Revealing the function of dormant soil microorganisms and the cues for their awakening

Fact Sheet

Project Information

DormantMicrobes

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Project website

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10.3030/636928

Project closed

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30 April 2022

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EXCELLENT SCIENCE - European Research Council (ERC)

Total cost
€ 1 499 356,25

EU contribution
€ 1 499 356,25

Coordinated by
UNIVERSITAT WIEN
Austria

This project is featured in...

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Objective

Soils are considered the last scientific frontiers that harbor one of the most diverse microbial communities on Earth. It is hypothesized that this diversity allows for redundancy in microbial key processes, thereby ensuring ecosystem stability. Much of this functional redundancy is embodied in non-active, dormant microorganisms that represent the ‘microbial seed bank’, which is characterized by a high number of low abundant taxa. Based on the recent theory of a ‘dynamic rank-abundance curve’, it is hypothesized that the rare dormant organisms can be recruited to participate in a given function upon resuscitation with environmental cue(s). In this project I will test this hypothesis on a level that matters for ecosystem processes – the functional level – by an innovative approach combining stable isotope probing (SIP) and sequencing with process-level and single-cell activity analysis.
By testing 4 hypotheses, we will (1) reveal environmental cues that resuscitate dormant microorganisms involved in major soil functions and identify the activated microorganisms. The activity of the resuscitated communities will be analyzed at the process level, as well as at the single-cell by NanoSIMS, thereby allowing us to elucidate the impact of dormancy/resuscitation dynamics on targeted processes at the population and ecosystem level. (2) We will investigate the genetics of microbial dormancy-resuscitation strategies in a natural model environment for dormancy, an arid ecosystem, by metatranscriptome analysis of critical dormancy-resuscitation steps. (3) We will retrieve genomic information of primarily rare, but after resuscitation active, microorganisms involved in important soil processes, as they presumably contain so far unknown genomic potential. In summary, this project will generate essential knowledge on the stability of microbial key processes and on the diversity, the function and the genetics of the dormant majority in terrestrial ecosystems.

Fields of science (EuroSciVoc)

natural sciences > biological sciences > **genetics** natural sciences > biological sciences > microbiology > **bacteriology**

medical and health sciences > medical biotechnology > **genetic engineering**

natural sciences > biological sciences > microbiology > **mycology**

natural sciences > biological sciences > ecology > **ecosystems**

Programme(s)

H2020-EU.1.1. - EXCELLENT SCIENCE - European Research Council (ERC) MAIN PROGRAMME

Topic(s)

ERC-StG-2014 - ERC Starting Grant

Call for proposal

ERC-2014-STG

See other projects for this call

Funding Scheme

ERC-STG - Starting Grant

Host institution

UNIVERSITAT WIEN

Net EU contribution

€ 1 499 356,25

Total cost

€ 1 499 356,25

Address

UNIVERSITATSRING 1
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Region

Ostösterreich > Wien > Wien

Activity type

Higher or Secondary Education Establishments

Links

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

Beneficiaries (1)

UNIVERSITAT WIEN

Austria

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