

Tubes

Rule OK

In the last issue of ROLF LINES, we looked at how our microstructure is comprised of three networks of interwoven cylinders. This time we shall keep the concepts of “three” and of “tubes”, but consider now our macrostructure.

It is easy to see how the tubes got to #1 with a bullet as the preferred shape for an organism. It allows a near-maximum number of cells to be on the surface, with access to the sea. This shape also defines an inside space which can be easily closed-off at either end by sphincters. Waves of circumferential muscular contraction along the axis produce a peristalsis to move water and food through the tube. Or modified (as in *The New Squids on the Block*) to move the organism itself through the sea. All the cells live better as a result of the cylindrical shape, and the genotype survives: an evolutionary success!

Phylogenetically, The Tubes made the charts early and have had several hits on the Top Ten ever since. Even some single-cell diatoms have a cylindrical shape but nearly *every* multi-cellular form bases itself around a tube. The flatworms and segmented worms, the echinoderms and arthropods, even the mollusks, all represent different design solutions to the problem (sorry, it's been a hard year: “opportunity”) of staying alive. Yet, every one of them is merely a complicated hydra. Every one of them—to use Walter Cannon's famous description of Man—is “something built around a gut”. A tubular gut.

Ontologically, a tube is also easily arrived at. Every multiplying sphere of cells, whatever the eventual organism, soon invaginates to form a blastula, a double-layered hollow sphere with an opening at one end. Although an organizational structure with one opening is conceivable (our respiratory system, for example, uses one opening for entrance and exit), great efficiency and diversity of function are achieved by merely opening the opposite end of the sphere to form a tube.

However, if you look a little further down the embryological road, the gut is not the only cylindrical core we have. The multitudinous folding and re-folding of tissues in the unfolding of the human being produces *three* cores, all tubular:

As the mesoderm folds around the ectoderm, about twenty days into development, it rolls the ectoderm into a tube. The hollow part of the tube will later define the brain's ventricles and the spinal canal, conduits for the cerebro-spinal fluid, while the now cylindrical ectoderm forms the brain and spinal cord. The mesoderm also rolls around the endoderm, forming the tube of the gut.

The mesoderm also forms a cylinder within itself, the notochord, a flexible cartilaginous tube filled with colloidal pulp. Sections of this tube specialize into the hardened bodies of the vertebrae, leaving the discs between. So, the soft-tissue discs are more fundamental than the vertebrae, and they are remnants of an ancient, primary structural cylinder!

Notice that each tube is surrounded by its own connective tissue cover. The endodermal tube is surrounded by a double layer consisting of the peritoneum mesentery and intestinal tunic, which have similar extensions around the more northerly mesodermal viscera of heart and lungs. The central nervous tube is surrounded by the entire dura mater, and we all must know what that means by now! Even the spinal discs and bodies are gripped or caressed in the surrounding longitudinal ligaments.

Considered in this light, the speno-basilar junction becomes an even more interesting place, one where the three cores come together: the function itself is the topmost element of the mesodermal core—in a way, the topmost disc. There the pharyngeal raphe attaches the gut-core from underneath, and the tentorium and hypothalamus-pituitary, central elements of the neural core, sit on top. Behind the nose is a critical organismic center. (Ok, now watch somebody start a new school based on this idea.)

So the next time you “go for the core”, pause and consider *which* tubular core you are affecting and how it in turn might structurally affect the others. Then again, The Druid promised no practical applications, so don't bother.

Next time: More cylindrical hits, Tube fans!

— The Druid