

OVERCOMING LIMITATIONS OF ORGAN-ON-CHIP (OOC) TECHNOLOGIES TO ADVANCE THE CHARACTERIZATION AND MEDICAL MANAGEMENT OF CHEMICAL AND BIOLOGICAL (CB) THREATS

The Use Of The 6dpf Larval Zebrafish In A Light Dark Behavioral Assay To Determine The Sub-lethal Effects Of Dexmedetomidine, Carfentanil, Ketamine, And Vx.

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Several technologies for predicting human toxicity values and inform drug development, are under investigation to reduce animal use and provide higher throughput evaluations to increase speed to answers on toxic chemicals. Zebrafish have traditionally been used to assess developmental toxicology across various industries and can be used in conjunction with novel organ on a chip (OOC) platforms as part of the pipeline to assess toxic chemicals. More recently, with the development of larval behavioral responsive assays, zebrafish have become a popular model to scope relative potency and sub lethal effects of potentially toxic compounds. In our study, we used the 6 day post fertilization (DPF) larval zebrafish to assess the sub-lethal effects of a potent α -adrenergic agonist dexmedetomidine, a potent Mu opioid receptor agonist carfentanil, Ketamine, an NMDA antagonist, and a cholinesterase inhibitor VX. Utilizing a 50 min light dark assay with three, ten minute dark intervals and two 10 min light intervals, we captured video behavior profiles that demonstrated behavioral differences between the tested compounds. Data from these analyzed profiles coupled with total response area under the curve analysis, generated statistically relevant dose curves with EC50 values for each compound.

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