



Evolution and Development



“Faith and reason are not only not opposed, but support and complement each other in an admirable way.”

Pope Leo XIV

Concept and rationale

The absence of conflict between the biological sciences and religion was explained in an admirable way by Werner Arber, President Emeritus of the Pontifical Academy of Sciences, in an [address to the 2012 Synod of Bishops](#): “For a long time curious human beings have acquired scientific knowledge primarily by observing with their senses and aided by mental reflections including logical reasoning. The chapter of the Genesis in the Old Testament is for me a testimony of an early scientific worldview already existing several thousand years ago. This chapter also reflects a wide consistency between religious faith and available scientific knowledge. It proposes a logical sequence of events in which the creation of our planet Earth may have been followed by the establishment of the conditions for life. Plants were then introduced and subsequently provided food for animal before human beings were finally introduced.”

The *Evolution and Development* Workshop will consider not only how the interpretation of the visible world through human reason led to powerful intellectual insights by Geoffroy Saint-Hilaire and Charles Darwin, but also how molecular biology uncovered an invisible historical book of animal evolution recorded in DNA. Variation and conservation, as recorded in genomic DNA, will be the leitmotif of this study group, with the purpose of advancing the still-young discipline of

molecular Evo-Devo.

In recent decades molecular genetics has revealed that animals share a conserved set of developmental genes that, under the pressure of natural selection of the fittest, has given rise to immense morphological diversity. At the same time, the reliance on ancient positional information systems to construct body plans has likely constrained the range of possible animal forms.

Before animals arose, microbial life developed photosynthesis and oxygenated the atmosphere, enabling the later evolution of multicellular life in the oceans. The origin of life, Oxygen, multicellularity, germ layers, Hox genes, positional information in the antero-posterior, dorsal-ventral and left-right axes, organogenesis, ecological change, and human speciation are among the topics to be examined. The common primeval ancestor of all extant bilateral animals possessed a complex developmental toolkit and a planktonic larval stage for dispersal before settling for life on the seafloor as an adult. Life on earth appears to have followed a very narrow evolutionary path before blossoming into the beautiful diversity of animal forms that surround us today.

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