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Ontogenetic propulsive transitions from viscous to inertial flow regimes in the medusae *Sarsia tubulosa* KAKANI KATIJA, HOUSHUO JIANG, Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution, SEAN COLIN, Environmental Science, Roger Williams University, JOHN COSTELLO, Biology, Providence College — Among marine organisms, the influences of flow regimes on swimming strategies are largely unknown. As an approach to examine this issue, we quantified how transitions from viscous to inertially dominated flow regimes, which commonly occur during the development of marine animals, relate to changes in swimming strategies. We used the hydromedusae *Sarsia tubulosa* as a model organism for this investigation because its morphology and propulsive actuation mechanism are radially symmetric. This feature allows for determination of three-dimensional fluid quantities from two-dimensional flow measurement techniques. Digital particle image velocimetry was used to quantify the flow fields created by free-swimming hydromedusae and calculate the impulse generated by their swimming pulses at different life stages. Swimming strategies were evaluated by quantifying the relationship between impulse production and hydrodynamic swimming efficiency. Utilizing these metrics enable us to generalize our findings to the swimming strategies of other aquatic animals that swim in similar fluid regimes.

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