

## FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

**Project Title:** Functional characterization of key molecules that regulate cardiovascular morphogenesis

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### 1. Background of research

Heart diseases and cerebrovascular diseases, which are the main cause of death of Japanese citizen, are attributed to the impairment of heart and vascular organization. However, the molecular mechanisms associated with these diseases are not fully understood. Establishment of model animals that resemble the human cardiovascular diseases would contribute to the understanding of cardiovascular formation in human and to the development of new drugs in human cardiovascular diseases.

### 2. Research objectives

It is well known that the developmental processes in cardiovascular formation between mammals and a model organism zebrafish are highly conserved. From the chemical mutagenesis screening, several zebrafish mutants defective in cardiovascular development have been isolated. The goal of this research is to reveal the identification of molecules involved in cardiovascular development by performing the functional analysis of the zebrafish mutants.

### 3. Research characteristics (incl. originality and creativity)

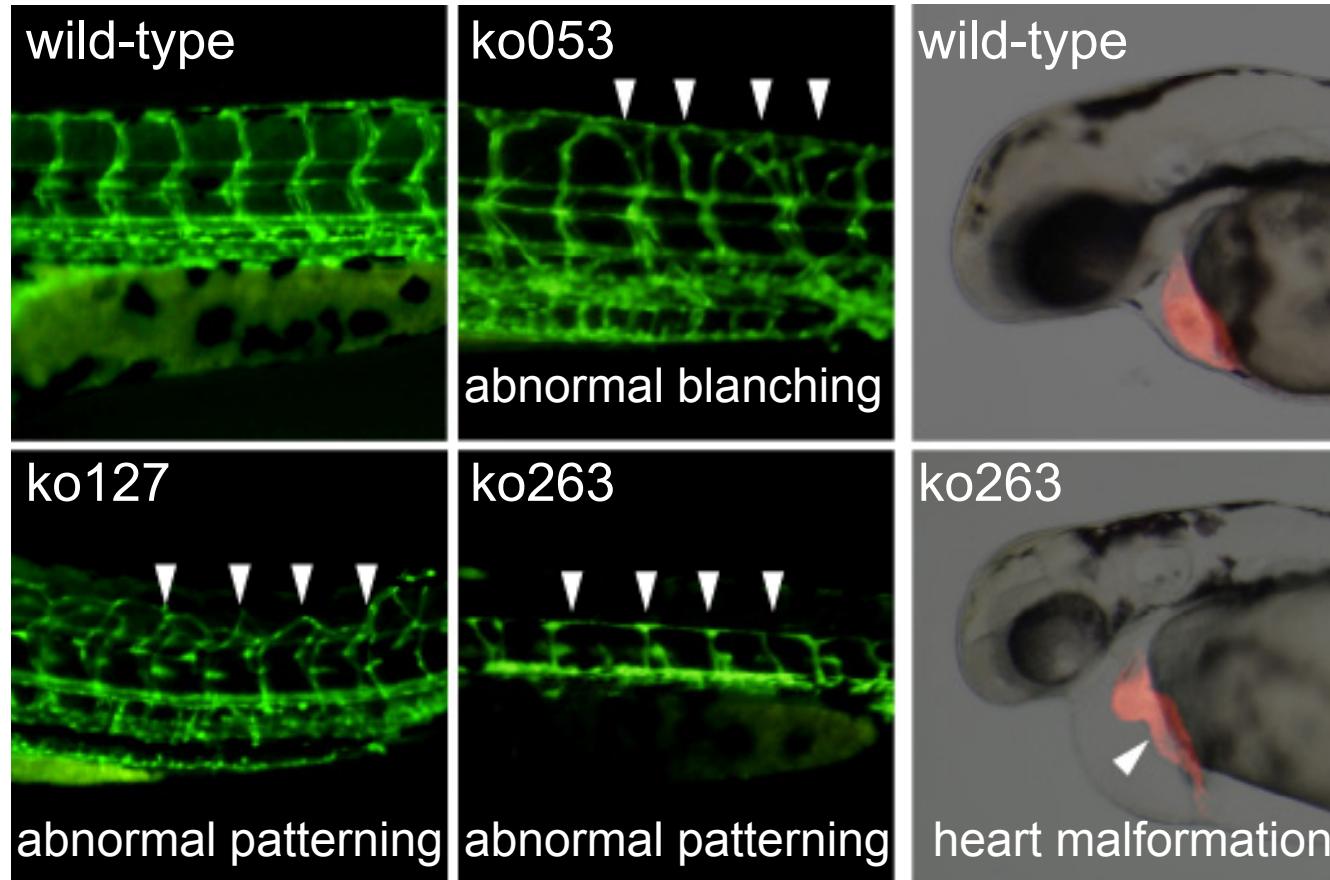
The trait of the present study is to identify molecules that control cardiovascular development by using the zebrafish mutants acceptable for the genetic analysis. By combining the cardiovascular visualization system and our established zebrafish mutants, the molecular mechanisms establishing the cardiovascular system would be elucidated.

### 4. Anticipated effects and future applications of research

Zebrafish mutants analyzed in the present study can become a model organism of the human cardiovascular diseases. Therefore, it is expected that the findings obtained from the functional analysis of the zebrafish mutants contribute to the understanding of pathogenic processes of the human cardiovascular diseases. Further, by searching small chemical compounds that suppress the cardiovascular defects in the zebrafish mutants, it is expected that the results obtained lead to the development of therapeutic drugs of the human cardiovascular diseases.

## Functional characterization of key molecules involved in cardiovascular development

### zebrafish mutants defective in heart and vascular development



Identification of candidate genes associated with the mutants

1. Functional analysis of genes responsible for the zebrafish mutants
2. Functional analysis of genes obtained from the microarray analysis