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Do the valve endocardial progenitors originate from a single zebrafish blastula HPRG1⁺ cell?

Xiushan Wu Hunan Normal University, China

The arguments regarding the origin of the endocardial progenitors remain unresolved. Here, we have identified a gene, tentatively named *HPRG1* (heart progenitor regulation gene 1), through a large-scale screen of *Drosophila* mutants. The gene is expressed in heart valves in zebrafish and its expression pattern is conserved in mice. Knockdown of the gene resulted in a valve defect, suggesting it is involved in endocardial valve development. It is known that Isl1 or *GATA4* positive cells are capable of differentiating into two cell types, endocardial and cardial progenitors and *NKx2.5* is the direct activator of endocardial master regulator *Etv2*. Our results indicated that *HPRG1* is expressed in a novel type of mesodermal progenitor cells that are co-expressed with each master regulators and *HPRG1* activates the expressions of *GATA4* and *NKx2.5* and inhibits the expression of *Isl1*. It is especially interesting that *HPRG1* determines the fate of a single cell of the 128-cells at zebrafish blastula stage, suggesting that it is a fate-determining gene. Thus, the *HPRG1* positive blastula cells provide an appropriate experimental system for exploring the specification mechanism of the endocardial progenitors. A mechanism for heart valve progenitor specification beginning with *HPRG1* through *GATA4*, *Isl1* and *NKx2.5* is under investigation.

Biography

Xiushan Wu has obtained his PhD in Genetics from Stockholm University in 1990 and Postdoctoral studies in Developmental Biology at Michigan University during 1990-1994. He did his research as a Scientist in Molecular Genetics at Karolinska Institute in 1994-2000. He is a Professor and Director of The Center for Heart Development, Deputy Director of the Key Laboratory of the Ministry of Education of China for Developmental Biology and Protein Chemistry at Hunan Normal University, China. His research focuses on understanding the mechanisms by which embryonic heart is developed using *Drosophila*, zebrafish and mice as models. He has published more than 300 papers including over 100 papers in international journals.

xiushanwu2003@aliyun.com

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