Contribution of *Xenopus* model to a better understanding of cardiac outflow tract

Torres-Prioris A.[1], Smith S.J.[2], Mohun T.J.[2], Fernández B.[1], Durán A.C.[1]

[1]Department of Animal Biology, Faculty of Science, and Biomedical Research Institute of Málaga (IBIMA), University of Málaga, Spain

[2]Developmental Biology Division, The Francis Crick Institute, Mill Hill Laboratory, London, UK

The morphology and morphogenesis of the cardiac outflow tract is a major topic in the study of the vertebrate circulatory system, especially regarding the pathologies affecting this region in humans. Recent studies have demonstrated that, in fish, the cardiac outflow tract consists of a myocardial conus arteriosus and a nonmyocardial bulbus arteriosus. Moreover, the bulbus arteriosus of fish has been considered homologous to the intrapericardial base of the aortic and pulmonary trunks of birds and mammals. Under this perspective, we have conducted a study on the outflow tract of *Xenopus laevis*, using histological, immunohistochemical and 3D reconstruction techniques. It has been assumed that the outflow tract of *Xenopus*, which is intercalated between the ventricle and the great arterial trunks, is of myocardial nature. At its luminal side, it contains two sets of valves between which the so-called spiral valve lies.

Our results demonstrate that, together with a proximal myocardial segment, a distal, nonmyocardial, intrapericardial segment is also present in amphibians. We propose that this distal segment, from which the pulmocutaneous and systemic arteries arise, is homologous to the bulbus arteriosus of fish. Therefore, the bulbus arteriosus is an evolutionarily conserved structure, which has become the aortic and pulmonary roots of birds and mammals. Our findings contribute to strengthening *Xenopus* as a good model to better understand the outflow tract morphology and evolution, and as an emerging model for studying human congenital heart diseases.

This work was supported by CGL2010-16417, BES-2011-046901, Estancias Breves para FPI (2012, 2013) and FEDER funds.