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## Building from scratch: *de novo* gene birth

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### Abstract

During evolution genes are continuously gained and lost, contributing to the adaptation of the organism to a changing environment. The best understood mechanism for the birth of new genes is the duplication and modification of already existing genes. However, in recent years, evidence has been gathered that some genes are born *de novo* from previously non-coding genomic sequences. The proteins encoded by *de novo* genes bear no resemblance to other proteins and thus represent radical innovations.

Over the past 10 years we have investigated the mechanisms underlying *de novo* gene birth, including the emergence of novel transcripts, the translation of small ORFs and the functions of recently originated proteins. Whereas some of these processes are now better understood, many mysteries remain. The talk will present a summary of the research in the area and the challenges ahead.

### References

Ruiz-Orera et al. (2015) *Origins of de novo genes in human and chimpanzee. Plos Genetics*, 11: e1005721.

Ruiz-Orera et al. (2018) *Translation of neutrally evolving peptides provides a basis for de novo gene evolution. Nature Ecology and Evolution*, 2: 890–896.



## Short bio



Mar Albà was awarded a PhD by Universitat de Barcelona (1997) and in the following five years she held postdoctoral positions at the Medical Research Council and University College London (UK). Since 2005 she is an ICREA Researcher at the Research Program on Biomedical Informatics (GRIB) from Hospital del Mar Research Institute (IMIM) and Universitat Pompeu Fabra (UPF). She works on comparative genomics and evolution,

having published about 80 articles in peer-reviewed journals. Her current interests include transcriptomics, the evolution of new genes and the study of extreme adaptations in mammals.