Reconstructing the origins of animal multicellularity using experimental evolution

Fact Sheet

Project Information

MULTICELLEXPEVO

Grant agreement ID: 746044

Project website

DOI
10.3030/746044

Project terminated on 28 February 2020

EC signature date
17 March 2017

Start date
1 September 2018

End date
31 August 2020

Funded under
EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions

Total cost
€ 158 121,60

EU contribution
€ 158 121,60

Coordinated by
AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS
Spain

Objective

All living animals are descended from a single-celled ancestor. Understanding how this ancestor became the first multicellular animal remains a major challenge in the field of evolutionary biology. Phylogenomic analyses have shown that animals are closely related to three unicellular lineages: choanoflagellates, filastereans and ichthyosporeans, altogether forming the Holozoa clade. Genetic and phenotypic studies have shown that the filasterean Capsaspora owczarzaki can under specific growth conditions form transient multicellular aggregates. However, why is this

multicellularity only transient? What are the genetic and phenotypic requirements for its emergence and stabilization? And what is the role of the actin cytoskeleton in this transition? Indeed the actin cytoskeleton is known for its pivotal role for cell coordination and morphology, which must play a role in evolution of multicellularity. To address these questions, we will use the C. owczarzaki as a model organism. We will combine cell biology, genomics and experimental evolution to unravel multicellularity emergence and stabilization. Specifically, we will aim to obtain evolved mutants showing excessive and more stable multicellular behaviour of C. owczarzaki using long-term experimental evolution. Such evolved strains would unravel how multicellularity emerged and stabilized. In addition, using random mutagenesis screen, we aim to identify mutants unable to form multicellular aggregates. Such mutants would reveal the minimum genetic requirements for such a transition. Finally, we will take advantage of recently developed genetic tools in C. owczarzaki to study the actin cytoskeleton during the cell cycle. Our results could reveal how the first multicellular ancestor of animals appeared from a genetic and cellular perspective, and, how cell fate specification was established during evolution. Results generated on this fellowship will be relevant to evolutionary, cell and developmental biologists.

Fields of science (EuroSciVoc)

natural sciences > biological sciences > **genetics**

natural sciences > biological sciences > **evolutionary biology**

natural sciences > biological sciences > **cell biology**

Keywords

Multicellularity emergence | Metazoa | Actin organization | Experimental evolution

Programme(s)

H2020-EU.1.3. - EXCELLENT SCIENCE - Marie Skłodowska-Curie Actions MAIN PROGRAMME

H2020-EU.1.3.2. - Nurturing excellence by means of cross-border and cross-sector mobility

Topic(s)

MSCA-IF-2016 - Individual Fellowships

Call for proposal

H2020-MSCA-IF-2016

See other projects for this call

Funding Scheme

MSCA-IF - Marie Skłodowska-Curie Individual Fellowships (IF)

Coordinator

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Address

CALLE SERRANO 117
28006 Madrid
Spain

Region

Comunidad de Madrid > Comunidad de Madrid > Madrid

Activity type

Research Organisations

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

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