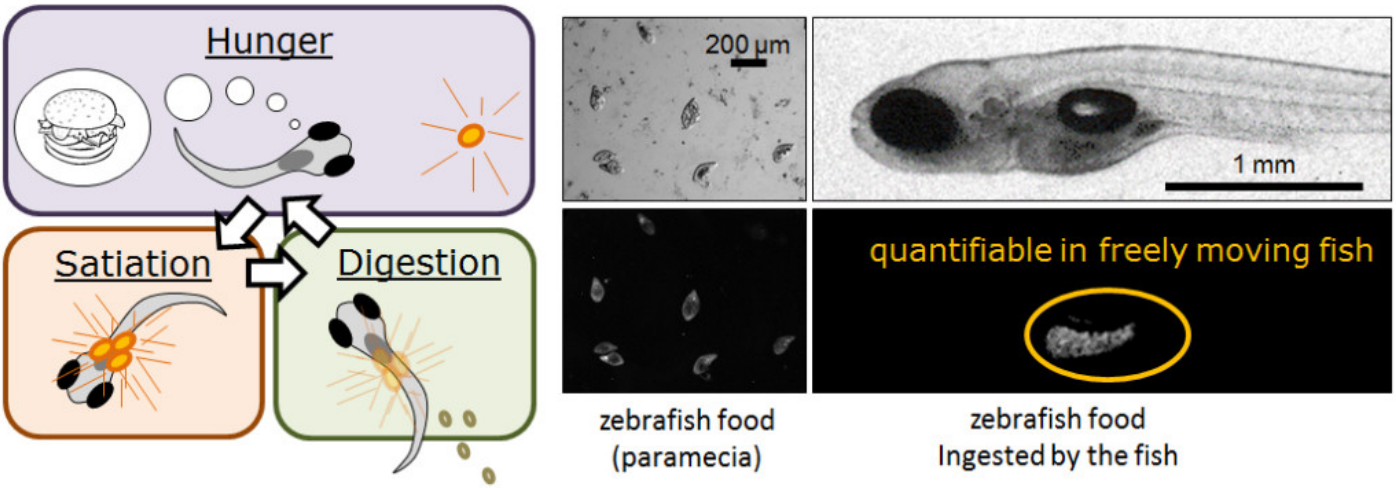
Technology to seek the elixir of hunger and satiation

Nowadays eating too much food or not enough are major social problems. Can we find identify medicine to promote either behaviour? Serendipity still drives first-in-class medicine identification. Hence, increasing the number of drugs tested increases the odds to find the elixir of hunger and/or satiation. The study of behavior requires an intact, live and unconstraint animal, ideally a small vertebrate to enable testing thousands of different chemical molecules. Larvae zebrafish are an excellent option, however, currently no method allows to quantify the amount of food they ingest.



Here, we developed a method to do exactly this. The trick – we stain zebrafish larvae's prey with a dye and measure how much dye appears in the larvae's intestine. Upon food digestion, the dye loses its color and thereby enables us to measure nutrient breakdown. Our custom-built macroscope can do all these measurements incl. the larvae's swimming behavior in 96 fish simultaneously for many hours. Using this technology we found fasted larvae to get hungry and upon food ingestion satiated, that larvae actively regulate nutrient digestion and that larvae respond analogously to human orexigenic and anorectic peptides. Overall we found several similar features of feeding behavior in this small vertebrate similar to humans, except that larvae do not perform a "siesta" after a large meal. Consequently this technology may enable to identify novel drugs to induce hunger or satiation.

Publication

A high-throughput assay for quantifying appetite and digestive dynamics.
Jordi J, Guggiana-Nilo D, Soucy E, Song EY, Lei Wee C, Engert F
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