

Role of Zebrafish in Human Disease Research

Guest Editor



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Message from the Guest Editor

Dear Colleagues,

Despite continuous development of new methods for the diagnosis and treatment of human diseases, knowledge regarding the mechanisms that underlie various pathologies affecting humans is still limited. The study of human disorders is often limited to the use of *in vivo* and *in vitro* systems and there is an urgent need to develop experimental models that reduce the complexities associated with current mammalian animal models. These include complicated embryonic manipulations and fetal experiments, long developmental stages and life cycle, high cost of animal breeding and animal house facilities.

In this regard, the application of zebrafish (*Danio rerio*) as a model organism offers the unique advantages of high fertility, low cost, well-characterized development stages, optical transparency and easy maintenance. Zebrafish represent an effective study model for human disease research as they share about 75% of their genome with humans and have similar molecular functions at the organ and cellular level as mammals.

Recent applications of zebrafish as an excellent animal model for disease research include the toxicological evaluation of various cytotoxic and genotoxic substances such as heavy metals, metal oxides, toxins, nanoparticles and endocrine disruptors. In addition, zebrafish have been used for the development of new drugs, vaccines and antigenotoxic molecules.

Different end points are considered in these applications, including survival rate, hatching rate, morphological and behavioral changes, neurotoxicity, reproductive toxicity, teratogenesis, genotoxicity and immunotoxicity.

For this special issue, researchers are invited to contribute original manuscripts and reviews that increase knowledge on the use of zebrafish as a gold standard model for studies on environmental toxicology, for the investigation of novel genes involved in specific pathological mechanisms, for the modeling of human diseases, and for drug discovery and development. Contributions on the generation of zebrafish disease models using the latest genome editing technologies and on the development of new therapies for diseases based on high-throughput screening are particularly welcome.

Prof. Lucia Rocco and Filomena Mottola

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