Innovating technology to characterize balance loss in Ecological setting of daily life: application to Parkinson’s disease

https://neurodegenerationresearch.eu/survey/innovating-technology-to-characterize-balance-loss-in-ecological-setting-of-daily-life-application-to-parkinson%c2%92s-disease/

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Country

France

Title of project or programme

Innovating technology to characterize balance loss in Ecological setting of daily life: application to Parkinson’s disease

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ANR

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€ 657,671

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01/02/2013

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4.0

The project/programme is most relevant to:

Parkinson's disease & PD-related disorders

Keywords
Research Abstract

Over the last three decades, loss of autonomy associated to aging has become a major health issue due in particular to dementia and falls. Balance and gait troubles are sources of

pronounced disability affecting durably and significantly quality of life. The prevalence of falls is even higher for neurodegenerative disorders such as Parkinson’s disease (PD).
Although improving, therapies including a combination of medication and deep brain stimulation have revealed inefficient for gait symptoms in PD. One of the main reasons is a misunderstanding of the physiological mechanisms of balance troubles and therapy effects, which are even more complicated by individual heterogeneity. Moreover, clinical assessment of gait troubles has been particularly insufficient as most of them emerge in daily life environment according to stress and fatigue. Tools are thus needed to understand the factors and processes of balance loss in daily life situations.
With “personalized medicine” in prospect, the aim of the ECOTECH project is to develop a device to monitor gait in real-life situations and give information about risk conditions of falling. This information will enable to (i) understand brain (dys)function in real-life situation, (ii) adjust physiotherapy with the possibility to objectively assess symptoms severity and effects of therapeutic intervention,(iii) adapt life situation accordingly with the choice of adequate personalized compensation and environment adaptation. To that end, we will develop a specific system composed by embedded/onboard biosensors and acquisition systems with user friendly graphical interface and specific signal processing softwares to record simultaneously and process several pertinent biomarkers including brain activity (task 1) based on an integrated approach crossing biomedical, technological and human sciences. This system made up of biomechanical and (neuro)electrophysiological sensors and data processing techniques will be characterized from knowledge elaborated in i) experimental laboratory conditions to identify recognition patterns of loss of postural control and neurophysiological correlates (task 2),and ii) daily life to understand the context of falls in natural settings and anticipatory events by analyzing both biomarkers and the psychophenomenology of subjective experience (task 3). Such methodology and technology will be transferable to (i) aging and other neurological disorders, and (i) activity conditions impacting motor control (workplace, ergonomics applications).
To be implemented successfully, this multidisciplinary project will benefit from cooperation with French SME Technologie Ergonomie Action (TEA) specializing in ergonomic sensor equipment and a solid four-year France-Taiwan collaboration developed through NSC-FOT (Taiwan National Science Council-French Office in Taipei) Orchid programme and associating groups specializing in:- neurology/neuroscience and movement disorders: Chan Gung Mermorial Hospital (CGMH-CGU), Taipei, Taiwan and ,Centre de Recherche Institut du cerveau de la Moëlle épinière? (CR-ICM), Paris, France;- technology and physiology: National Tsing Hua University (NTHU), Hsinchu, Taiwan and laboratory ,Pluridisciplinaire Robotique Signal Matériaux Energétique? (PRISME), Orleans, France; – human factors: University of Orleans, France.

Lay Summary
Further information available at:

Types:
Investments > €500k

Member States:
France

Diseases:
Parkinson's disease & PD-related disorders

Years:
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Database Categories:
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