Studies on vertebrate development by the transposon-mediated Gal4 enhancer trap method in zebrafish

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【Outline of survey】

The aim of this study: Several vertebrate genomes have been sequenced and enormous amounts of the genomic sequence information have been accumulated. However, the function of most of the genes encoded by the genome has not been elucidated. We aim to understand the function of vertebrate genes by studying a model vertebrate, zebrafish. Research plans:We will perform the transposon-mediated Gal4 enhancer trap methodin zebrafish. By this method, we will create random integration of the yeast trans-cription factor Gal4 gene whose expression will be activated by endogenous enhan-cers, and visualize cell and organ specific expression of these genes. Furthermore, we will inhibit or modify the function of cells expressing Gal4. By these analyses, we will disclose the function of vertebrate genes and cells. Significance: Since this study will be carried out by performing a novel geneticmethod, which we developed for the first time in zebrafish, this study should reveal novel findings that had not been discovered by the other methods.

【Expected results】

1. This study should lead to discovery of novel genes which play important roles in morphogenesis and organogenesis in vertebrates.
2. This study should lead to discovery of novel cellular functions which are important for vertebrate morphogenesis and organogenesis.
3. This study should gain new insights into expression and function of vertebrate developmental genes.
4. This study should lead to establishment of zebrafish lines expressing a fluore-scent protein in specific cells and organs. These will be useful resources to study vertebrate development at the gene and cellular levels.

【References by the principal researcher】

• Kawakami, K., Takeda, H., Kawakami, N., Kobayashi, M., Matsuda, N. and Mishina, M. A transposon-mediated gene trap approach identifies developmentally regulated genes in zebrafish. Developmental Cell 7, 133-144 (2004).

【Term of project】 FY2006－2010

【Budget allocation】16,800,000 yen

【Homepage address】 none