Spinal cord rehabilitation enhanced by the use of data-driven and dynamic cortical state models

Fact Sheet

Project Information

E-WALK

Grant agreement ID: 331602

Project closed

Start date
1 May 2013

End date
30 April 2015

Funded under
Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Total cost
€ 192 622,20

EU contribution
€ 192 622,20

Coordinated by
ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE
Switzerland

Objective

Neuromotor disease and insult negatively affect the lives of millions of people worldwide. In some cases, such as severe spinal cord injury (SCI), a completely functional central nervous system is abruptly disconnected from the completely

functional body. Currently, there is no therapy capable of promoting recovery after complete spinal cord injury. While our understanding of the organization of the brain has advanced dramatically in recent years, there have been few successes building a complete system to enable people in such states to regain the ability to interact with and control their environment. Two clinical approaches to treatment have been used: one where brain scientists and engineers have developed cortical implants to record and decode the intended movement for prosthetic control, and one where robotic assisted rehabilitation of the damaged area is driven by coordinated electrochemical stimulation. These two neural interface technologies paint the background of the proposed research. Expertise in the design of brain machine interfaces combined with the advanced spinal neuroprosthesis developed in the host laboratory open the intriguing possibility to merge both approaches, and pioneer a brain spinal interface (BSI) system capable of restoring movement in severely paralyzed subjects. Consequently, this project addresses two critical and clinically applicable hypotheses for the fusion of population decoding in the brain and electrochemical stimulation of the spinal cord after complete or partial SCI. First, after complete SCI, a BSI may re-establish cortical control over a library of spinal cord stimulation paradigms, thus restoring a range of voluntary locomotor functions in paralyzed rats. Second, training enabled by a newly developed BSI in rats with a severe spinal cord contusion may enhance remodeling of supraspinal and spinal neural systems, thus leading to significantly improved recovery compared to training with electrochemical stimulation alone.

Fields of science (EuroSciVoc)

natural sciences > biological sciences > **neurobiology**

medical and health sciences > clinical medicine > **physiotherapy**

medical and health sciences > medical biotechnology > **implants**

Programme(s)

FP7-PEOPLE - Specific programme "People" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Topic(s)

FP7-PEOPLE-2012-IIF - Marie Curie Action: "International Incoming Fellowships"

Call for proposal

FP7-PEOPLE-2012-IIF
See other projects for this call

Funding Scheme

MC-IIF - International Incoming Fellowships (IIF)

Coordinator

ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE

EU contribution

€ 192 622,20

Total cost

No data

Address

BATIMENT CE 3316 STATION 1
1015 Lausanne
Switzerland

Region

Schweiz/Suisse/Svizzera > Région lémanique > Vaud

Activity type

Higher or Secondary Education Establishments

Links

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

Last update: 6 September 2024

Permalink: https://cordis.europa.eu/project/id/331602