Cytoplasmic actomyosin contractions drive streaming in zebrafish eggs

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At the onset of zebrafish development, the egg is composed of a mixture of yolk granules (the food supply for the future larva) and cytoplasm from which the embryonic tissues will develop. For development to start, the cytoplasm and yolk granules segregate with all the cytoplasm accumulating at one side of the egg (animal pole) and the yolk granules on the other (vegetal pole). This process is called ‘cytoplasmic streaming’ as the cytoplasm flows to the animal pole of the egg, while the yolk granules remain in the vegetal pole. The goal of this project is to unravel the physical basis of cytoplasmic streaming within the egg.
Previous studies have speculated that reorganization of cortical actomyosin triggers cytoplasmic flows within the egg. By generating embryos lacking cortical actomyosin, we were able to show that cytoplasmic streaming also occurs in the absence of the cortical actomyosin network, arguing against a critical function of this network in generating cytoplasmic flows. Instead, we propose that contraction of a previously uncharacterized subcortical actomyosin network can drive this process.