



ROLE OF ZEBRA FISH IN STUDYING VARIOUS HUMAN DISEASES

SHAIK.NAINA SULTHANA

Department of Pharmacology, Hindu college of pharmacy, Amaravathi road, Guntur, Andhra Pradesh, India,

➤ AIM :

- To elucidate zebra fish model for various human diseases,

➤ OBJECTIVE:

- To have a clear vision on zebra fish as an alternate animal model for research

➤ INTRODUCTION:

- The **zebra fish** (*Danio rerio*) is a freshwater fish belonging to the minnow family (Cyprinidae). (1)
- Zebrafish research began in the 1960s, it is only since the 1990s/2000s that it has shot to prominence.(1)
- It all began with George Streisinger.Zebrafish embryos develop outside the body and can be viewed and manipulated at all stages.(1)
- It all began with George Streisinger.Zebrafish embryos develop outside the body and can be viewed and manipulated at all stages.(2)
- zebrafish was initially introduced by Streisinger and colleagues1 in the early 1980s. (2)
- **Why Zebra fish is highly used in research?**
- According to the scientific reports The zebrafsh (*Danio rerio*) it can produce high number of offsprings or individuals, and also due to the low cost of maintenance, their rapid maturation, and the extensive molecular tools that are available to the system (e.g., CRISPR/Cas9 gene editing).(3)

- zebrafish embryos can be isolated and experimentally manipulated in vitro, affording opportunities to discern how exposure to various exogenous factors, such as environmental toxicants, impacts zebrafsh development.
- In Recent years have witnessed a rapid integration of microbiome research methods into this model system, including relatively straightforward procedures for deriving germ-free and gnotobiotic zebrafish techniques for visualizing gut microbiota in situ, and procedures for passive sampling of zebrafsh microbiota.(6)
- The zebrafsh model system has been especially useful for determining how chemical exposure impacts initial microbiome assembly, alters established microbiota, and how variation in the microbiome links to vertebrate physiology (6).

➤ STUDIES THAT ARE CONDUCTED ON ZEBRAFISH:

- Behavioral studies,Inflamation(2),Metabolic diseases(1)(3),Genitic diseases,Toxicological studies,Diet induces obesity studies(1),Vaccine safety,Pathogenesis and host defense studies,Vaccination research modeling(5) and many human diseases(T.B, StaphylococcusAureus, shigella,Inflamation,Atherosclerosis(1),(2),Amyotrophic laterealsclerosis(2),Heart failure(2),Type2 diabetesmellitus(1), spectrum disorder(2),Sensorineural Hearingloss(2),Enteric nervous system disease(1),Cancer research --- etc.)(1),(2)

• also used for Nonalcoholic Fatty Liver Disease and Other Liver Disorders(2), Study of Intestinal Diseases and Host–Microbe Interactions(1), developmental disorders During early animal development(3), Mental disorders(Psychatric disorders)(3), Molecular pathogenesis, Gut microbe studies(6)

➤ **ADVANTAGES OF ZEBRA FISH:**

• Small (2.5- 4 cm), Robust(Strong and survives at any condition),Cheaper than mice in maintainence, Easy to examine the development of internal structure,Similar to human genes,Ability to repair heart muscle(1),

➤ **CONCLUSION:**

- The zebra fish plays an important role for the study of human diseases. And
- Many studies are going on this model. The researches selected this model because of its attractive advntages, and it's a teleost model which is proved to be effective in elucidating of infection and immunological responses to the humanpathogens
- Thus expecting its use would expand in future

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