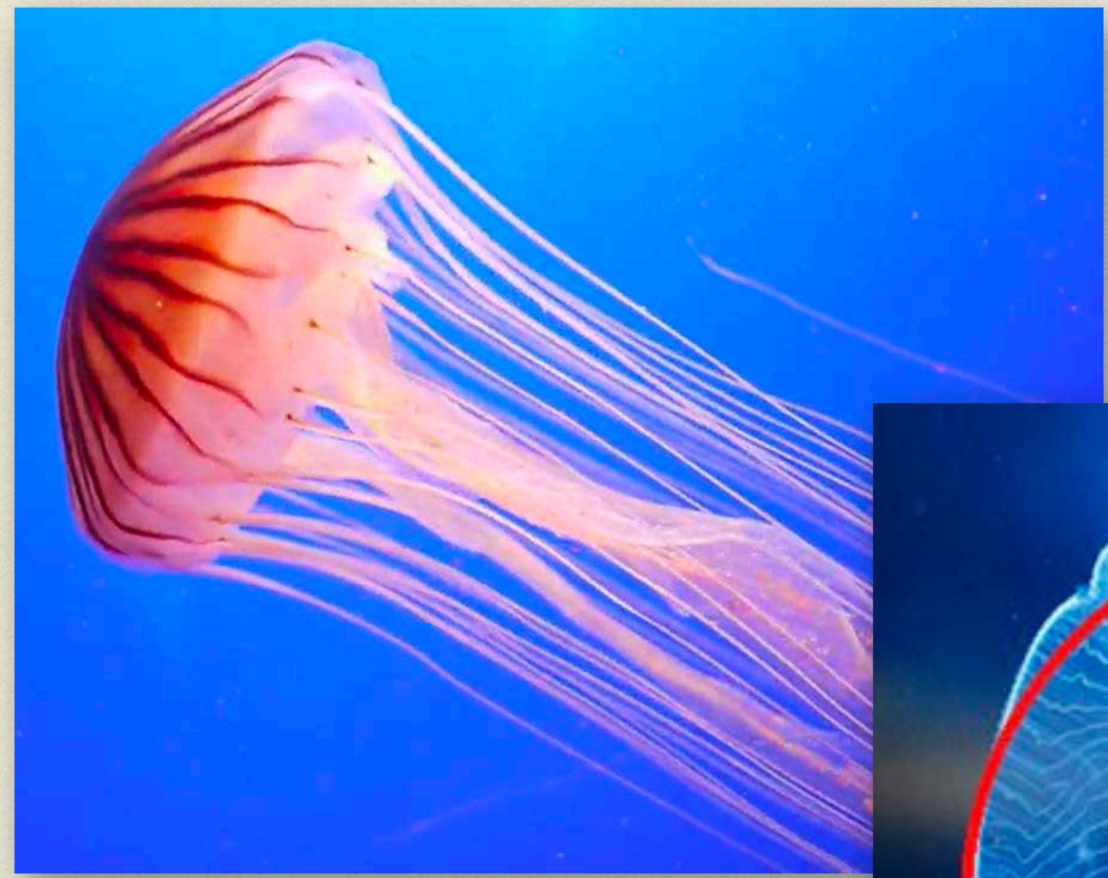

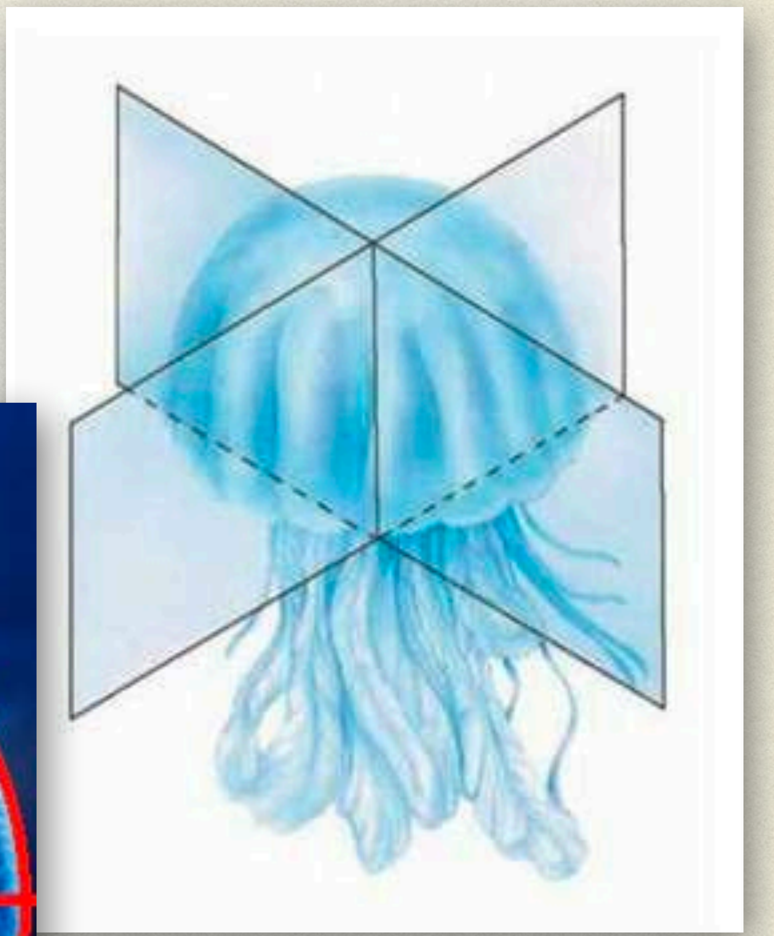

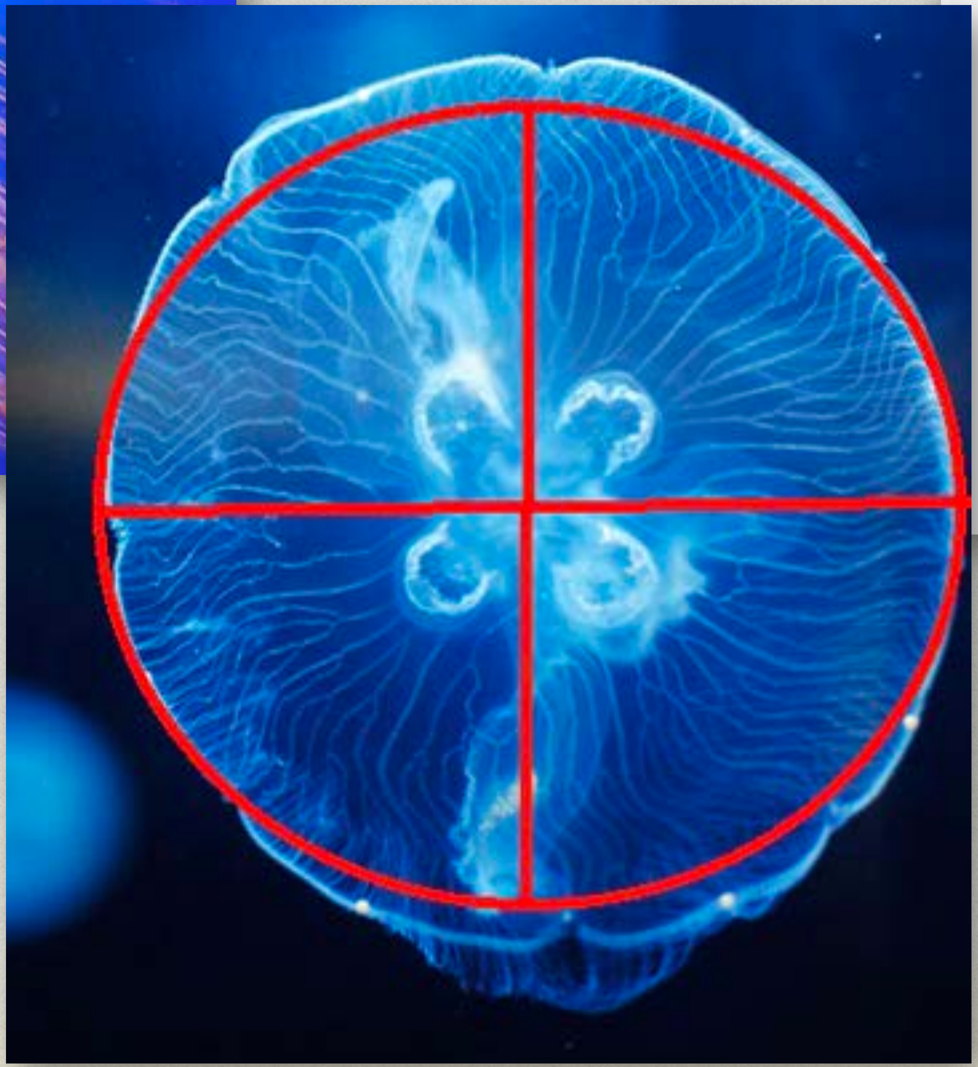

Meduse di cnidari

SIMMETRIA RADIALE

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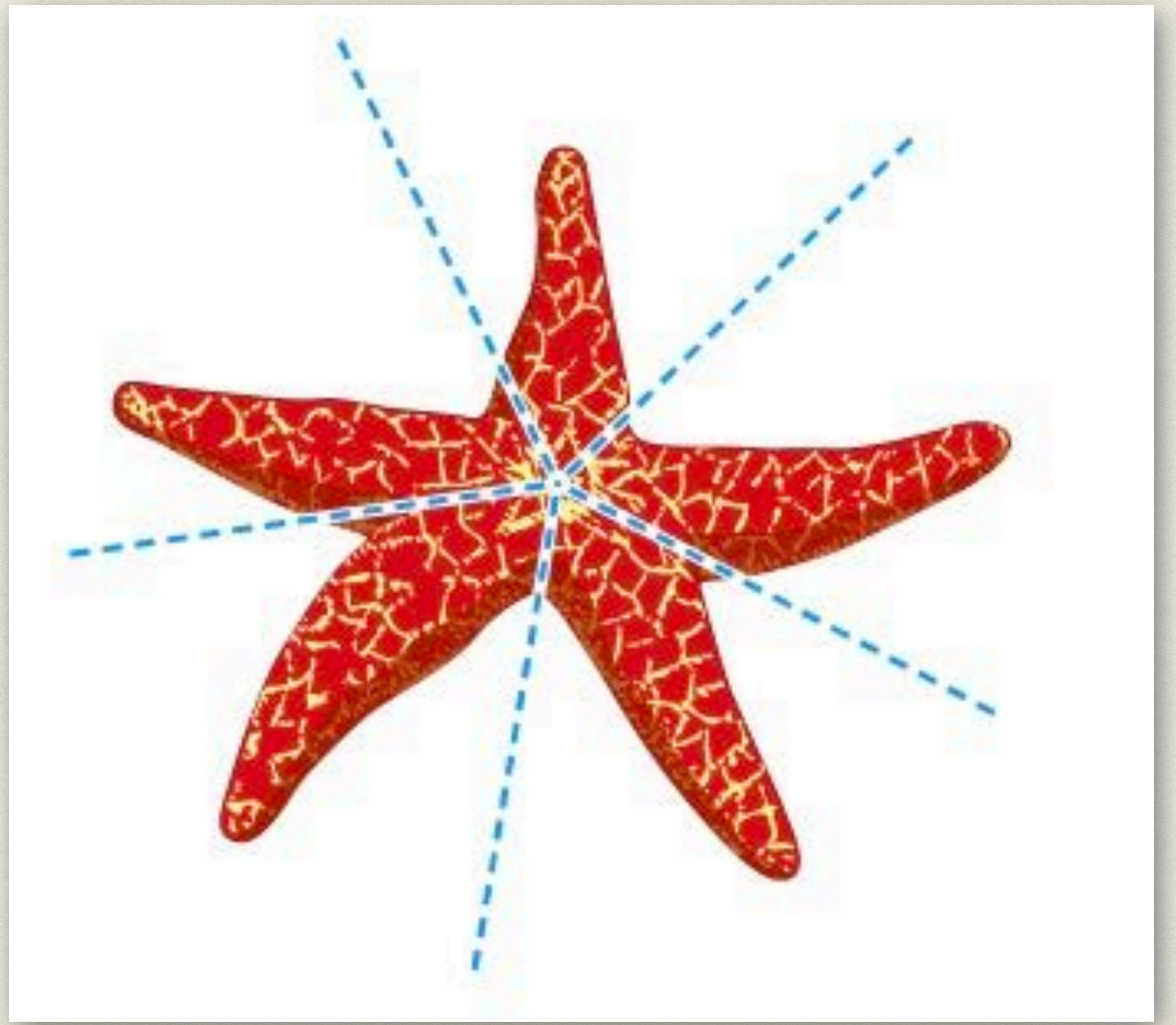

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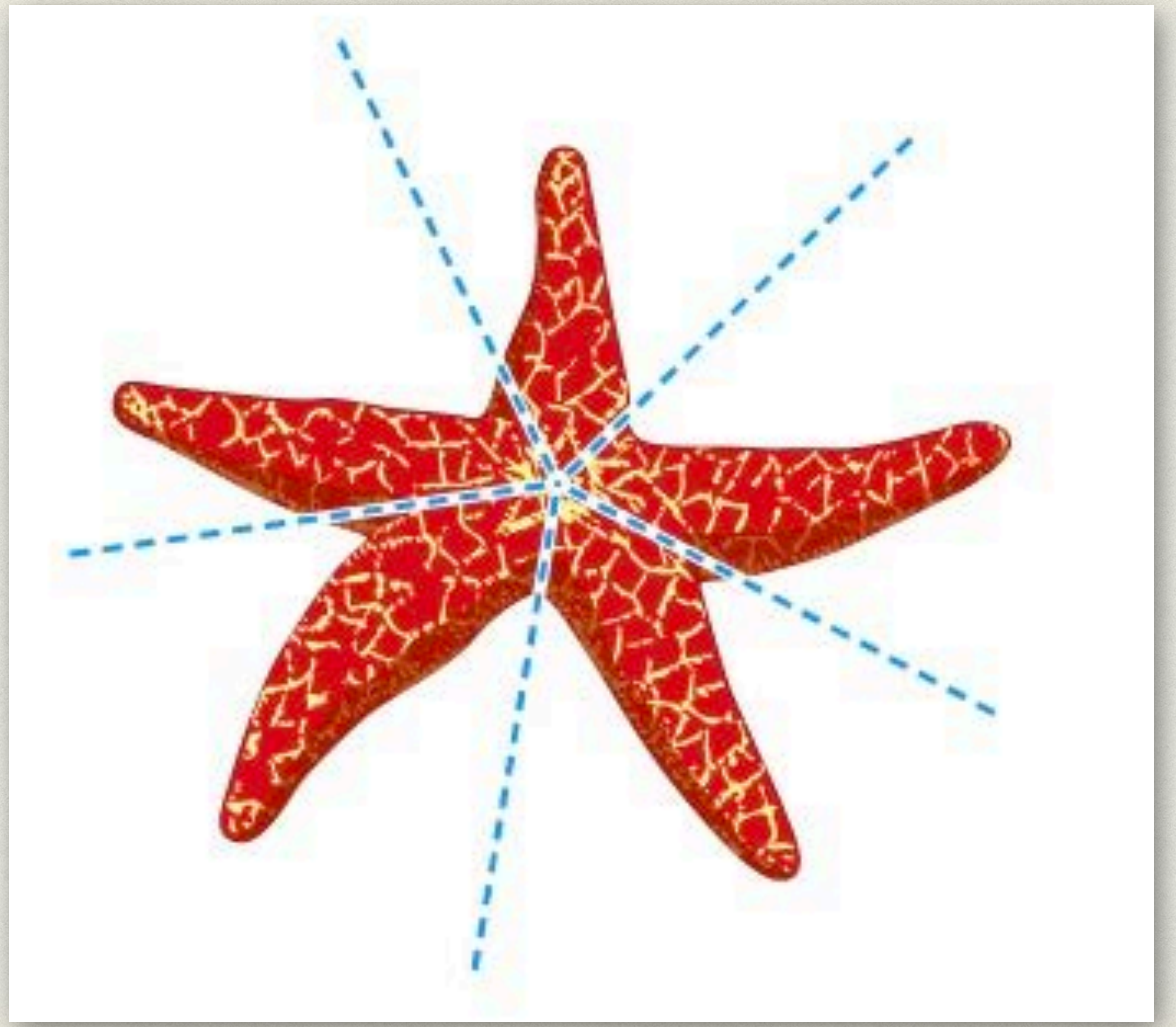
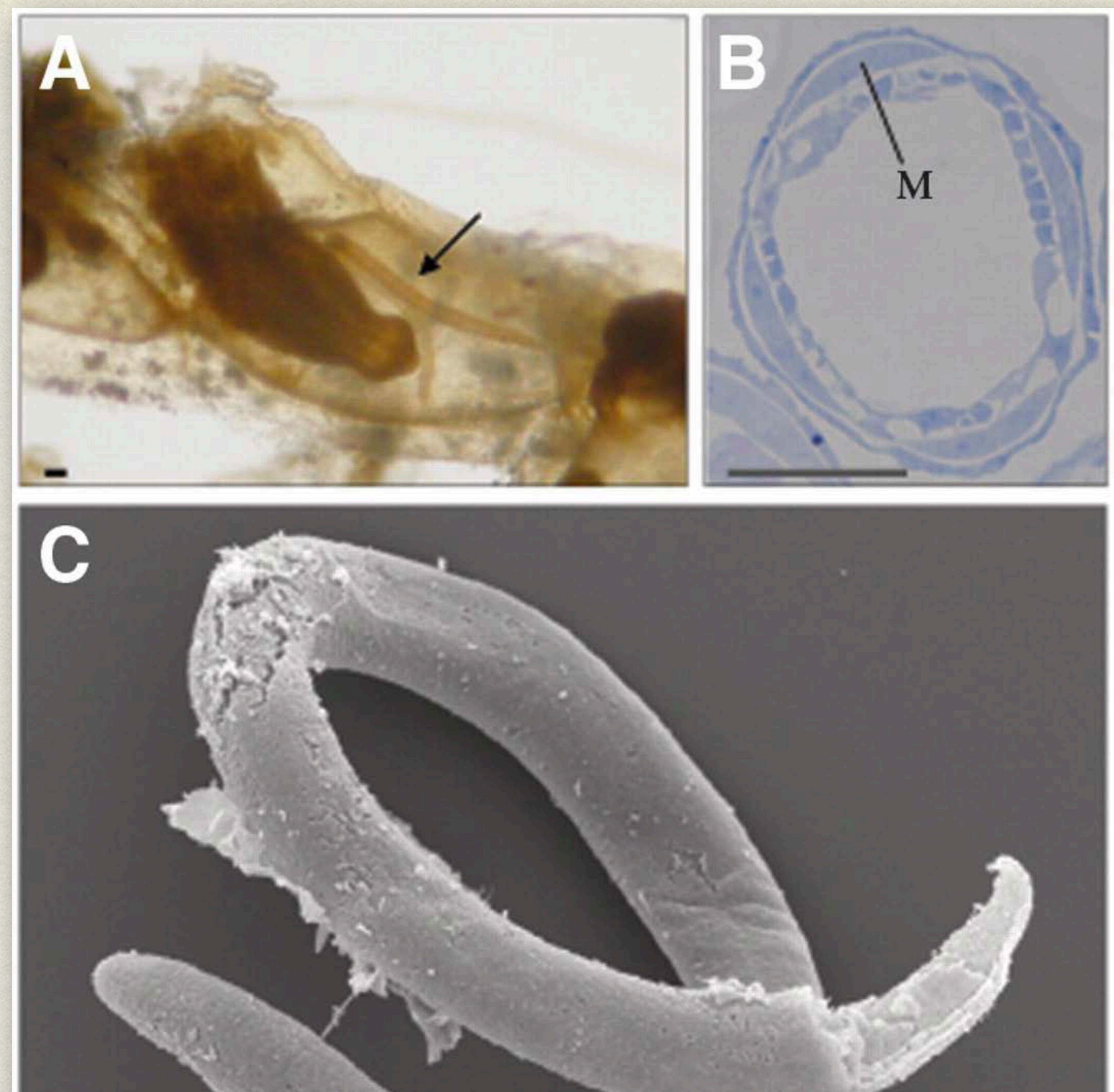
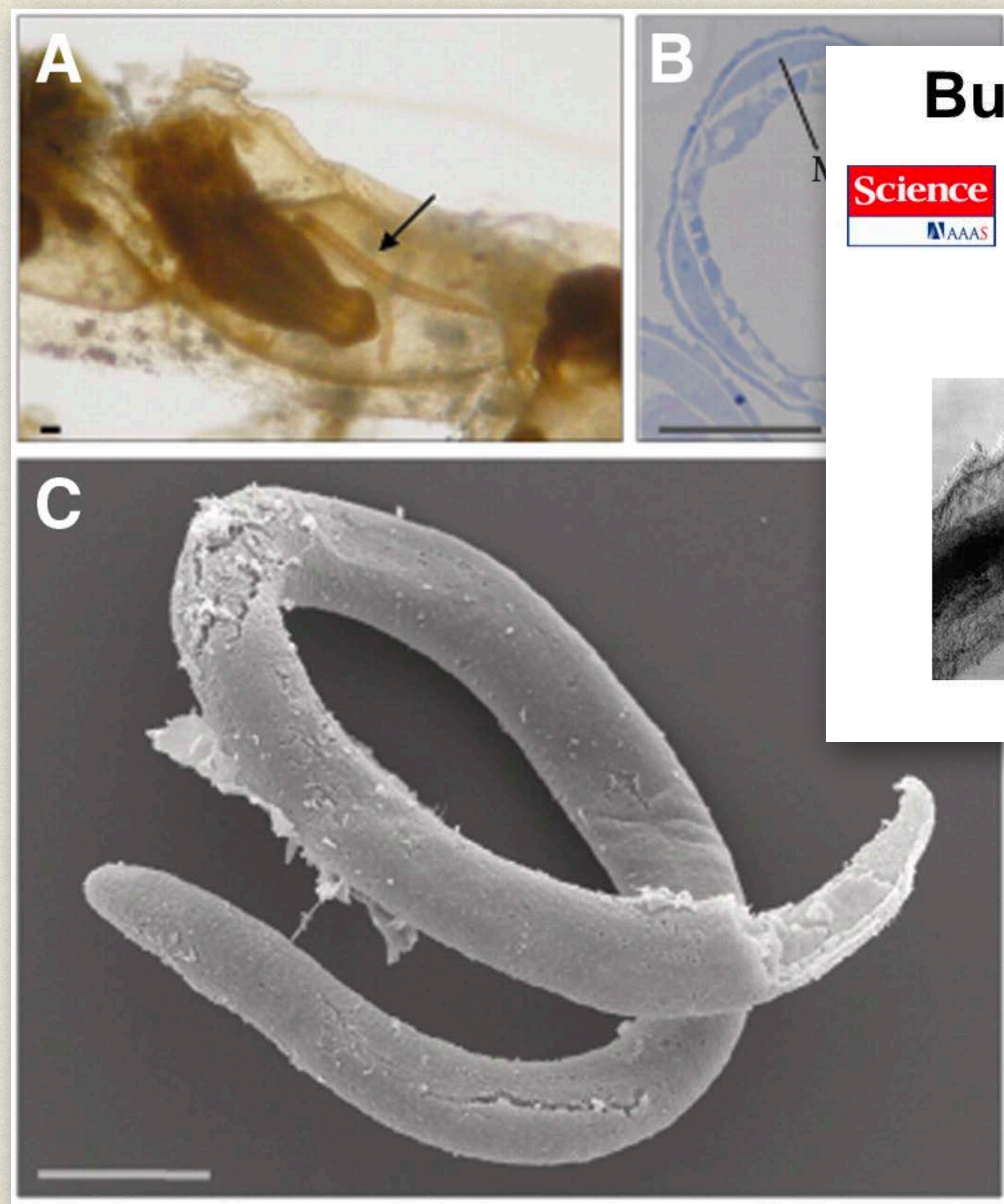


Non proprio!

SIMMETRIA RADIALE?



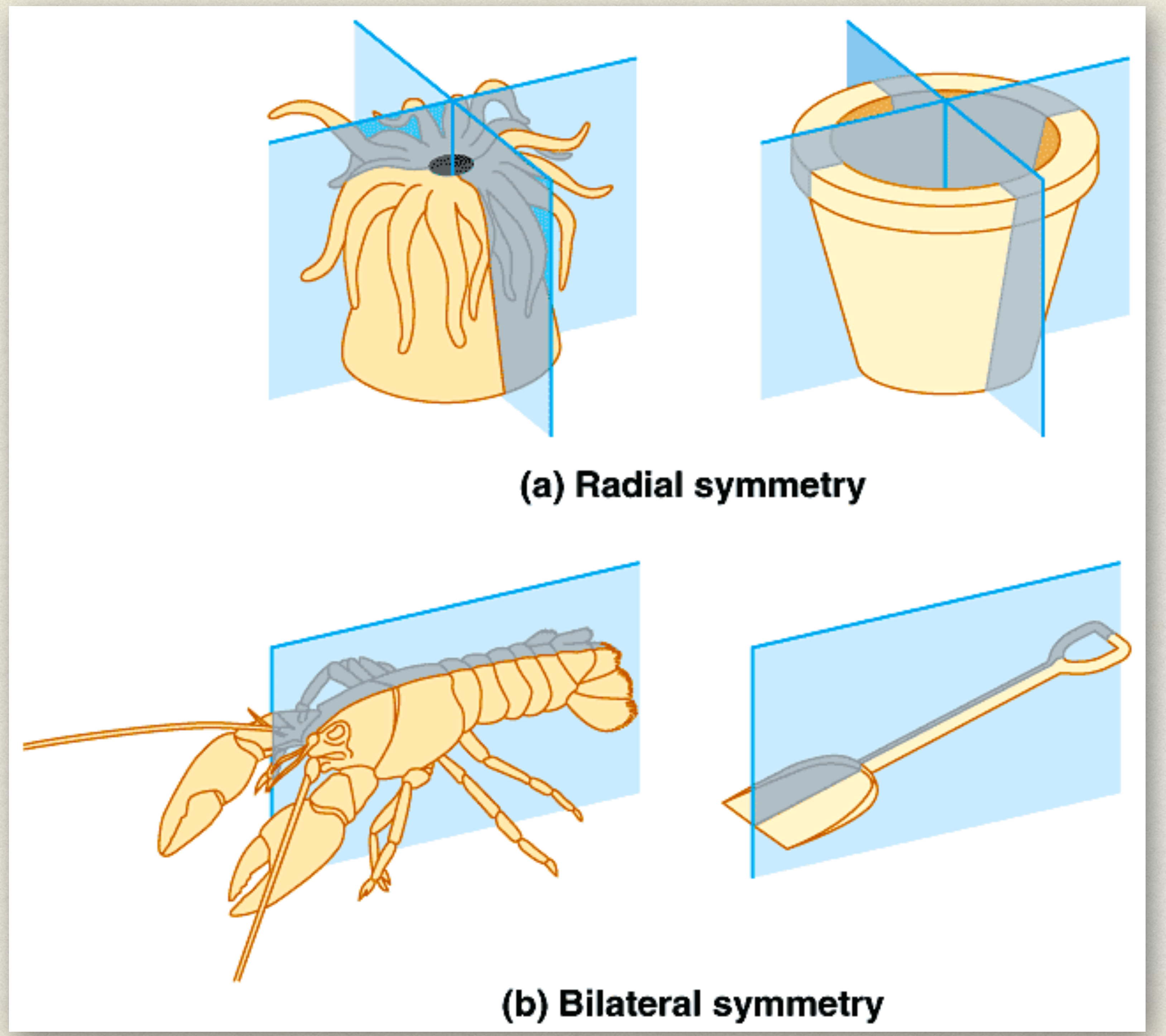
SIMMETRIA RADIALE?

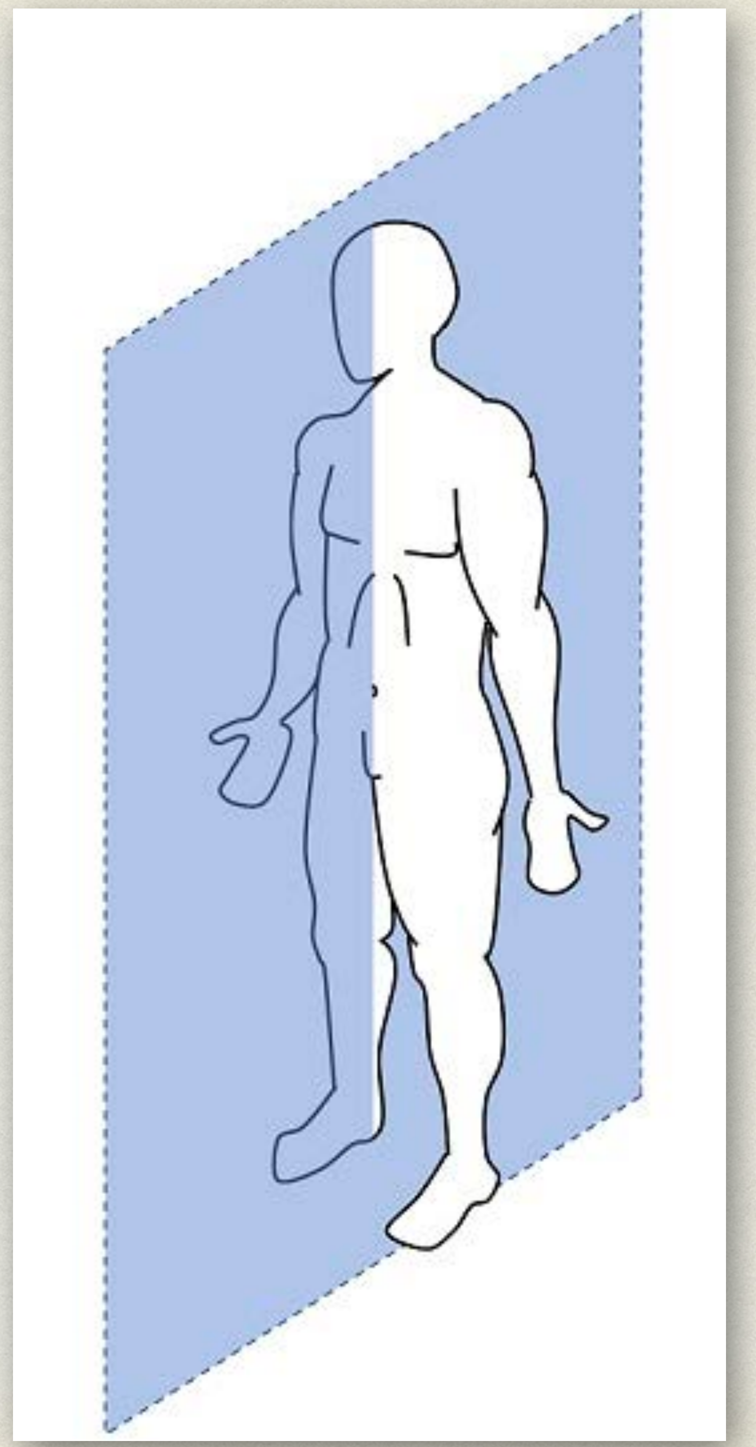


SIMMETRIA RADIALE

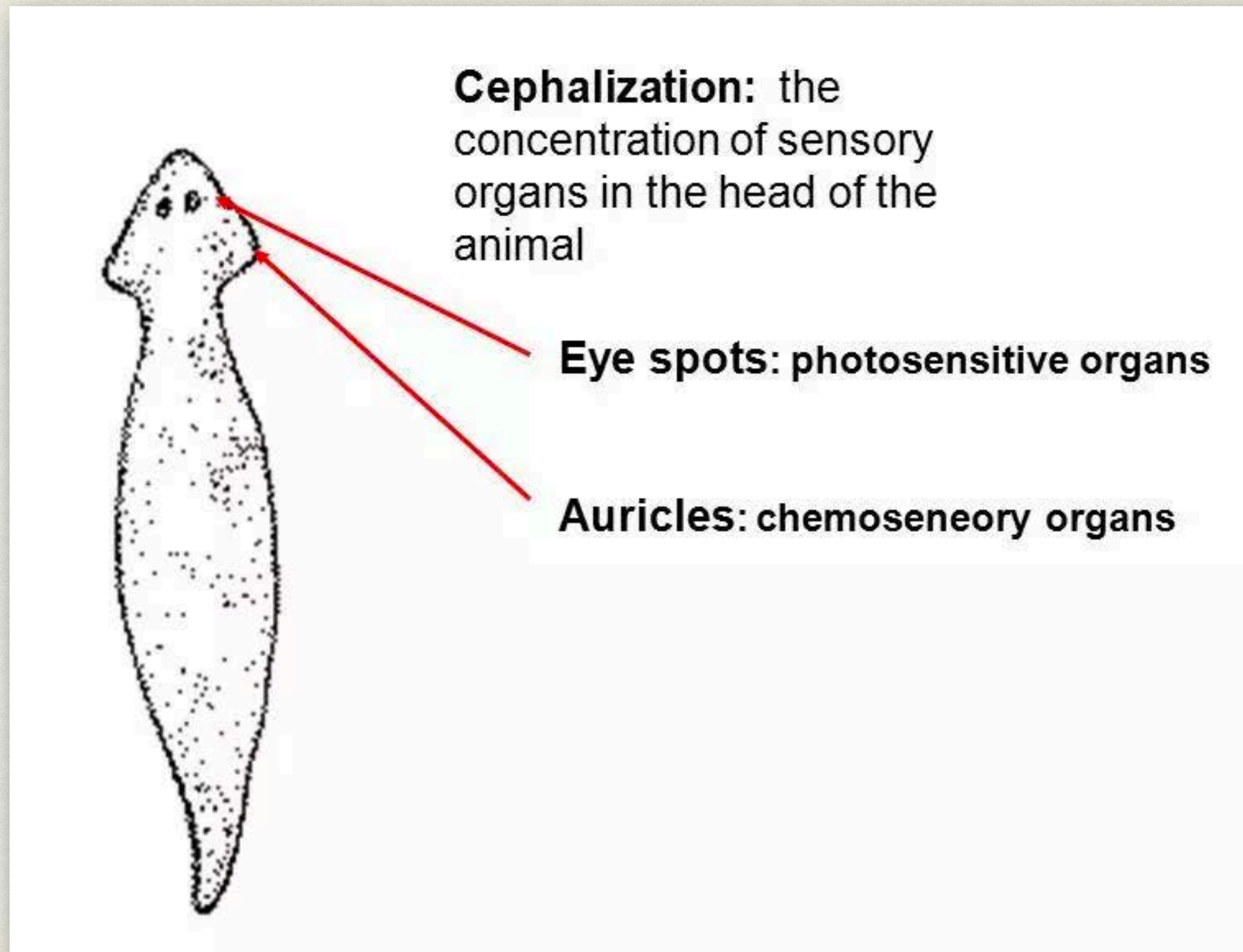
SIMMETRIA RADIALE

SIMMETRIA BILATERALE

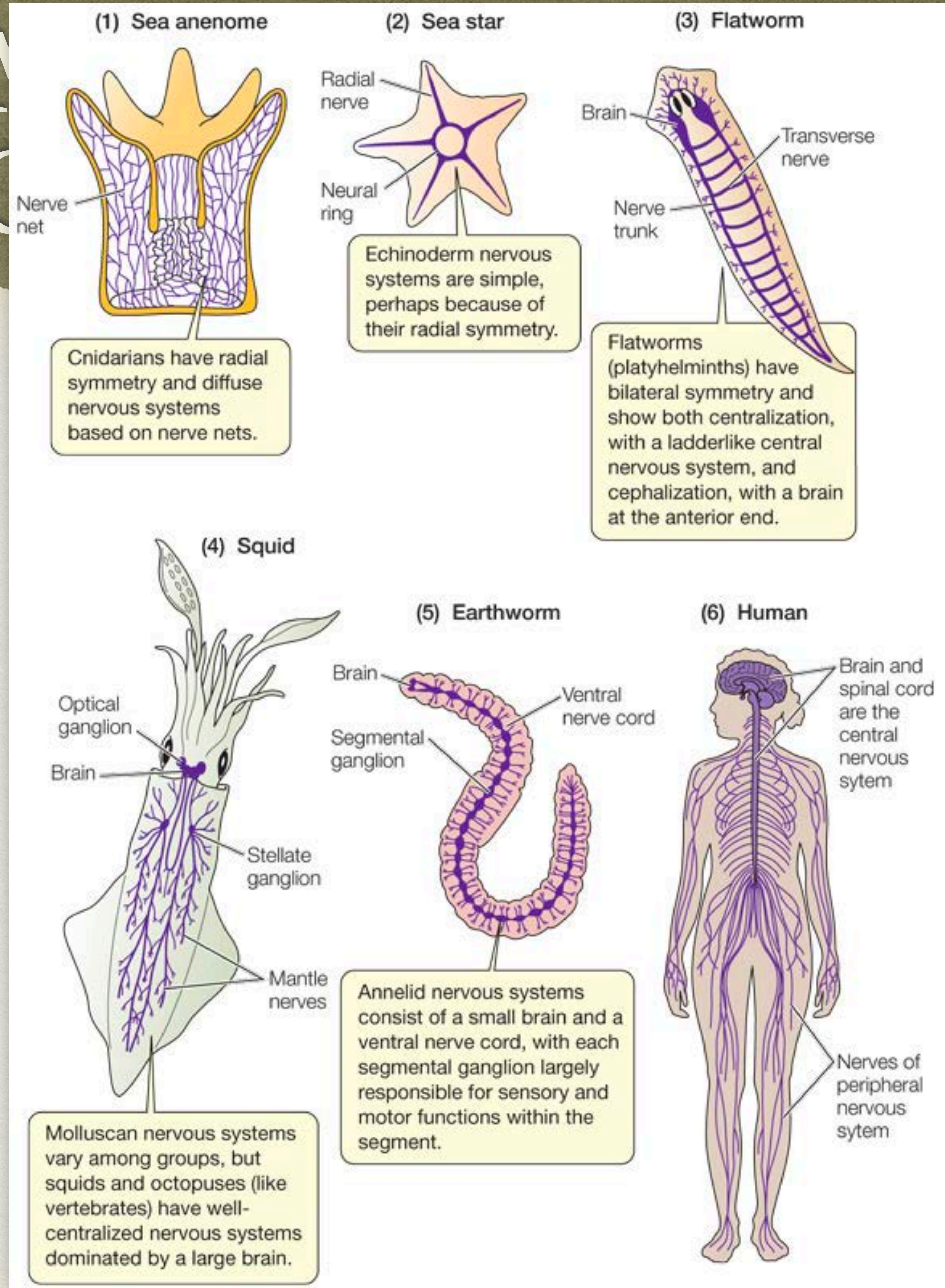




SIMMETRIA BILATERALE - CEFALIZZAZIONE -



SIMM RALE
- C E -



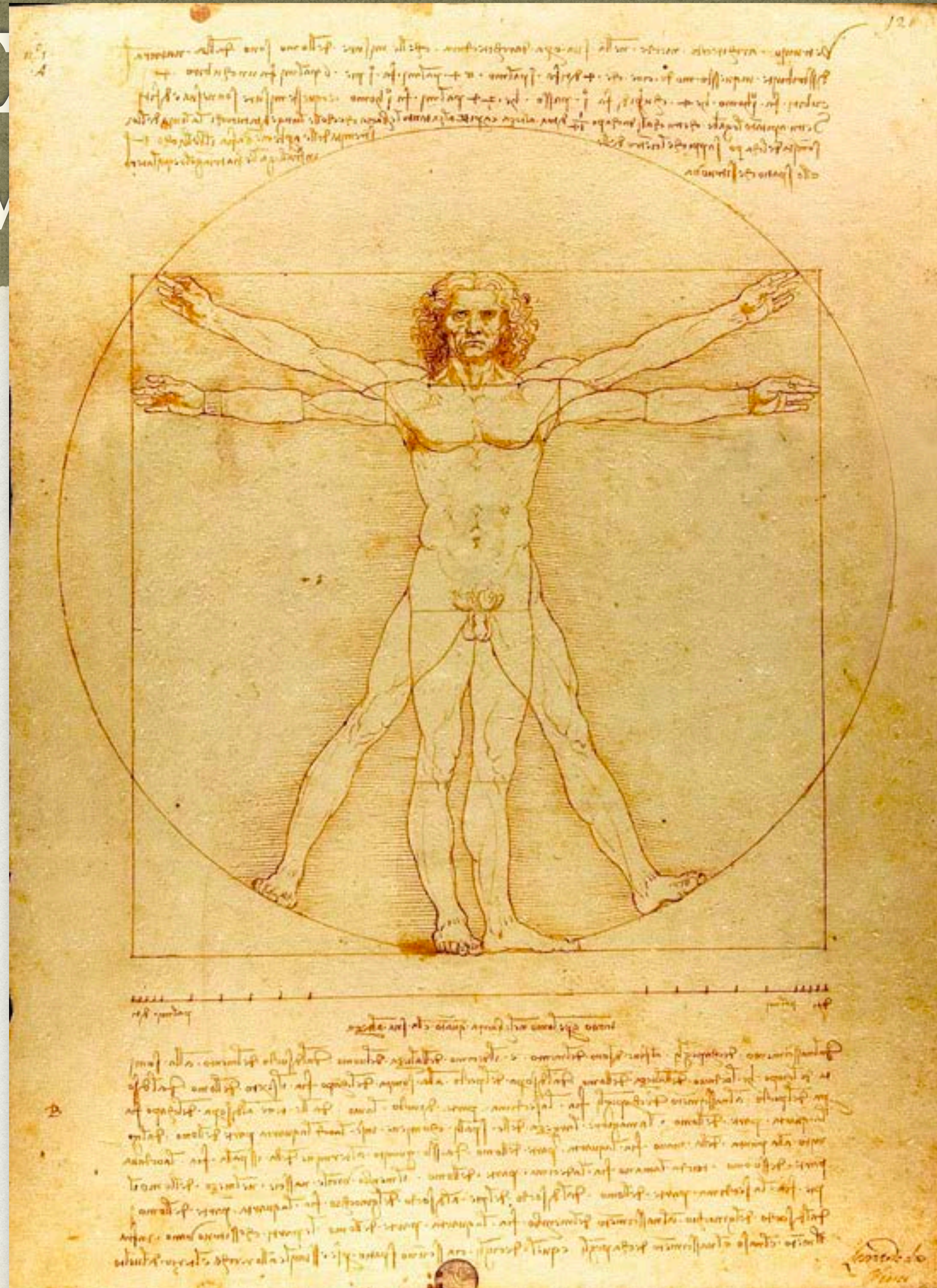
(1) Sea anenome
Nerve net
Cnidarians have radial symmetry and diffuse nervous systems based on nerve nets.
(2) Sea star
Radial nerve
Neural ring
Echinoderm nervous systems are simple, perhaps because of their radial symmetry.
(3) Flatworm
Brain
Transverse nerve
Nerve trunk
Flatworms (platyhelminths) have bilateral symmetry and show both centralization, with a ladderlike central nervous system, and cephalization, with a brain at the anterior end.
(4) Squid
Optical ganglion
Brain
Stellate ganglion
Mantle nerves
Molluscan nervous systems vary among groups, but squids and octopuses (like vertebrates) have well-centralized nervous systems dominated by a large brain.
(5) Earthworm
Brain
Ventral nerve cord
Segmental ganglion
Annelid nervous systems consist of a small brain and a ventral nerve cord, with each segmental ganglion largely responsible for sensory and motor functions within the segment.
(6) Human
Brain and spinal cord are the central nervous sytem
Nerves of peripheral nervous sytem

LA SIMMETRIA

Il 99% degli animali è a simmetria bilaterale

“PERFEZIONE” DELLA SIMMETRIA BILATERALE

“PE … LLA
SIMM … RALE



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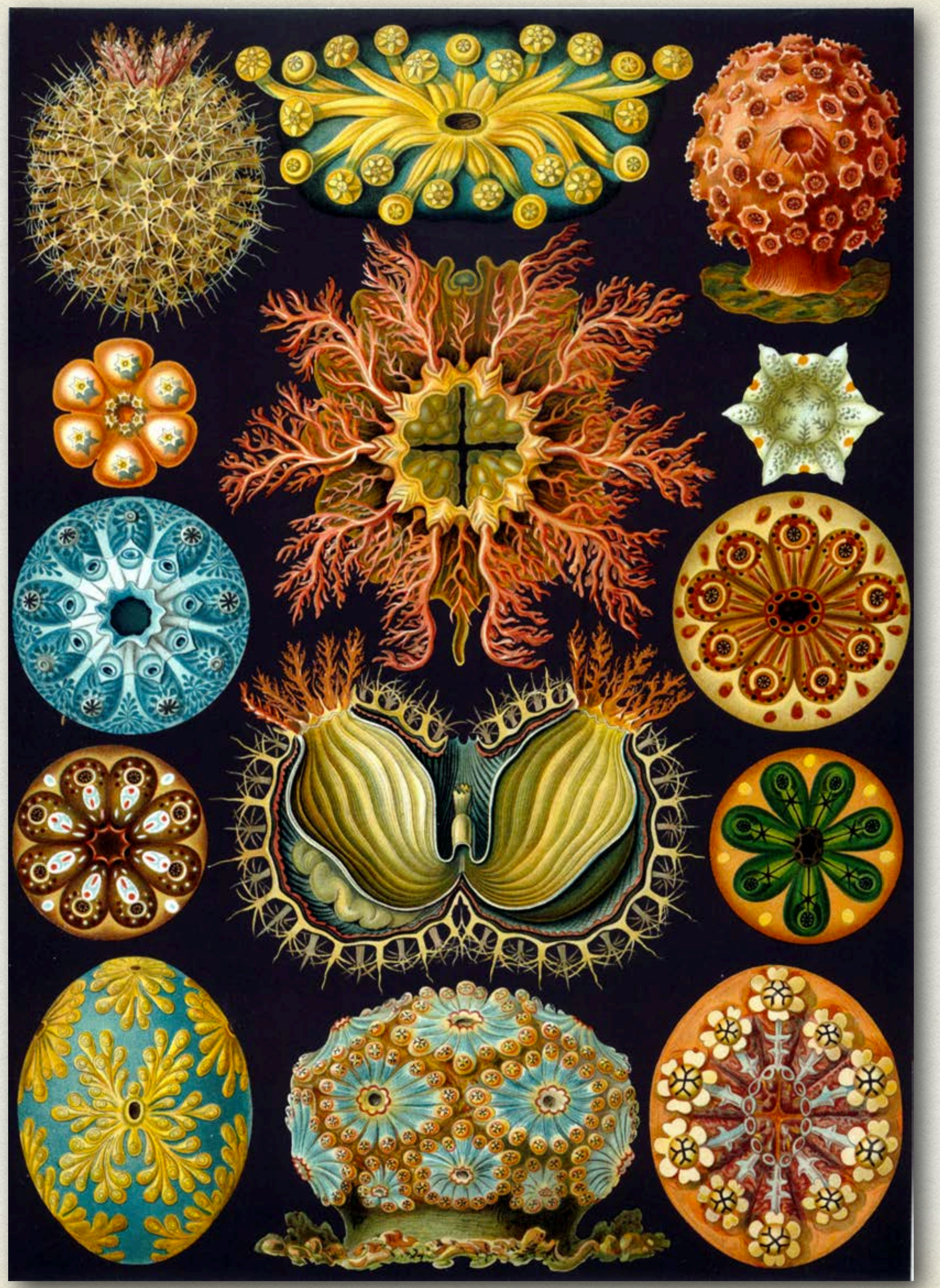

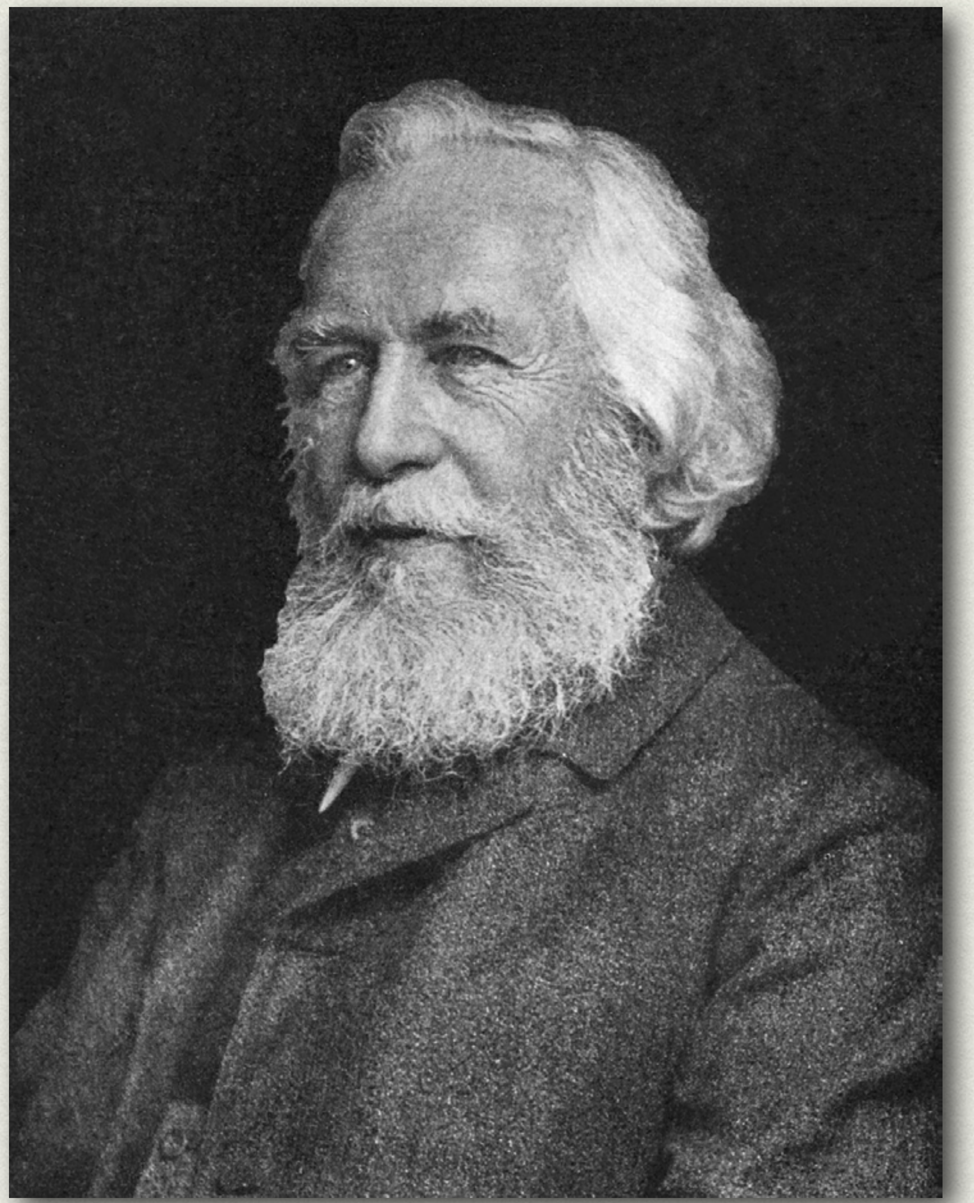

Ernst Haeckel

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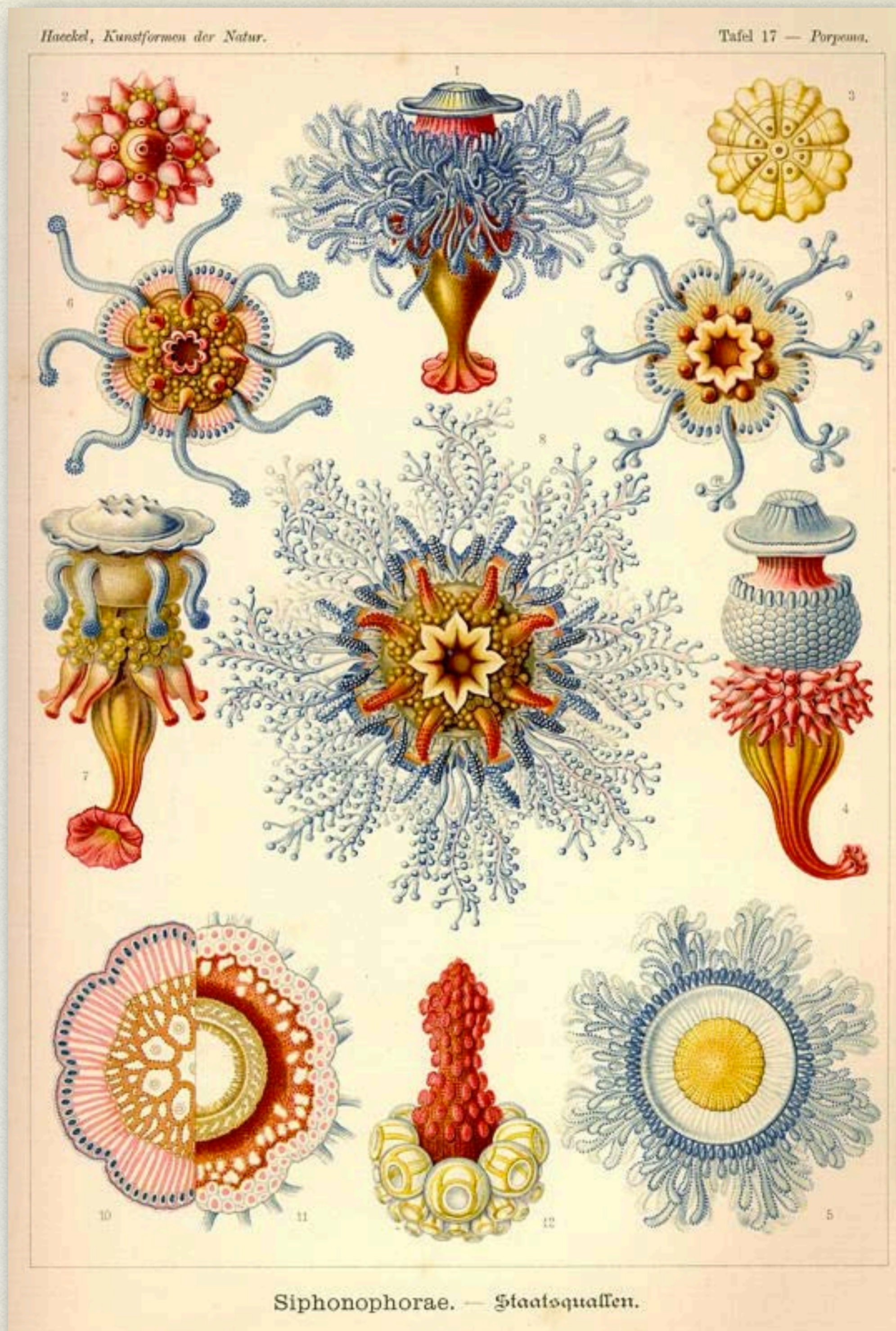

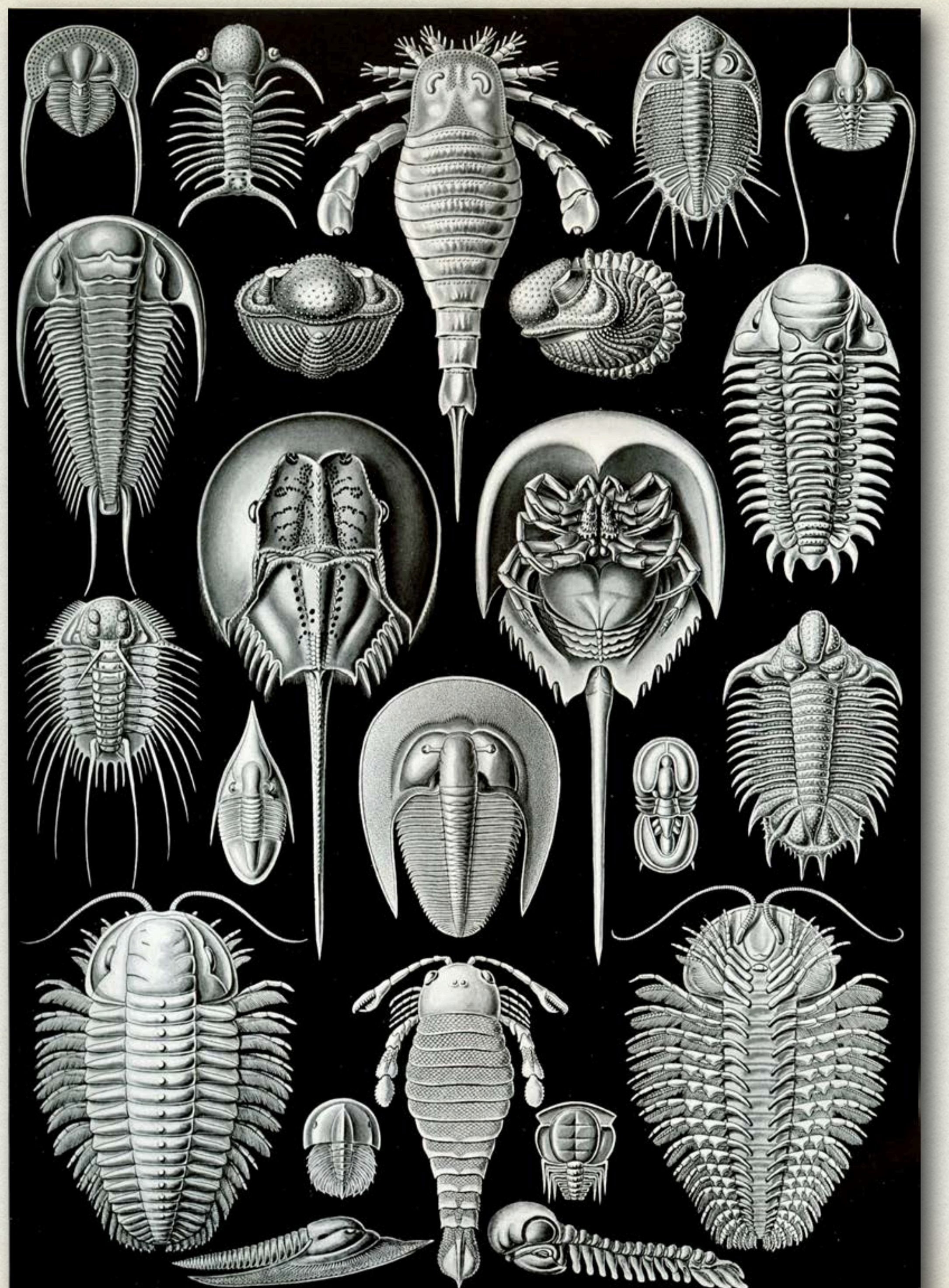

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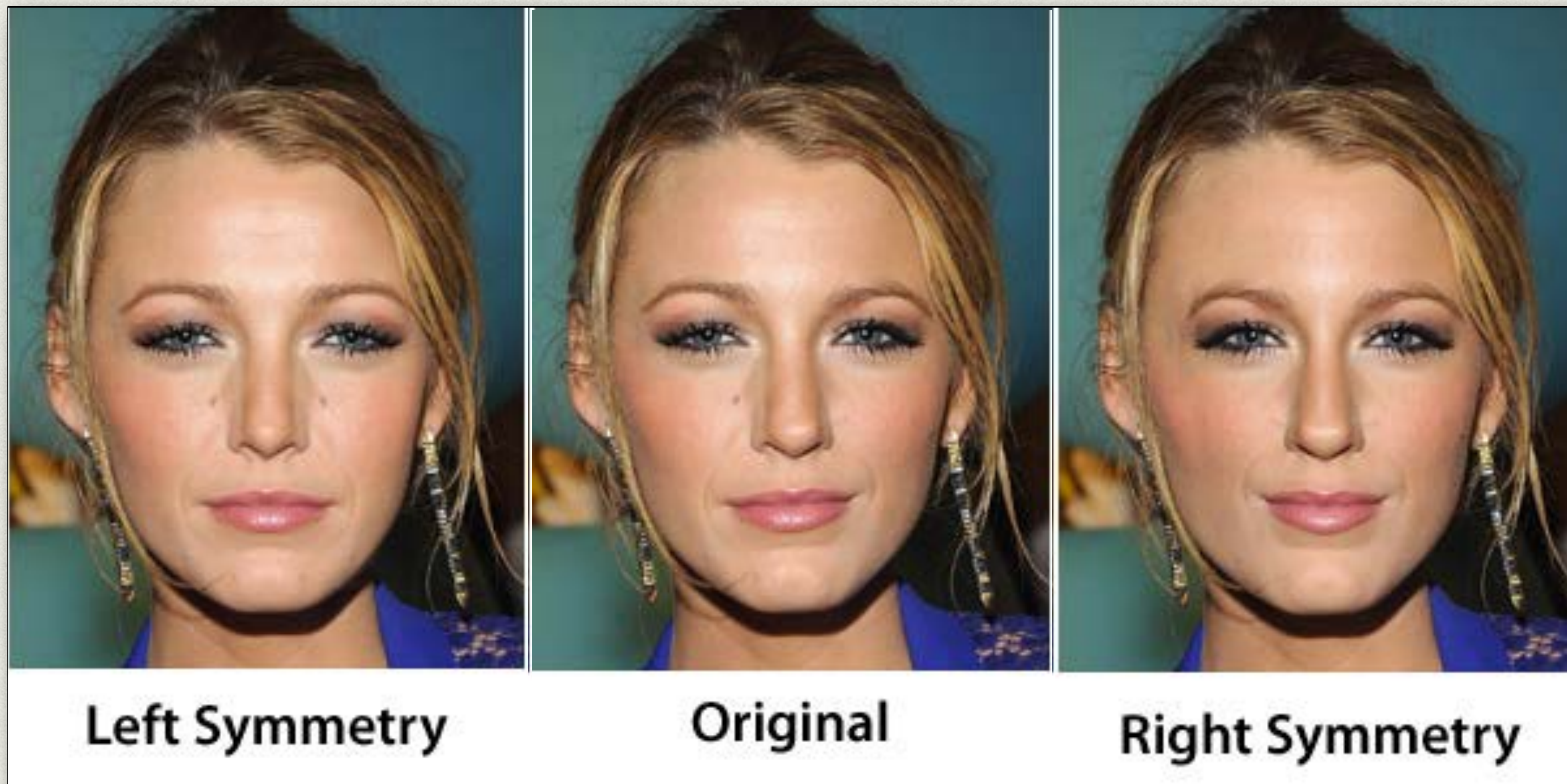

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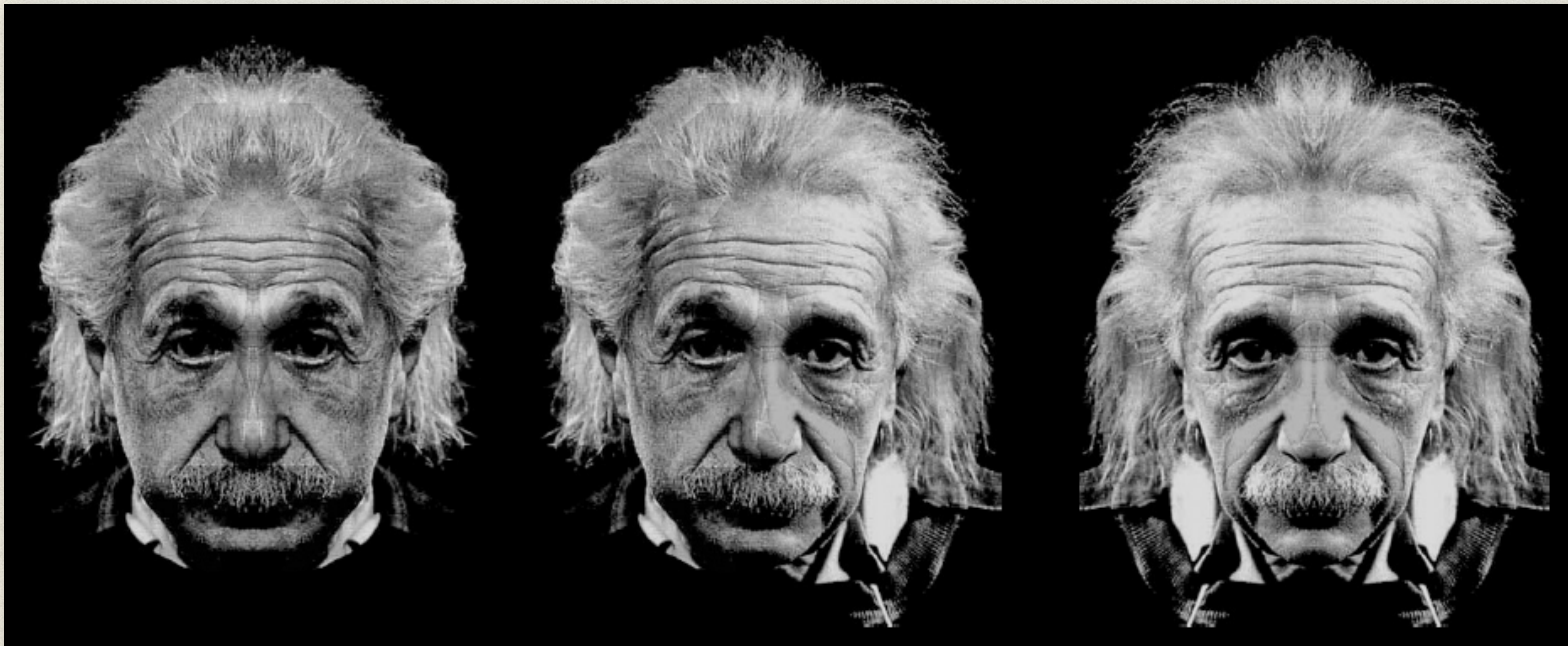

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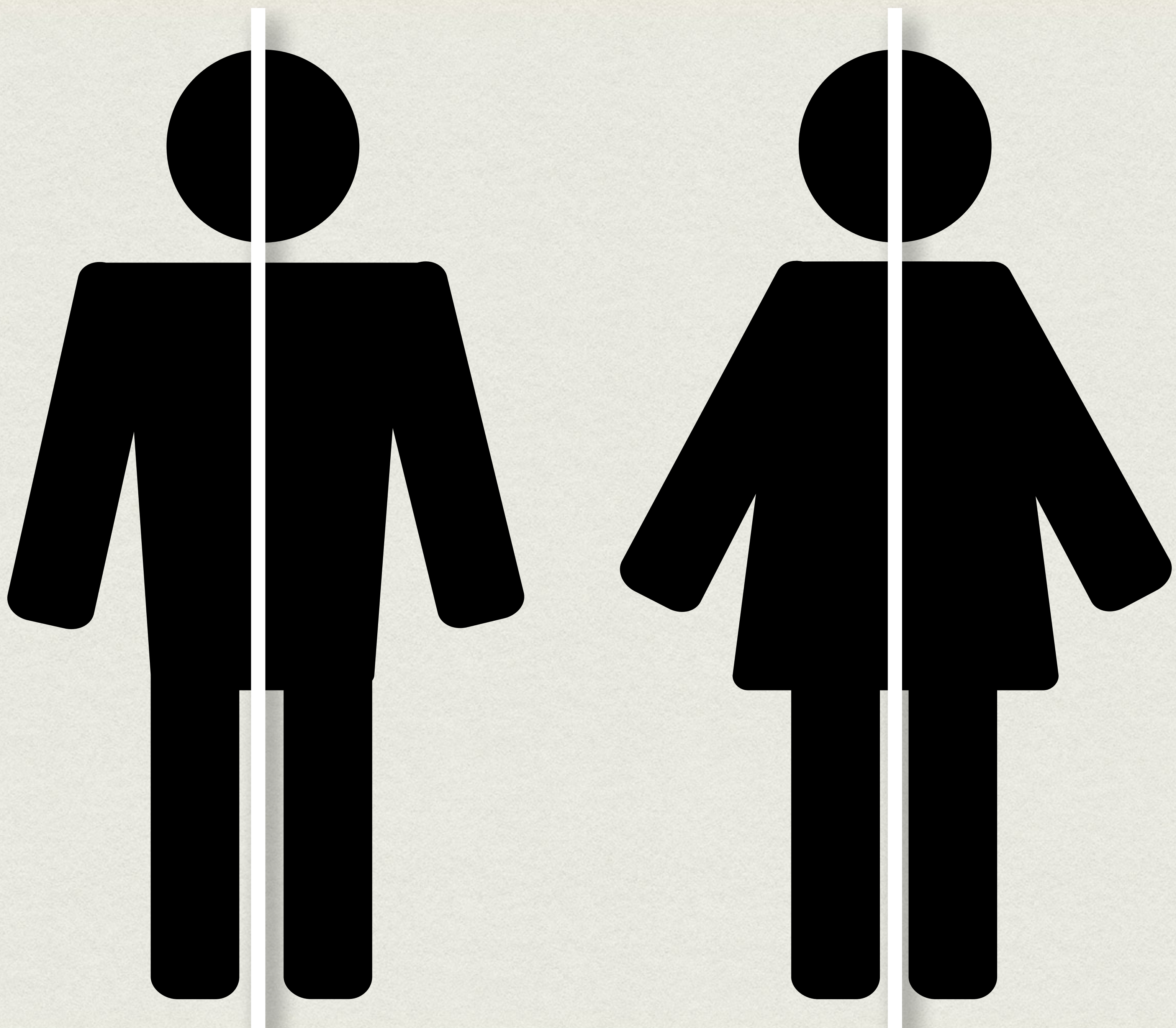

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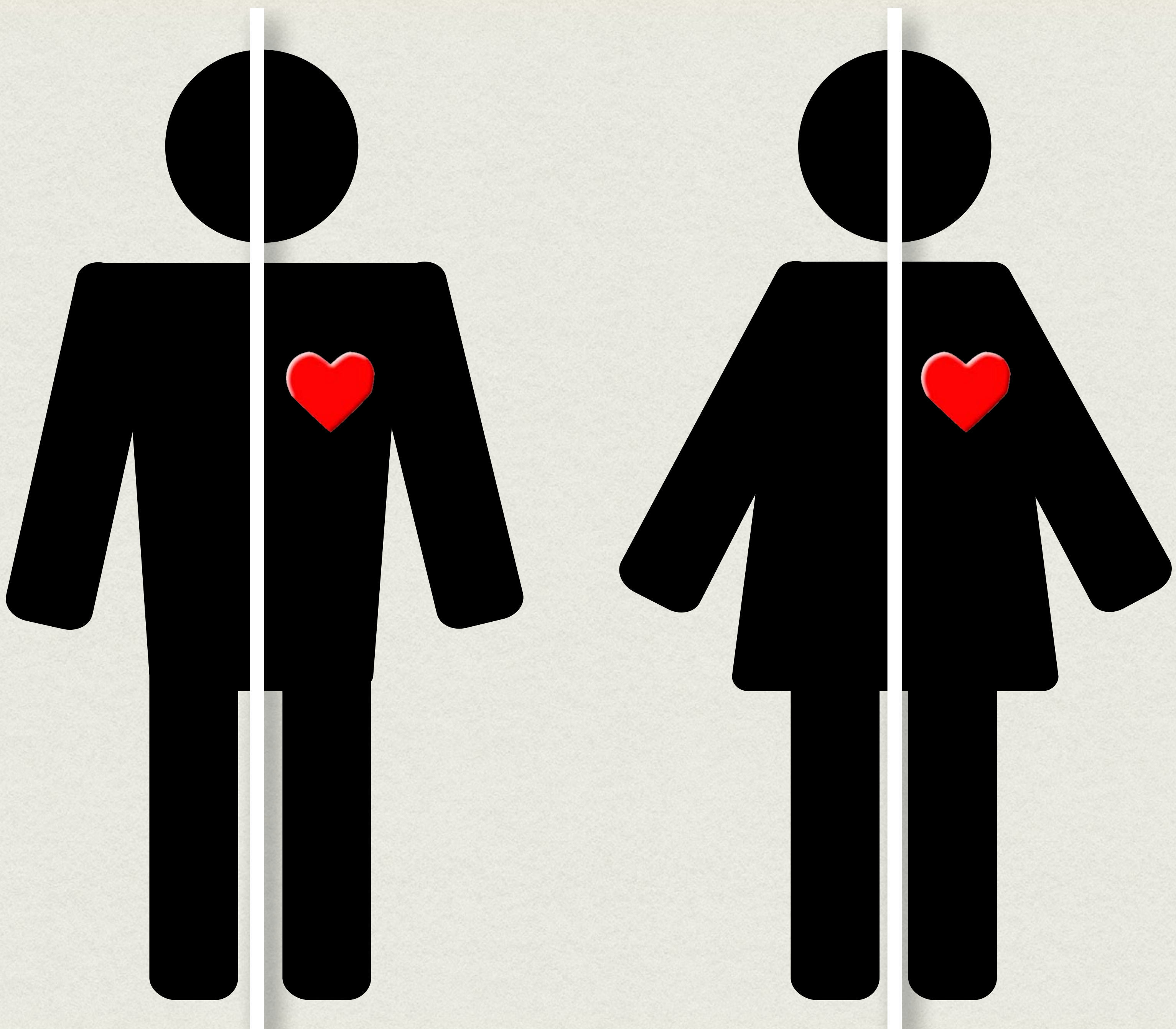

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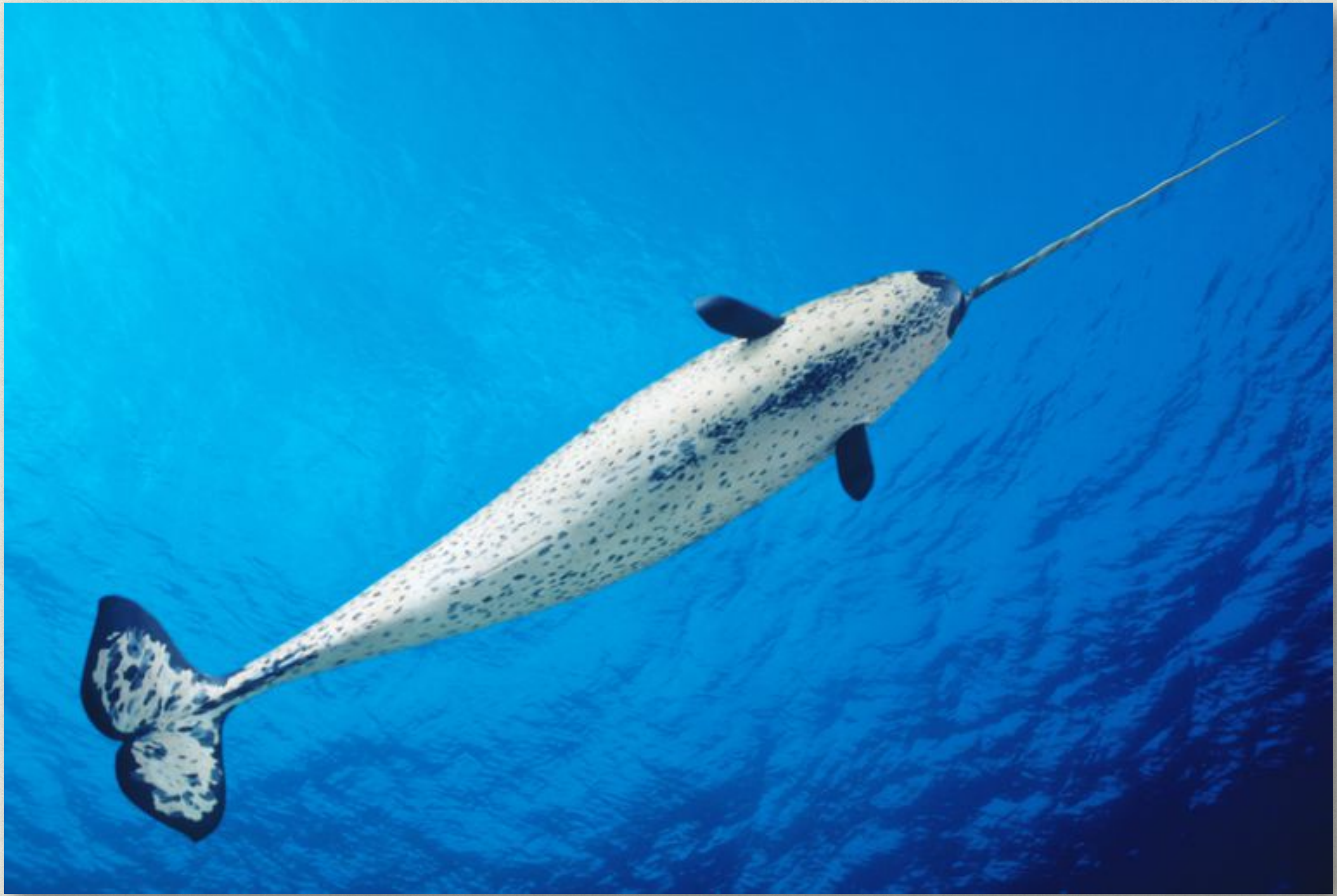
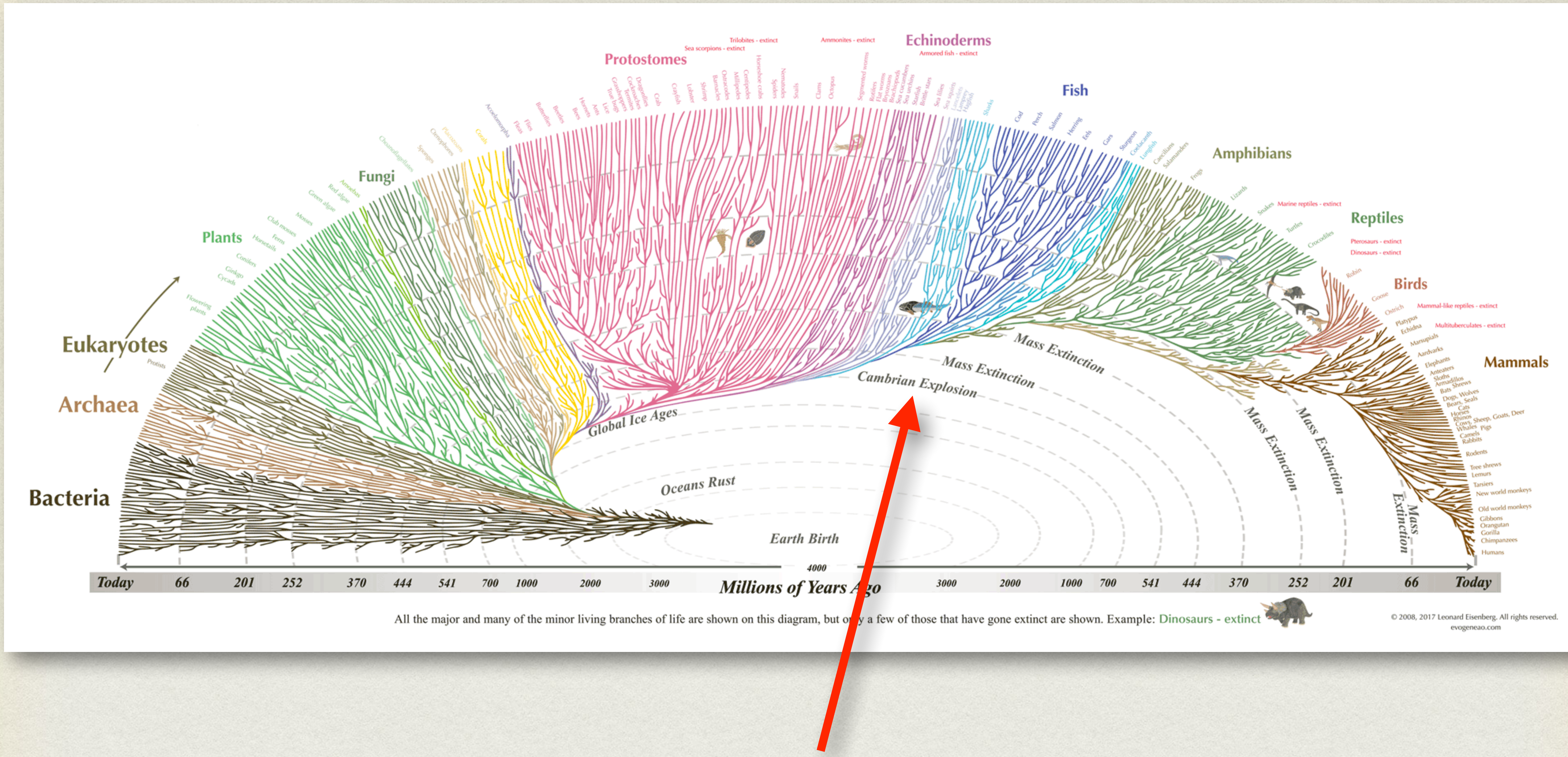


“PERFEZIONE” DELLA SIMMETRIA BILATERALE

SIMMETRIA BILATERALE E SELEZIONE SESSUALE

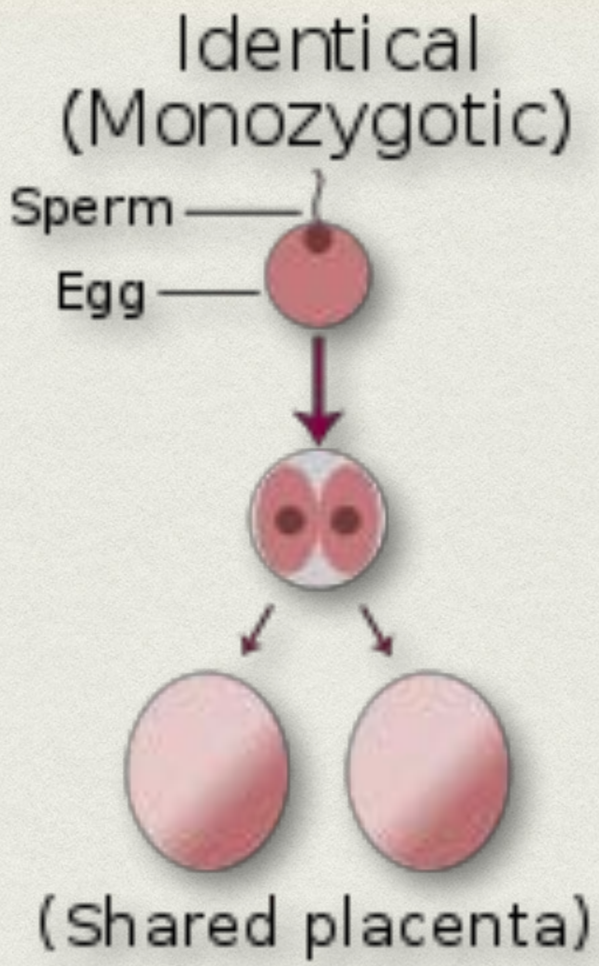
Females will choose symmetric males;
Males will thus display their symmetry

COMPARSA DELLA SIMMETRIA BILATERALE



LA SIMMETRIA

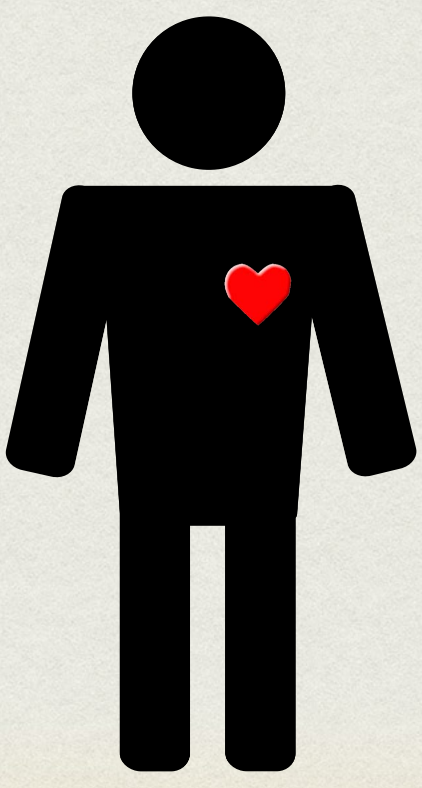
LA COMPARSA DELLA SIMMETRIA BILATERALE



LA COMPARSA DELLA SIMMETRIA BILATERALE

Studio delle asimmetrie

Asimmetria direzionale



Asimmetria casuale

LA COMPARSA DELLA SIMMETRIA BILATERALE

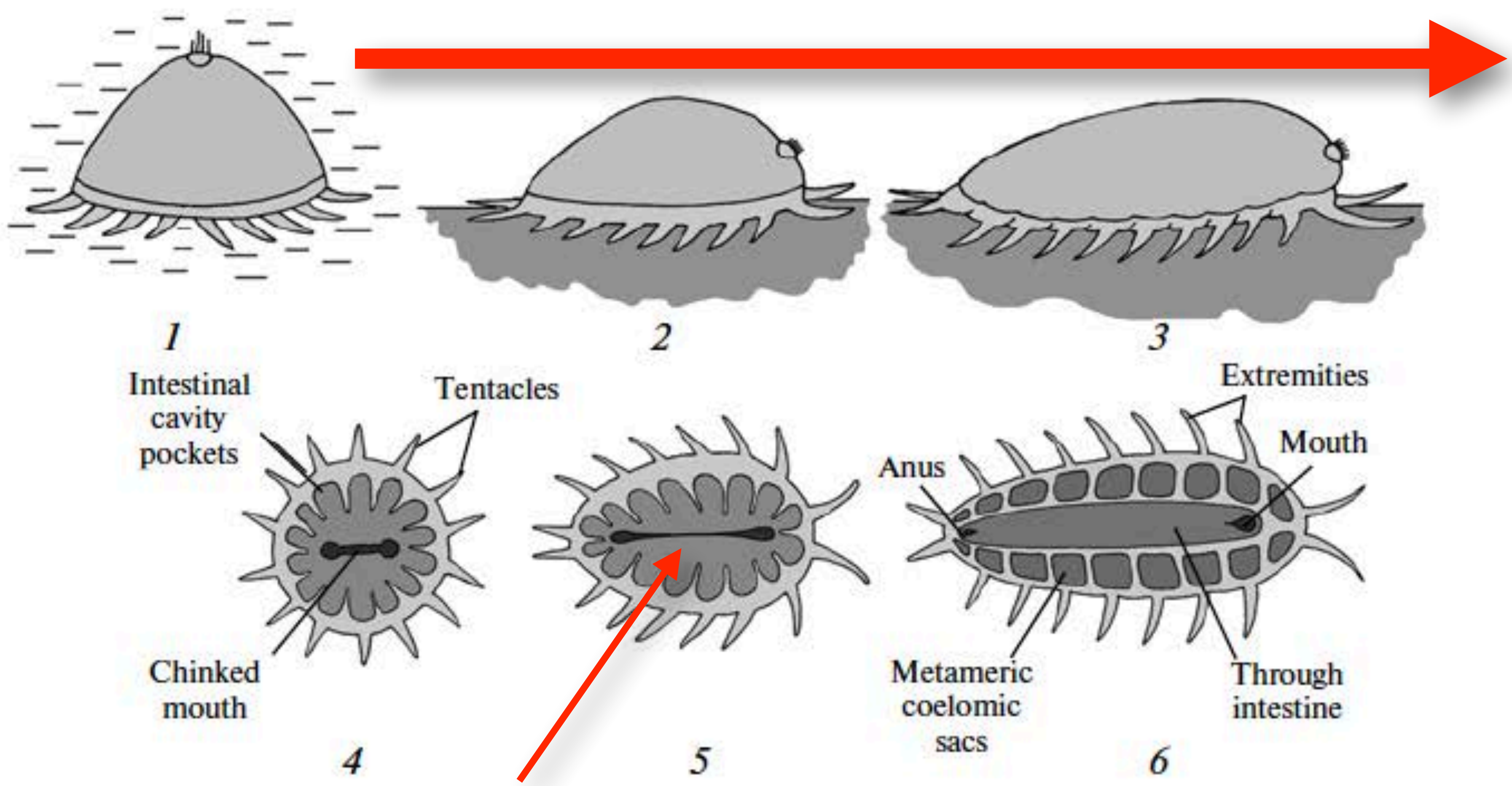
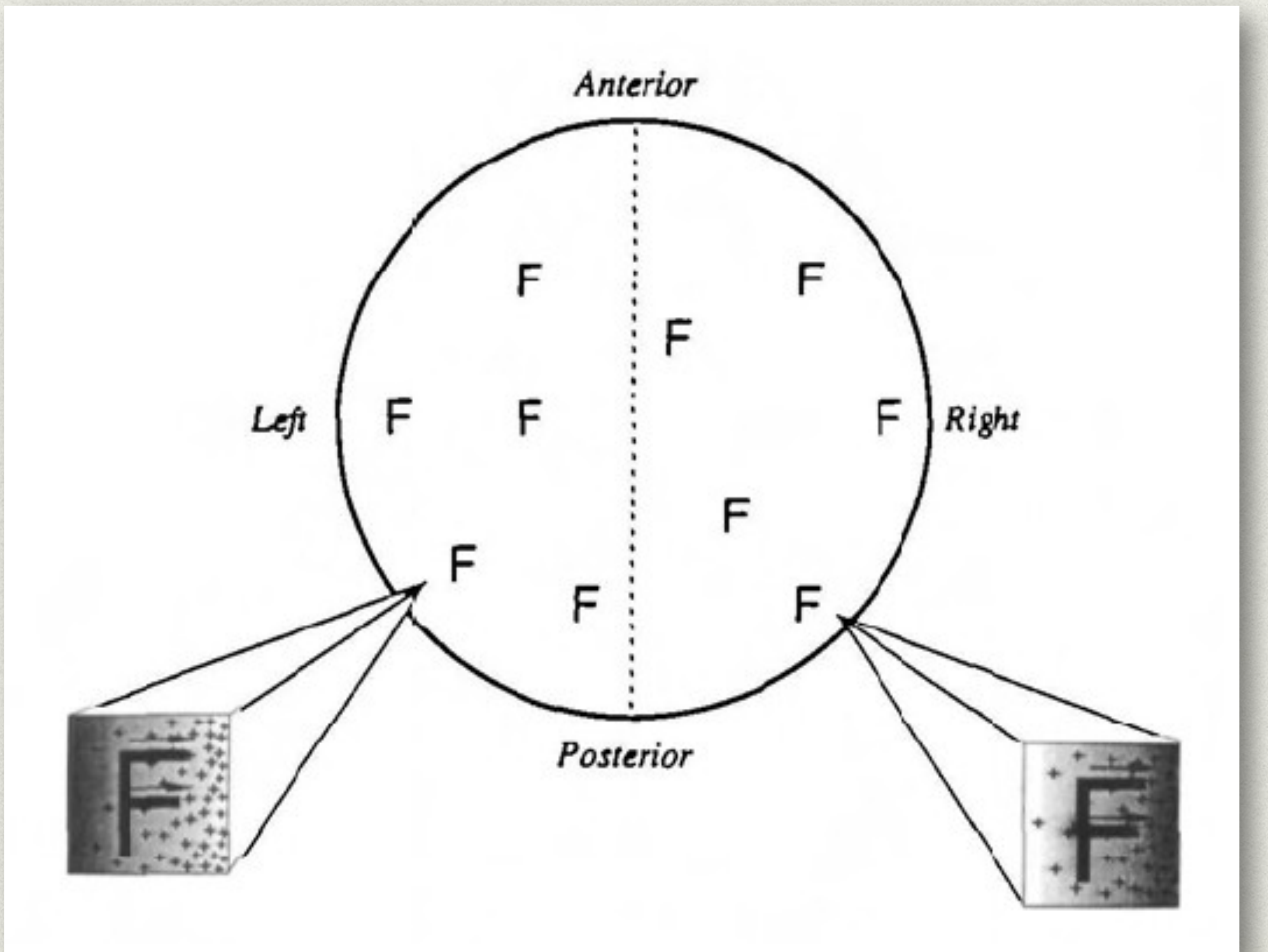


Fig. 2. The most likely path of origin for bilaterally symmetrical animals.
(*1*) Pelagic radially symmetrical ancestor (side view); (*2*), (*3*) formation of bilaterian symmetry in a mobile bottom-dwelling ancestor (side view); (*4*) radially symmetrical ancestor (mouth-side view); (*5*), (*6*) formation of the through intestines and the metameric coelom (mouth-side view).

LA COMPARSA DELLA SIMMETRIA BILATERALE

What is the first event defining orientation?
Idea of the existence of a chiral molecule (**'F molecule '**)



LA COMPARSA DELLA SIMMETRIA BILATERALE

HYPOTHESIS

Demystification of animal symmetry: symmetry is a response to mechanical forces

Gábor Holló

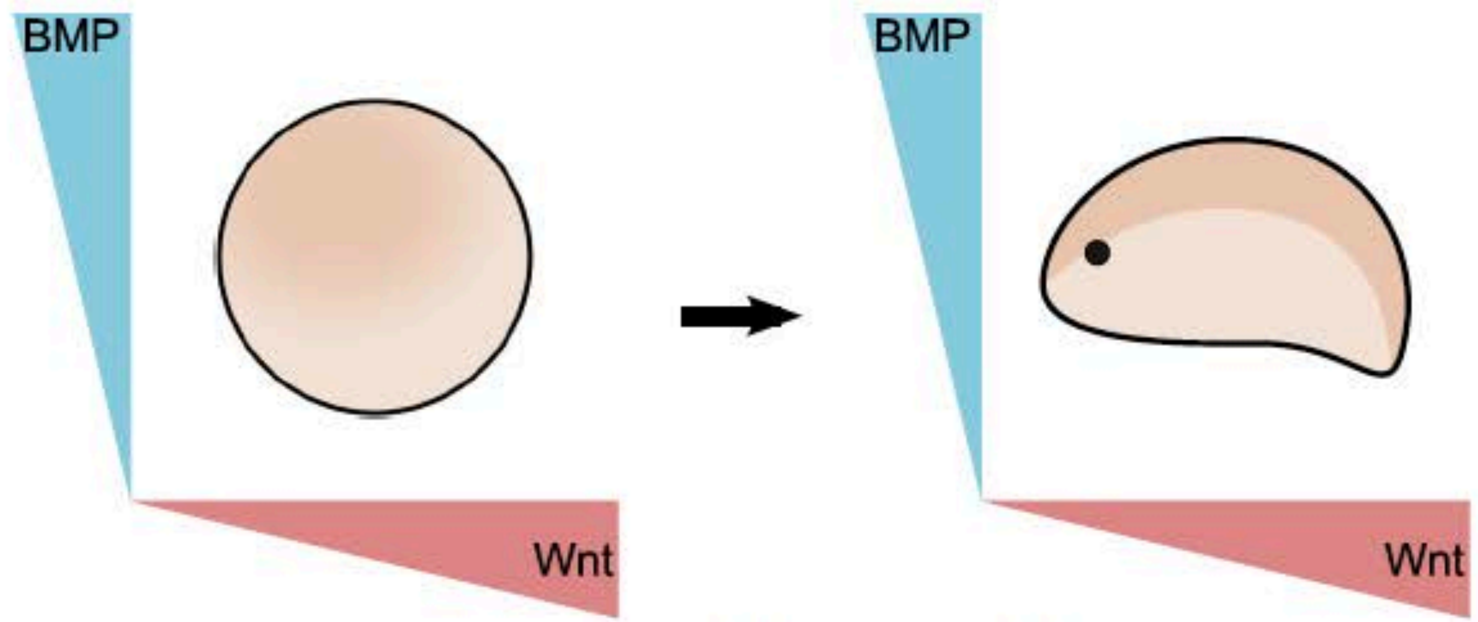


Fig. 2 The bilaterally symmetrical body plan of most animals is generated by two, perpendicularly acting diffusible morphogen gradients: Wnt and BMP. The figure has been inspired by Fig. five of [5]. Note that the BMP gradient is oriented in the opposite direction in chordates

GRAZIE PER L'ATTENZIONE!

GRAZIE PER L'ATTENZIONE!