Metabolic Coupling During Bacterial Development

Fact Sheet

Project Information

MetaboDevo

Grant agreement ID: 853323

Start date
1 March 2020

End date
28 February 2025

Funded under
EXCELLENT SCIENCE - European Research Council (ERC)

Total cost
€ 1 500 000

EU contribution
€ 1 500 000

Hosted by
MAX-PLANCK-GESELLSCHAFT ZUR FORDERUNG DER WISSENSCHAFTEN EV
Germany

Project description

Metabolic regulation of differentiation in bacteria

Bacterial endospores (a.k.a. spores) are highly resilient cell types that some species form to survive extreme conditions. Spore formation involves the collaboration between two cells: the forespore, which becomes the resilient spore, and the mother cell, which dies after sporulation. This project will explore the role housekeeping metabolism, required for a cell to function normally, in sporulation. To achieve this goal, the researcher will perform a genome-wide study of the role of housekeeping genes during sporulation, taking advantage of a system that allows the inactivation of individual housekeeping functions in the mother cell or the forespore. This study may

find out if mother cell and forespore depend on each other and what factors play a critical role in their differentiation.

Objective

Studies on developmental biology have traditionally focused on deciphering the signaling and regulatory networks that control cellular differentiation. However, it remains unclear how the interplay between developmental regulatory circuits and housekeeping metabolism contributes to the determination of cell fate. Here, I aim to provide a comprehensive analysis of the role of housekeeping metabolic functions during endospore formation in the bacterium Bacillus subtilis. Sporulation is a simple developmental pathway that entails the interaction between two cells arising from a single cell division: the forespore, which becomes the metabolically dormant spore, and the mother cell, which dies after sporulation. The mother cell and forespore activate different genetic programs, leading to the production of sporulation-specific structural proteins necessary for proper spore development. However, little is known about how essential housekeeping functions contribute to the process of sporulation. I have developed a system to degrade proteins catalyzing key metabolic reactions in a cell- and developmental stage-specific manner during sporulation. Here, I will use this system to perform a genome-wide study to evaluate the role that housekeeping metabolism plays in spore development. My preliminary results provide evidence for metabolic differentiation between the mother cell and the forespore, metabolic dependency of the forespore on metabolic precursors synthesized in the mother cell, and bidirectional transport of phospholipids between the mother cell and forespore membranes. I will use a combination of cutting edge genetic, cell biology and chemical biology techniques to reveal the metabolic transactions that underlie this unique, syntrophic relationship. The successful completion of this project will provide the first exhaustive metabolic description of a developmental process.

Fields of science

natural sciences › biological sciences › microbiology › **bacteriology**
natural sciences › biological sciences › biochemistry › biomolecules › **proteins**
natural sciences › biological sciences › **cell biology**
natural sciences › biological sciences › **developmental biology**

Programme(s)

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

Topic(s)

ERC-2019-STG - ERC Starting Grant

Call for proposal

ERC-2019-STG

See other projects for this call

Funding Scheme

ERC-STG - Starting Grant

Host institution

MAX-PLANCK-GESELLSCHAFT ZUR FORDERUNG DER WISSENSCHAFTEN EV

Net EU contribution

€ 1 500 000,00

Address

Hofgartenstrasse 8
80539 Munchen
Germany

Region

Bayern > Oberbayern > München, Kreisfreie Stadt

Activity type

Research Organisations

Contact the organisation Website
Participation in EU R&I programmes
H2020 collaboration network

Non-EU contribution

€ 0,00

Beneficiaries (1)

MAX-PLANCK-GESELLSCHAFT ZUR FORDERUNG DER WISSENSCHAFTEN EV

Germany

Net EU contribution

€ 1 500 000,00

Address

Hofgartenstrasse 8
80539 Munchen

Region

Bayern > Oberbayern > München, Kreisfreie Stadt

Activity type

Research Organisations

Contact the organisation Website
Participation in EU R&I programmes
H2020 collaboration network

Non-EU contribution

€ 0,00

EC signature date: 30 September 2019
Last update: 22 July 2021
Record number: 225379

Permalink: https://cordis.europa.eu/project/id/853323

Parental BONDing for a better start in life

Fact Sheet

Project Information

BOND

Grant agreement ID: 830471

Closed project

Start date
1 December 2018

End date
31 May 2021

Funded under
INDUSTRIAL LEADERSHIP - Innovation In SMEs

Total cost
€ 3 420 625

EU contribution
€ 2 394 437

Coordinated by
BAMBI BELT BV
Netherlands

Project description

A wireless and skin-friendly solution for preterm baby monitoring

Each year in Europe, about 500 000 babies are born too soon (before 37 completed weeks of gestation). To monitor their vital signs, adhesive electrode systems are used. But since these electrodes are designed for adults, they often cause stress and pain for the preterm baby and prevent skin-to-skin contact with parents. The EU-funded BOND project is developing a special belt made of a soft, non-sticky fabric that is skin-friendly and fitted with a wireless monitoring device. It accomplishes the same functions as wired adhesive electrode systems currently implemented in neonatal intensive care units. Its wireless features also allow parents to take their baby out of the incubator more easily.

Objective

Annually, 130.000 babies in the EU are born extremely premature, ranging from 24 to 32 weeks of gestation (so called
preterms). Currently the vital signs of these pre-terms are monitored with an adhesive electrode system that was originally
designed for adults. These electrodes cause stress and pain for the pre-term during the daily removal by which skin damage
can occur. Furthermore, the system prevents skin-to-skin contact with the pre-term parents (Kangaroo Mother Care) due to
the wires. Stress, pain and impaired Kangaroo Mother Care prevent pre-term development. Research shows that one out of
two pre-terms develops concentration disorders and/or cognitive impairments during their lifetime. This results in high
healthcare costs. Therefore, neonatologists demand an better solution that allows them to better assess pre-term wellbeing.
Bambi Medical, a rising med-tech company, responds to this market need with the introduction of the Bambi Belt. The Bambi
Belt is an innovative wireless and non-invasive system that can measure the vital signs of pre-terms. With the Bambi Belt
sensors are kept in place via an elastic belt that does not harm the fragile pre-term skin. In addition, the system is wireless
and therefore parents are enabled to give significant more Kangaroo Mother Care. This will improve the development of the
pre-term and reduce both short-term (less hospital days) and long-term (less costs due to development delays) healthcare
costs. These benefits of the Bambi Belt result in a higher quality of care and a more cost-effective solution.

Fields of science

social sciences › sociology › demography › **mortality**
medical and health sciences › clinical medicine › **critical care medicine**
engineering and technology › electrical engineering, electronic engineering, information engineering › electronic engineering › **sensors**
engineering and technology › electrical engineering, electronic engineering, information engineering › information engineering › telecommunications › **radio technology**

Programme(s)

H2020-EU.2.3. - INDUSTRIAL LEADERSHIP - Innovation In SMEs MAIN PROGRAMME

H2020-EU.3. - PRIORITY 'Societal challenges
H2020-EU.2.1. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies

Topic(s)

EIC-SMEInst-2018-2020 - SME instrument

Call for proposal

H2020-EIC-SMEInst-2018-2020

See other projects for this call

Sub call

H2020-SMEInst-2018-2020-2

Funding Scheme

SME-2 - SME instrument phase 2

Coordinator

BAMBI BELT BV

Net EU contribution

€ 2 394 437,00

Address

High Tech Campus 29
5656AE Eindhoven
Netherlands

Region

Noord-Brabant › Zuidoost-Noord-Brabant

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Contact the organisation
Participation in EU R&I programmes
H2020 collaboration network

Non-EU contribution

€ 1 026 188,00

EC signature date: 19 November 2018
Last update: 25 May 2022
Record number: 220231

Permalink: https://cordis.europa.eu/project/id/830471

The Remote Control of Maternal Metabolism by the Placenta

Fact Sheet

Project Information

PlaEndo

Grant agreement ID: 703160

Closed project

Start date
1 September 2016

End date
25 September 2018

Funded under
H2020-EU.1.3.2.

Overall budget
€ 195 454,80

EU contribution
€ 195 454,80

Coordinated by
THE CHANCELLOR MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE
United Kingdom

Objective

During pregnancy many physiological changes occur in the mother that are designed to support fetal growth. These include changes in the cardiovascular, pulmonary, immune and metabolic systems. In particular, the mother becomes less reactive to insulin, leading to increased glucose availability to the fetus in late pregnancy. These adaptations are thought to be signaled, in part by changes in placental hormone production. Whilst studies have shown that the placenta has the capacity to produce different hormones, their specific role in adapting maternal metabolism during pregnancy relies principally on association studies. Moreover, there are likely to be more protein mediators secreted by the placenta with systemic actions in the mother. Failure to adjust the mother's body to the pregnant state may result in pregnancy complications, including abnormal birth weight and maternal diabetes, which can

further lead to a range of medical complications for the mother and baby. The overall goal of this study will be to identify the nature and wider biological significance of placental endocrine function in adapting the mother's body during pregnancy to support fetal growth, with a focus on maternal metabolism. This work will primarily use the mouse as an experimental model as the placental signaling/secreting cells are conveniently organized into a distinct region and are under unique genetic control. Therefore placental signaling cells can be isolated, cultured and genetically-modified independent of other cells in the mouse placenta. The secreted placental candidates will be identified using the latest sequencing technologies, and their metabolic effects will be tested on cell lines and in the whole organism using unique genetic tools available at the University of Cambridge. Knowledge gained from this study will be the first step in the development of targeted interventions for optimizing fetal growth and preventing pregnancy complications.

Fields of science

natural sciences › biological sciences › biochemistry › biomolecules › **proteins**
medical and health sciences › clinical medicine › endocrinology › **diabetes**
medical and health sciences › clinical medicine › obstetrics › **fetal medicine**
medical and health sciences › basic medicine › **physiology**
medical and health sciences › clinical medicine › **embryology**

Programme(s)

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

Topic(s)

MSCA-IF-2015-EF - Marie Skłodowska-Curie Individual Fellowships (IF-EF)

Call for proposal

H2020-MSCA-IF-2015
See other projects for this call

Funding Scheme

MSCA-IF-EF-ST - Standard EF

Coordinator

THE CHANCELLOR MASTERS AND SCHOLARS OF THE UNIVERSITY OF CAMBRIDGE

Address

Trinity Lane The Old Schools
CB2 1TN Cambridge
United Kingdom

Activity type

Higher or Secondary Education Establishments

Contact the organisation Website
H2020 collaboration network

EU contribution

€ 195 454,80

Last update: 26 May 2022
Record number: 201112

Permalink: https://cordis.europa.eu/project/id/703160

Genetic, behavioural and cognitive mechanisms underpinning the association between mother and offspring mental health problems: mental (M) health (H) intergenerational transmission (INT) -(MHINT)

Fact Sheet

Project Information

MHINT

Grant agreement ID: 758813

Start date
1 December 2017

End date
30 November 2022

Funded under
EXCELLENT SCIENCE - European Research Council (ERC)

Total cost
€ 1 499 611

EU contribution
€ 1 499 611

Hosted by
UNIVERSITY OF BRISTOL
United Kingdom

Objective

Despite decades of research, and the introduction of parenting interventions, children of mentally ill mothers remain substantially more likely to have mental health problems themselves. I propose to shed new light on why mental health problems in a mother are passed on to her child, and help break this reinforcing cycle of mental health risk across generations. In order to harness the potential of modifying parenting for the prevention of child mental health risk, I will study parenting using

more detailed, ecologically valid and genetically sensitive designs than have been done before.
Objectives:
1: To investigate the respective role of genetic and environmental (chiefly parenting) mechanisms in explaining associations between mother and child mental health. HOW: using a consortium of international cohorts with intergenerational genetic and phenotypic data (n>10,000) and, for the first time, modeling genetic risk which is and is not transmitted from mother to child to test alternative hypotheses.
2: To identify behavioural manifestation of maternal mental health, in observed mother-infant interaction, in an ecologically valid way. HOW: recording 300 mother-child dyads at home, using novel wearable cameras, in the next generation of a key cohort (ALSPAC-G2).
3: To identify cognitive underpinnings of maternal behaviour. HOW: including cognitive tasks (with eye tracking) as new measures in ALSPAC-G2, applying computational models to cognitive and (uniquely) real life data (measured in 2).
4: To establish whether modification of maternal parenting (highlighted in 1-3), changes child mental health. HOW: systematic review of parenting intervention trials and new synthesis methods to extract which intervention components reduce child mental health problems.
My study will provide critical new evidence regarding the nature of parenting interventions that have potential to improve child mental health and break intergenerational transmission of mental health problems.

Fields of science

engineering and technology › electrical engineering, electronic engineering, information engineering › electronic engineering › sensors › **optical sensors**
medical and health sciences › clinical medicine › **psychiatry**
social sciences › **psychology**
natural sciences › biological sciences › genetics › **genomes**

Programme(s)

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

Topic(s)

ERC-2017-STG - ERC Starting Grant

Call for proposal

ERC-2017-STG

See other projects for this call

Funding Scheme

ERC-STG - Starting Grant

Host institution

UNIVERSITY OF BRISTOL

Net EU contribution

€ 1 499 611,00

Address

Beacon House Queens Road
BS8 1QU Bristol
United Kingdom

Region

South West (England) › Gloucestershire, Wiltshire and Bristol/Bath area › Bristol, City of

Activity type

Higher or Secondary Education Establishments

Contact the organisation Website
Participation in EU R&I programmes
H2020 collaboration network

Non-EU contribution

€ 0,00

Beneficiaries (1)

UNIVERSITY OF BRISTOL

United Kingdom

Net EU contribution

€ 1 499 611,00

Address

Beacon House Queens Road
BS8 1QU Bristol

BS8 1QU Bristol

Region

South West (England) › Gloucestershire, Wiltshire and Bristol/Bath area › Bristol, City of

Activity type

Higher or Secondary Education Establishments

Contact the organisation Website
Participation in EU R&I programmes
H2020 collaboration network

Non-EU contribution

€ 0,00

EC signature date: 15 December 2017
Last update: 9 February 2022
Record number: 212763

Permalink: https://cordis.europa.eu/project/id/758813

Cancer treatment during pregnancy: from fetal safety to maternal efficacy

Fact Sheet

Project Information

CRADLE

Grant agreement ID: 647047

Closed project

Start date
1 October 2015

End date
31 March 2021

Funded under
EXCELLENT SCIENCE - European Research Council (ERC)

Total cost
€ 2 000 000

EU contribution
€ 2 000 000

Hosted by
KATHOLIEKE UNIVERSITEIT LEUVEN
Belgium

Objective

The evolution in drug regulation of the last 50 years has left pregnant women and their fetuses orphaned. This is particularly problematic for cancer during pregnancy, which raises a difficult and conflicting medical ethical decision process and which has recently become increasingly frequent. In 2012 we published the first prospective study indicating that antenatal exposure to cancer treatment can overall be considered safe. Building on this proof of concept, the current proposal wants to take a groundbreaking step towards developing a standard of care for cancer during pregnancy by addressing –in an integrated fashion- the challenges at the level of the fetus, the mother and the fetomaternal barrier. At the core of this proposal lies an international registry of pregnant women with cancer, along with a registry of their children, and biobanks of maternal, placental, cord blood and tumoral tissues.

Research track ‘child’ aims to deliver robust evidence of fetal safety. Research track ‘mother’ aims to address the emerging concerns in the oncological management of the mother, and specifically, the possible distinct biology of pregnancy-associated breast cancer, the most frequent cancer type in pregnancy. The research approach includes large-scale clinical follow-up studies along with laboratory studies on patient biomaterials, including pharmacological investigations and RNA-sequencing studies. Complementary to these studies is research track ‘placenta’ in which cutting-edge models of human placental research are used to address the poorly understood physiological basis of the placental barrier function in this specific situation. This ambitious program will rely on a multidisciplinary team of experts. Not only may the scientific deliverables of this proposal constitute a major step forward to the well-being of both mother and fetus in a pregnancy complicated by cancer, the methodological approach may also provide critical impetus to further research in this field.

Fields of science

medical and health sciences › health sciences › public health › **epidemiology**
medical and health sciences › basic medicine › physiology › **pathophysiology**
medical and health sciences › clinical medicine › oncology › **breast cancer**
medical and health sciences › clinical medicine › **obstetrics**
medical and health sciences › clinical medicine › **embryology**

Programme(s)

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

Topic(s)

ERC-CoG-2014 - ERC Consolidator Grant

Call for proposal

ERC-2014-CoG

See other projects for this call

Funding Scheme

ERC-COG - Consolidator Grant

Host institution

KATHOLIEKE UNIVERSITEIT LEUVEN

Net EU contribution

€ 1 709 375,00

Address

Oude Markt 13
3000 Leuven
Belgium

Region

Vlaams Gewest > Prov. Vlaams-Brabant > Arr. Leuven

Activity type

Higher or Secondary Education Establishments

Contact the organisation Website
Participation in EU R&I programmes
H2020 collaboration network

Non-EU contribution

€ 0,00

Beneficiaries (2)

KATHOLIEKE UNIVERSITEIT LEUVEN

Belgium

Net EU contribution

€ 1 709 375,00

Address

Oude Markt 13
3000 Leuven

Region

Vlaams Gewest > Prov. Vlaams-Brabant > Arr. Leuven

Activity type

Higher or Secondary Education Establishments

Contact the organisation Website
Participation in EU R&I programmes
H2020 collaboration network

Non-EU contribution

€ 0,00

STICHTING HET NEDERLANDS KANKER INSTITUUT-ANTONI VAN LEEUWENHOEK ZIEKENHUIS

Netherlands

Net EU contribution

€ 290 625,00

Address

Plesmanlaan 121
1066 CX Amsterdam

Region

West-Nederland › Noord-Holland › Groot-Amsterdam

Activity type

Research Organisations

Contact the organisation Website
Participation in EU R&I programmes
H2020 collaboration network

Non-EU contribution

€ 0,00

EC signature date: 25 September 2015
Last update: 11 December 2021
Record number: 198614

Permalink: https://cordis.europa.eu/project/id/647047