Name	MARGARIDA CARDOSO MOREIRA
Position	Group Leader (1st 6)
Year joined *(Crick or founder institute)*	2021

Career History

1999-2003: University of Porto, Portugal - BSc (*Summa Cum Laude*) in Biology
2003-2009: University of Porto, Portugal and The University of Chicago, USA – PhD in Evolutionary Genetics
2009-2012: Department of Molecular Biology & Genetics, Cornell University, USA; Postdoctoral fellow
2013-1015: University of Lausanne, Switzerland; Novartis and Marie Curie postdoctoral fellow
2016-2020: University of Heidelberg, Germany; Postdoctoral fellow
2021-present: Francis Crick Institute, UK; Head of Evolutionary Developmental Biology Lab

Major Awards, Honours and Prizes

2003: Engenheiro António de Almeida Foundation Award (Portugal)
2003-2007: GABBA Ph.D. fellowship (Portugal)
2009-2010: FCT Postdoctoral fellowship (Portugal)
2013: Novartis postdoctoral fellowship (Switzerland)
2014-2015: Marie Curie postdoctoral fellowship (European Commission)
2020: Otto Schmeil Prize (Germany)
2020: Member of the Heidelberg Academy of Sciences and Humanities (Germany)

Membership of external committees, editorial boards, review panels, SABs etc

2016-2018: Member of the Equal Opportunities Committee (EOC) of the European Society for Evolutionary Biology

Lab Name	***Evolutionary Developmental Biology Laboratory***

Research programme and achievements

We study how new organs originate and how they subsequently change in form and function across species.

A fundamental problem in biology is understanding how new cells, new tissues, or whole new organs are created. Our lab works on this problem by studying an exceptional organ: the placenta.

The placenta controls the physiological exchanges between the mother and her foetus and is essential for pregnancy. Our placenta originated more than 160 million years ago in the ancestors of placental mammals and marsupials. Since then, it has evolved to create an incredible diversity of forms and functions across mammals.

Placentas are thought to have evolved independently as many as 100 times in vertebrates. There are evolutionary young and old placentas in many fishes, lizards, and snakes. This makes the placenta an exceptional organ in which to study how organs originate and how they evolve across species.

In our lab we study the evolution and development of the placenta in fishes and in mammals. In one project we directly address the question of how new organs are created by identifying the genetic, cellular and developmental conditions that have allowed the repeated and independent evolution of placentas in a group of closely related fishes.

In another project we focus on one of the most fascinating aspects of pregnancy - the mother's tolerance to the direct contact between her own cells and those of her foetus. We study how maternal immune systems have evolved different solutions in different mammals (including in humans) to deal with the challenges of the foetus on the mother's immune system.

Research outputs

Wang ZY, et al. (2020) ***Transcriptome and translatome co-evolution in mammals.*** **Nature 588, 642-647. DOI: 10.1038/s41586-020-2899-z**
We showed across mammals that the rate of expression divergence is lower at the translational layer than at the transcriptional layer and further demonstrated that this is due to widespread compensatory co-evolution between the two layers.

Cardoso-Moreira M. et al. (2020) ***Developmental gene expression differences between humans and mammalian models.*** **Cell Reports, 33, 108308. DOI: 10.1016/j.celrep.2020.108308**
We systematically compared developmental gene expression profiles between human genes and their counterparts in rhesus macaque, mouse, rat, and rabbit. We found that half of human genes differ from their mouse orthologs in their developmental profiles in at least one major organs. These include more than 200 genes associated with brain, heart, and liver disease, for which mouse models should undergo extra scrutiny.

Cardoso-Moreira M. et al. (2019) ***Gene expression across mammalian organ development*****. Nature, 571, 505-509. DOI: 10.1038/s41586-019-1338-5**
We identified general principles underlying the evolution of developmental programs across mammals and identified hundreds of genes likely to be involved in the phenotypic diversification of 7 mammalian organs.

Sarropoulos I., Marin R., Cardoso-Moreira M, Kaessmann H. (2019) ***Developmental dynamics of lncRNAs across mammalian organs and species*****. Nature, 571, 510–514.**
DOI: 10.1038/s41586-019-1341-x
We showed that developmental gene expression could successfully identify sets of functional long non-coding RNAs and identified key differences in the contribution of lncRNAs to different stages of organ development. (co-senior & co-corresponding author)