**Zebrafish: An emerging model for Neurobehavioral Toxicology**

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**Abstract**

Neurobehavioral toxicology is a branch of toxicology, dedicated to understanding the adverse effects that chemicals and other drugs have on the nervous system which lead to changes in locomotor response, social behaviour, cognitive learning, memory. Analysis of neurobehavior can be a comprehensive and unbiased way with which functional changes of the brain may be detected. Neurotoxicity assessments often rely on behavioral evidence along with neuropathological and/or neurochemical evidence. Another reason behavioural assessment is used because it represents the integrated output of the brain and is often a sensitive index of whether a significant effect on brain function has occurred. Heavy metals like mercury, lead, organic chemicals like polychlorinated biphenyls(PCBs),Copper oxide nanoparticles, are some examples of neurotoxic compounds. When present in the aquatic environment, these compounds exert their effects on non-target organisms which include fish and other aquatic organisms. In the past, rodents were extensively used as a model organism in experimental psychology and neuroscience, but now-a-days, the cyprinid Zebrafish *Danio rerio* (Hamilton 1822), a key model in developmental biology and genetics, is gaining more popularity. It is an inexpensive, simple-to-maintain model organism ,have a fully sequenced genome, high fecundity, a short generation time (3 months), a quick embryonic development(24 hours), translucent embryo, similar genetic structure to humans (70% of human genes). Various researchers have developed behavioural models for anxiety, aggression, tension, like Novel Tank Test, Light Dark Test, Shoaling test, Mirror test, T-Maze test to access neurobehavioral toxicity indicator in adult zebrafish. The two most commonly employed assays for studying anxiety-like behaviour are the novel tank test(NTT) and the light–dark test (LDT) .The NTT exploits the natural tendency of zebrafish to dive to the bottom, (70–85% of the first minute of the test) of a novel environment, gradually exploring the top zone of the tank as they habituate to the environment. Prior studies reported that treated zebrafish with BPA or E2 exposure has a lower latency to reach the top, longer time spent in top zone, which increase predation risk. The LDT evaluates the extent of a fish’s natural tendency for scototaxis (aversion to bright areas and natural preference for the dark) in a novel environment .In the LDT, anxiety is operationally defined either by time spent in the light portion or more time spent in the dark compartment. Previous reports have shown that some chemicals altered the fish’s preference for dark or light zone.. For studying aggression in a Zebrafish, one can perform Mirror test. The time spent in the left-most part (closer to the mirror) is measured as an indicator of aggressiveness.. To study cognitive learning ability and memory of a Zebrafish, T- maze test can be performed. Zebrafish embryos can be used as a useful model to assess the neurobehavioural effects of a wide range of chemicals. In zebrafish embryos, behavioural endpoints, like spontaneous tail coiling (STC), Photomotor response (PMR),have been addressed by a number of behavioural test methodologies. Therefore, there is a need for more attention to high throughput screening methods that rely on species such as zebrafish The effects of a contaminant can be studied using fish behaviour as a toxicological indicator, with the objective of understanding impacts on natural populations. Thus, it can be concluded that zebrafish serves as an excellent emerging model organism for studying various neurobehavioral changes.

Keywords**: Zebrafish, NTT, LDT, Memory test, Neurobehavioral toxicology**

**References**

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