# DEVELOPMENT OF AN ERE-GFP TRANSGENIC ZEBRAFISH FOR ASSESSING HEALTH EFFECTS OF ENVIRONMENTAL OESTROGENS

**Okhyun Lee[1], Aya Takesono[1], Masazumi Tada[2], Charles R. Tyler[1]* and Tetsuhiro Kudoh[1]**

[1] Biosciences, College of Life and Environmental Sciences, University of Exeter, Exeter, U.K.
[2] Department of Cell and Developmental Biology, University College London, London, UK
* Equal correspondence
Email:c.r.tyler@ex.ac.uk

**Background:**

Environmental oestrogens are the major group of so-called Endocrine Disrupting Chemicals (EDCs) that can alter hormone signalling in the body and exposure to these chemicals has been shown to impact on reproductive function and alter behaviours in fish. Many thousands of chemicals have now been identified with oestrogenic effects. Understanding the physiological effects of oestrogenic chemicals would be greatly enhanced with in vivo models capable of detecting tissue specific effects of oestrogens with high sensitivity.

**Methods:**

We have developed a novel Gal4ff-UAS mediated oestrogen responsive transgenic (TG) zebrafish for identifying body system targets of environmental estrogens in real time. The system contains an oestrogen inducible promoter derived from a short stretch of multiple tandem oestrogen responsive elements (EREs) and devoid of any tissue specific enhancer/suppressor elements. To enhance the system's response sensitivity, we used a Gal4ff-UAS system, not previously applied in fish.

**Results:**

Exposure of the TG fish to oestrogenic EDCs induced specific patterns of GFP expression in a wide variety of tissues including the liver, heart, skeletal muscle, ear, forebrain, lateral line and ganglions, most of which have not been established previously as targets for estrogenic chemicals. Furthermore, we found that different EDCs induced GFP expression with different tissue response patterns and time trajectories suggesting different potential health effects. Importantly, the ERE –TG fish were responsive to oestrogens at environmentally relevant exposure concentrations.

**Conclusion:**

Our TG zebrafish model provides a new prospect for understanding toxicological effects and health impacts of environmental estrogens in vertebrates.