

Dr. Randall Peterson
Friday, September 27, 9:00 a.m.

Automated, in vivo screening for behavior-modifying compounds

Throughout the history of neuroscience, a handful of neuroactive compounds have had a huge impact on our understanding of CNS function and treatment of psychiatric disease. To expand the neuropharmacological toolset, we have developed a panel of automated, high-throughput behavioral assays that can be performed with live zebrafish in 96-well plate format. These assays, which incorporate robotics, optics, and high-throughput video analysis, can be used to screen >1000 small molecules per day and detect behavioral changes caused by compounds with diverse mechanisms of action. We have validated the assays with 700 existing neuroactive compounds affecting several distinct neurotransmitter systems. Compounds from each functional class produce distinctive behavioral profiles, suggesting a strong correlation between zebrafish behavioral profiles and compound mechanisms of action. We have also screened 25,000 diverse small molecules and discovered more than 800 compounds that alter zebrafish behaviors in diverse ways. Some of these novel compounds function via well-characterized neurotransmitter pathways, while others appear to function via novel pathways. We anticipate that this in vivo approach to psychotropic drug discovery will greatly expand the toolset of neuroactive compounds for neuroscience research and will also provide novel therapeutic avenues for treating CNS disorders.