

Animal Model

GFP Transgenic Zebrafish strain as tool for studying kidney development

Reference Number 11-00046

Abstract

Challenge

The zebrafish is a relevant model system for studying vertebrate development and organogenesis due to its short life cycle and the easiness of isolating large numbers of mutants. For the simplicity of its pronephros it suits especially for the analysis of kidney development.

The Wilms tumour protein WT1 is an essential factor for kidney development. In humans, mutations in WT1 lead to Wilms tumour, a paediatric kidney cancer, and to anomalies of the uro-genital tract. Inactivation of Wt1 in mice causes multiple organ defects, most notably agenesis of the kidneys. Basically, the zebrafish model, with two paralogous wt1 genes wt1a and wt1b and short live times, is a perfect tool investigate nephrogenesis and Wt genes role during development; however, due to lack of a suitable read-out approach, wt gene products could not be visualized so far.

Technology

The technology relates to transgenic zebrafish lines expressing GFP under the control of the wt1b promotor. The wt1b::GFP stable zebrafish strain shows GFP expression specifically located in pronephric regions in zebrafish embryos, starting from 17 hours post fertilization. Furthermore, a weak GFP expression is seen in heart sac, eyes and gill arches. The direct observation of the GFP signal reflecting natural wt1b gene expression patterns makes the transgenic strain a useful tool for analysis of kidney development and wt1 gene function. Strikingly, the influence of modulators on kidney development can be studied with this strain in a time efficient and easy way. In particular, the model provides for an ideal system to analyse toxic or harmful effects of drugs or environmental poisons on kidney development.

Commercial Opportunity

Material available for licensing; Collaboration opportunity.

Further Reading

Perner B, Englert C, Bollig F. "The Wilms tumor genes wt1a and wt1b control different steps during formation of the zebrafish pronephros." Dev Biol. 2007 Sep 1;309(1):87-96.