in vivo optogeneticS, elecTrophysiology and phArmacology with an ultRasonically-powered DUST for Parkinson's Disease

Ergebnisse

Projektinformationen

STARDUST

ID Finanzhilfevereinbarung: 767092

Projektwebsite

DOI
10.3030/767092

Projekt abgeschlossen

EK-Unterschriftsdatum
8 August 2017

Startdatum
1 Oktober 2017

Enddatum
30 September 2022

Finanziert unter
EXCELLENT SCIENCE - Future and Emerging Technologies (FET)

Gesamtkosten
€ 3 803 057,50

EU-Beitrag
€ 3 787 932,50

Koordiniert durch
AARHUS UNIVERSITET
Dänemark

CORDIS bietet Links zu öffentlichen Ergebnissen und Veröffentlichungen von HORIZONT-Projekten.

Links zu Ergebnissen und Veröffentlichungen von RP7-Projekten sowie Links zu einigen Typen spezifischer Ergebnisse wie Datensätzen und Software werden dynamisch von OpenAIRE abgerufen.

Leistungen

Dokumente, Berichte (13)

Kick-off Meeting
The kick-off meeting will be arranged at the beginning of the project to sketch the whole strategy and plan for the STARDUST. All partners will discuss their contributions to the project and we discuss how we are going forward. Also, an arrangement for WP leaders meetings and so on will be discussed

Dissemination and Communication report
The main goal of the Dissemination and Communication final report is to report the dissemination and communication activities done during the STARDUST project

Annual Meeting 3
The 3rd annual meeting together with all the partners and the advisory board This is an internal annual meeting within the consortium

Motor function restoration in PD mice by GPe optogenetic neuromodulation
Motor function restoration in PD mice by optogenetic manipulation of the external globus pallidus (GPe) (M24): Identification of a novel target (selective GPe neuronal population) to restore motor function in a 6-OHDA PD mouse model. Validation of the target on motor behavior and neuronal activity.

PhD course material
This materials for a disciplinary PhD course will be prepared based on the inputs from all the partner. In future, this can be presented in Universities as an intensive course training PhD students with such advanced interdisciplinary technology.

Annual Meeting 2
The 2nd annual meeting with GA and the advisory board. Local industries might be invited. This is an internal annulal meeting within the consortium.

Project website and logo
In M3, the logo for the project as well as the Website for the project will be up and running.

Blue µLED and the interconnects
Blue µLED from Tyndall with their interconnects will be ready to be integrated with the electronic chip as well as the piezoelectric device from AU.

Dissemination, exploitation and communication plan

Dissemination, exploitation and communication plan will raise the awareness of the project activities in order to make STARDUST a successful project.

Dissemination, exploitation and communication plan update

The dissemination, exploitation and communication plan will be updated.

Plan for Quality Assurance

Plan for Quality Assurance is to assure a high quality outcome of the STARDUST project.

Blue and Red µLEDs and the driver chip

Blue and Red µLEDs and the driver chip will be fabricated through Europractice in CMOS technology. The chip will decide on how to drive the blue and red LEDs and how to choose between them. For the Basic Dust we will not use chip driver as only one LED will be used which will be powered by the harvested ultrasonic wave.

Annual Meeting 1

The first annual meeting with GA will be done in M12 (1-2 partners from each beneficiary). This is an internal annual meeting.

Demonstrationssysteme, Piloten, Prototypen (1)

Basic Dust tested in motor cortex

In vivo validation of basic Dust in the motor cortex (M30): Basic Dust efficiency to control light delivery with ultrasound in vivo in the motor cortex. Behavioral readout on locomotor activity in transgenic mice.

Open Research Data Pilot (1)

Data Management Plan

The current deliverable is presented to ensure a proper management of the data generated and processed within STARDUST project to be deposited in a proper way to be findable, accessible, interoperable and reusable (FAIR) as requested by EC. In short, the main objectives of this document are to: • Properly handle the research data during and after the project • Describe the required methodology • Decide whether and how the data will be shared, used or made available for re-

use and verification • Identify how the data are created and how they are going to be preserved

Veröffentlichungen

Fachlich begutachtete Artikel (11)

Anion-conducting channelrhodopsins with tuned spectra and modified kinetics engineered for optogenetic manipulation of behavior

Autoren: Jonas Wietek, Silvia Rodriguez-Rozada, Janine Tutas, Federico Tenedini, Christiane Grimm, Thomas G. Oertner, Peter Soba, Peter Hegemann, J. Simon Wiegert
Veröffentlicht in: Scientific Reports, Ausgabe 7/1, 2017, ISSN 2045-2322
Herausgeber: Nature Publishing Group
DOI: 10.1038/s41598-017-14330-y

Potassium channel-based optogenetic silencing

Autoren: Yinth Andrea Bernal Sierra, Benjamin R. Rost, Martin Pofahl, António Miguel Fernandes, Ramona A. Kopton, Sylvain Moser, Dominik Holtkamp, Nicola Masala, Prateep Beed, John J. Tukker, Silvia Oldani, Wolfgang Bönigk, Peter Kohl, Herwig Baier, Franziska Schneider-Warme, Peter Hegemann, Heinz Beck, Reinhard Seifert, Dietmar Schmitz
Veröffentlicht in: Nature Communications, Ausgabe 9/1, 2018, ISSN 2041-1723
Herausgeber: Nature Publishing Group
DOI: 10.1038/s41467-018-07038-8

Electrical properties, substrate specificity and optogenetic potential of the engineered light-driven sodium pump eKR2

Autoren: Christiane Grimm, Arita Silapetere, Arend Vogt, Yinth Andrea Bernal Sierra, Peter Hegemann
Veröffentlicht in: Scientific Reports, Ausgabe 8/1, 2018, ISSN 2045-2322
Herausgeber: Nature Publishing Group
DOI: 10.1038/s41598-018-27690-w

Crystal structure of the red light-activated channelrhodopsin Chrimson

Autoren: Kazumasa Oda, Johannes Vierock, Satomi Oishi, Silvia Rodriguez-Rozada, Reiya Taniguchi, Keitaro Yamashita, J. Simon Wiegert, Tomohiro Nishizawa, Peter Hegemann, Osamu Nureki
Veröffentlicht in: Nature Communications, Ausgabe 9/1, 2018, ISSN 2041-

1723
Herausgeber: Nature Publishing Group
DOI: 10.1038/s41467-018-06421-9

Striatal cholinergic interneurons regulate cognitive and affective dysfunction in partially dopamine-depleted mice
Autoren: Samira Ztaou, Juliette Lhost, Isabelle Watabe, Giulia Torromino, Marianne Amalric
Veröffentlicht in: European Journal of Neuroscience, Ausgabe 48/9, 2018, Seite(n) 2988-3004, ISSN 0953-816X
Herausgeber: Blackwell Publishing Inc.
DOI: 10.1111/ejn.14153

Contribution of cholinergic interneurons to striatal pathophysiology in Parkinson's disease
Autoren: Samira Ztaou, Marianne Amalric
Veröffentlicht in: Neurochemistry International, Ausgabe 126, 2019, Seite(n) 1-10, ISSN 0197-0186
Herausgeber: Elsevier BV
DOI: 10.1016/j.neuint.2019.02.019

Biointegrated and Wirelessly Powered Implantable Brain Devices: A Review
Autoren: Rupam Das, Farshad Moradi, Hadi Heidari
Veröffentlicht in: IEEE Transactions on Biomedical Circuits and Systems, Ausgabe 14/2, 2020, Seite(n) 343-358, ISSN 1932-4545
Herausgeber: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tbcas.2020.2966920

An Implantable Ultrasonically Powered System for Optogenetic Stimulation with Power-Efficient Active Rectifier and Charge-Reuse Capability
Autoren: Amin Rashidi, Kjeld Laursen, Seyedsina Hosseini, Hai-Au Huynh, Farshad Moradi
Veröffentlicht in: IEEE Transactions on Biomedical Circuits and Systems, Ausgabe 13/6, 2019, Seite(n) 1362-1371, ISSN 1932-4545
Herausgeber: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tbcas.2019.2949154

Ultrasonically Powered Compact Implantable Dust for Optogenetics
Autoren: Kjeld Laursen, Amin Rashidi, Seyedsina Hosseini, Tanmay Mondal, Brian Corbett, Farshad Moradi
Veröffentlicht in: IEEE Transactions on Biomedical Circuits and Systems, 2020, Seite(n) 1-1, ISSN 1932-4545
Herausgeber: Institute of Electrical and Electronics Engineers
DOI: 10.1109/tbcas.2020.2984921

Where dopaminergic and cholinergic systems interact: a gateway for tuning neurodegenerative disorders

Autoren: Marianne Amalric, Tommy Pattij, Ioannis Sotiropoulos, Joana M Silva, Nuno Sousa, Samira Ztaou, Cristiano Chiamulera, Lars U Wahlberg, Dwaine F Emerich, Giovanna Paolone
Veröffentlicht in: Frontiers in Behavioral Neuroscience, Ausgabe 2267828X, 2021, ISSN 2267-828X
Herausgeber: HAL
DOI: 10.3389/fnbeh.2021.661973

Interplay between inhibitory control and behavioural flexibility: impact of dorsomedial striatal dopamine denervation in mice

Autoren: Lhost J., More S., Watabe I., Louber D., Ouagazzal AM., Liberge M., Amalric M.
Veröffentlicht in: Neuroscience, Ausgabe 2267828X, 2021, Seite(n) 25-39, ISSN 2267-828X
Herausgeber: HAL
DOI: 10.1016/j.neuroscience.2021.09.026

Konferenzprotokolle (6)

Realization of high efficiency ultrasound-powered micro-LEDs for optogenetics

Autoren: Tanmay Mondal, Kjled Laursen, Seyedsina Hosseini, Amin Rashidi, Farshad Moradi, Brian Corbett
Veröffentlicht in: Integrated Photonics Platforms: Fundamental Research, Manufacturing and Applications, 2020, Seite(n) 55, ISBN 9781-510635012
Herausgeber: SPIE
DOI: 10.1117/12.2555762

An Ultrasonically Powered Optogenetic Microstimulators with Power-Efficient Active Rectifier and Charge Reuse Capability

Autoren: Amin Rashidi, Kjeld Laursen, SeyedSina Hosseini, Farshad Moradi
Veröffentlicht in: 2019 IEEE International Symposium on Circuits and Systems (ISCAS), 2019, Seite(n) 1-5, ISBN 978-1-7281-0397-6
Herausgeber: IEEE
DOI: 10.1109/iscas.2019.8702735

Piezoelectric Energy Harvester with Piezo-Magnet Stack for Ultrasonically-Powered Brain Implants

Autoren: Seyedsina Hosseini, Amin Rashidi, Kjeld Laursen, Johan Pelloux-Prayer, Farshad Moradi
Veröffentlicht in: 2019 IEEE International Ultrasonics Symposium (IUS), 2019, Seite(n) 201-204, ISBN 978-1-7281-4596-9

Herausgeber: IEEE
DOI: 10.1109/ultsym.2019.8926195

Multi-Ring Ultrasonic Transducer on a Single Piezoelectric Disk For Powering Biomedical Implants
Autoren: Seyedsina Hosseini, Kjeld Laursen, Amin Rashidi, Farshad Moradi
Veröffentlicht in: 2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2019, Seite(n) 3827-3830, ISBN 978-1-5386-1311-5
Herausgeber: IEEE
DOI: 10.1109/embc.2019.8857473

STARDUST: Optogenetics, Electrophysiology and Pharmacology with an Ultrasonically Powered DUST for Parkinson's Disease
Autoren: Amin Rashidi, Seyedsina Hosseini, Kjeld Laursen, Farshad Moradi
Veröffentlicht in: 2019 26th IEEE International Conference on Electronics, Circuits and Systems (ICECS), 2019, Seite(n) 109-110, ISBN 978-1-7281-0996-1
Herausgeber: IEEE
DOI: 10.1109/icecs46596.2019.8965042

Overvoltage Protection Circuits for Ultrasonically Powered Implantable Microsystems
Autoren: Amin Rashidi, Kjeld Laursen, Seyedsina Hosseini, Farshad Moradi
Veröffentlicht in: 2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2019, Seite(n) 4354-4358, ISBN 978-1-5386-1311-5
Herausgeber: IEEE
DOI: 10.1109/embc.2019.8857795

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Patent (3)

LOAD-REGULATED IMPLANTABLE OPTICAL MICRO DEVICE
Antrags-/Publikationsnummer: 20 21074096
Datum: 2021-09-01
Antragsteller:

IMPLANTABLE MICRO DEVICE WITH HIGH DATA RATE BACK SCATTERING
Antrags-/Publikationsnummer: 20 21074099
Datum: 2021-09-01

Antragsteller:
WIRELESS BRAIN-COMPUTER INTERFACE
Antrags-/Publikationsnummer: 20 21074095
Datum: 2021-09-01
Antragsteller:

Weitere Forschungsprodukte

Weitere Forschungsprodukte über OpenAire (1)

Sapajus apella as a model for the development of novel therapeutic approaches for Parkinson's disease

Autoren: Muniz, José Augusto Pereira Carneiro; Leal, Leon Claudio Pinheiro; Bahia, Carlomagno Pacheco; Krejcová, Lane Viana
Veröffentlicht in: MS/SVS/Instituto Evandro Chagas

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