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Endocrinology and Induction Mechanism of Imposex in Gastropod Molluscs

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Abstract:

Imposex, the superimposition of male type genital organs (penis and vas deferens) on female gastropod molluscs, is cause-specific and induced by low concentrations of certain organotin compounds such as tributyltin (TBT) and triphenyltin (TPT) from antifouling paints. Reproductive failure may be observed at severely affected stages, resulting in declining the populations. Fundamental knowledge of the endocrinology of gastropods is briefly described. Although some papers have suggested that steroids also function as sex hormones in gastropods, similarly to vertebrates, it is still unclear. Meanwhile, neuropeptides have been reported to control the reproduction in gastropods. Four hypotheses, such as aromatase-inhibition, regarding the induction mechanism of imposex induced by organotin compounds in gastropods are reviewed. Finally, a new hypothesis that states that RXR plays an important role in inducing the development of imposex, the differentiation and growth of male type genitalia in female gastropods, is reviewed and discussed toward the elucidation of the entire mode of action of TBT or TPT in the development of imposex in gastropods.

Key words: imposex, endocrine disruption, gastropod molluscs, tributyltin (TBT), triphenyltin (TPT), retinoid X receptor (RXR), steroid hormones

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