The role of muscle contraction to generate pulsatile flow in the canals of the jellyfish, *Aurelia aurita*

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We are investigating the role of pulsatility in the formation of loops in networks. Many models explain the formation of branched networks, but only few can explain reticulated ones. Some theoretical investigations show that the reversal of flows favors the presence of loops. Here the question is to look if pulsatility affects morphogenesis and supports the presence of loops in vascular networks of biological systems. We will use Aurelia jellyfish as an experimental model (Figure). The scyphozoan jellyfish Aurelia belongs to the cnidarian, which is an ancient phylum considered a sister group to all bilaterian animals, including mammals. Common mechanisms found in jellyfish and mammals will highlight their universality possibly applying to their common ancestor and it descendants.

We hypothesize that besides the movement of cilia in the canals, the pulsatile flow in the canals of Aurelia jellyfish is generated by squeezing of the deformable canals by the swimming muscle.
To that end we want to quantify the swimming movements and the deformability of the canals in jellyfish Aurelia aurita to better understand how the squeezing of the canals impacts the flow.

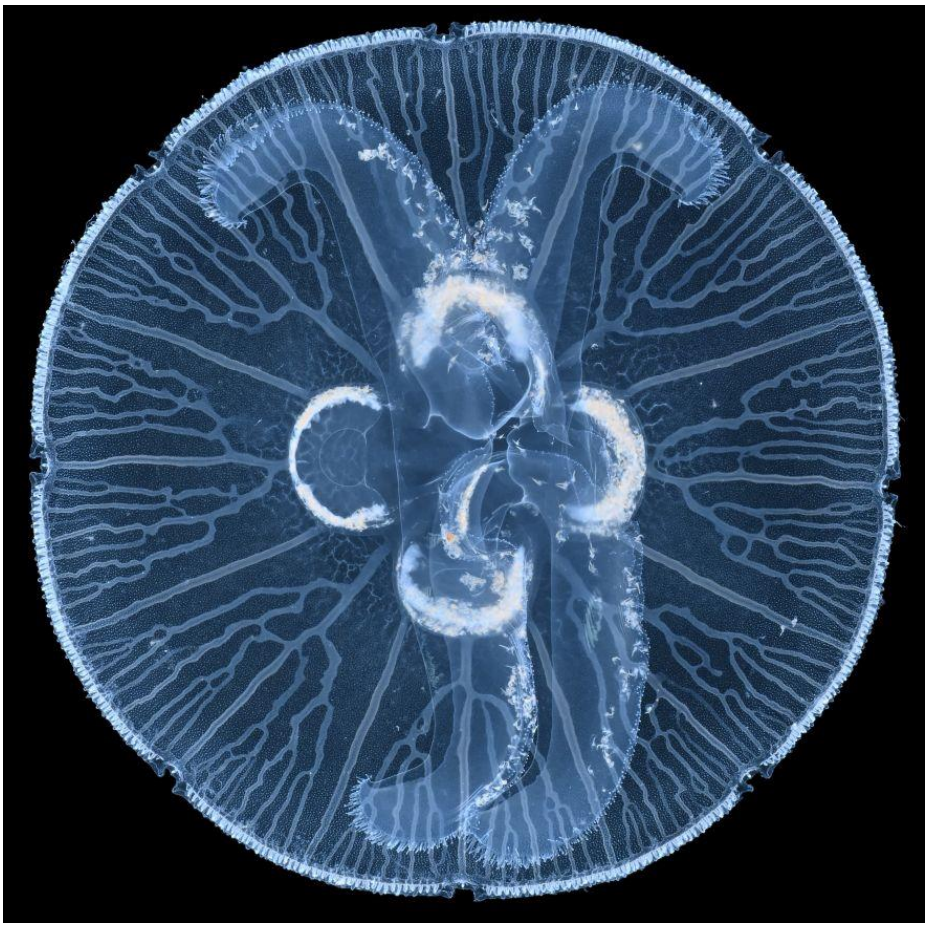

Figure 1 the jellyfish Aurelia auria and it gastrivascular canal network