

18th Global Summit on

ENVIRONMENTAL TOXICOLOGY AND PHARMACOLOGY

September 17-18, 2018 Singapore



Wen Der Wang

National Chiayi University, Taiwan

Retinoic acid protects zebra fish retinal photoreceptor cells from the toxicity of Paclobutrazol

Paclobutrazol (PBZ), a fungicide and plant growth retardant, shows toxicity to aquatic embryos, probably through rain wash. Here, we show the toxic effect of PBZ on eye development in zebra fish, as well as the role of the vitamin A metabolite, Retinoic Acid (RA), controls proliferation and differentiation of retinal photoreceptor cells, in PBZ toxicity. Embryos were exposed to PBZ with or without RA from 2 to 72 hours post-fertilization (hpf) and PBZ-treated embryos (2-72 hpf) were exposed to RA for additional hours until 120 hpf. Eye size and histology were examined. Examination of the expression levels of *gnat1* (rod photoreceptor marker), *gnat2* (cone photo receptor marker), aldehyde dehydrogenases (encoding key enzymes for RA synthesis) and phosphohistone H3 (an M-phase marker) in the eyes of control and treated embryos were examined and the results indicated that PBZ exposure dramatically reduces photoreceptor proliferation, thus resulting in a thinning of the photoreceptor cell layer and leading to a small eye. Co-treatment of PBZ with RA or post-treatment of PBZ-treated embryos with RA partially rescues photoreceptor cells revealed by expression levels of marker proteins and by retinal cell proliferation. PBZ has strong embryonic toxicity to retinal photoreceptors, probably via suppressing the production of RA with effects including impaired retinal cell division.

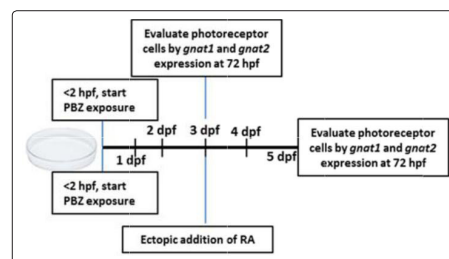


Figure-1: Schematic diagram showing the timeline of PBZ exposure and the evaluation of photoreceptor cells by staining with retinal specific marker genes, GNAT1 and GNAT2.

Recent Publications

1. Yekti A P, Su H J and Wang W D (2017) The effect of paclobutrazol on the development of zebrafish (*Danio rerio*) embryos. *Zebrafish*; 11: 1-9.
2. Wang W D, Chen G T, Hsu H J and Wu C Y (2015) Aryl hydrocarbon receptor 2 mediates the toxicity of paclobutrazol on the digestive system of zebrafish embryos. *Aquatic Toxicology*; 159: 13-22.

References

1. Li J, Sun L, Zuo Z, Chen M and Wang C (2012) Effects of paclobutrazol exposure on antioxidant defense system in *Sebastiscus marmoratus*. *Bulletin of Environment Contamination and Toxicology*; 89: 723-72.

Biography

Wen Der Wang has his expertise in biological toxicology and molecular pathology and he applies his expertise to investigate the toxic effects and the molecular mechanisms of environmental pollutants (especially environmental hormones and pesticides).

wangw4@mail.ncyu.edu.tw