RESEARCH LINES AND PROJECTS 2016

RESEARCH LINE A Clinical and Behavioral Neurology

Aphasia Research Lab
• New research methodologies for Aphasia treatment

Behavioral Neuropsychology Lab
• ASCEND Studio multicentrico, randomizzato, in doppio cieco, controllato con placebo sull’efficacia di Natalizumab nel ridurre la progressione dell’invalidità in soggetti con sclerosi multipla secondaria progressiva, con estensione in aperto opzionale
• EXCHANGE Studio osservazionale prospettico, multicentrico, per la valutazione della soddisfazione al trattamento con Extavia somministrato attraverso il nuovo autoiniettore Extavipro in pazienti affetti da Sclerosi Multipla
• EXPAND Studio multicentrico, randomizzato, in doppio cieco, a gruppi paralleli, controllato verso placebo, con durata variabile del trattamento per valutare l’efficacia e la sicurezza di siponimod (BAF312) in pazienti con sclerosi multipla secondaria progressiva con estensione in aperto
• MACFIMS Validazione di una batteria per la valutazione neuropsicologica dei pazienti con Sclerosi Multipla
• Ruolo dello stress Lavorativo nel verificarsi di incidenti sul luogo di lavoro in pazienti con SM
• Studio multicentrico per la valutazione multidimensionale (clinica, neuropsicologica e psichiatrica) di pazienti con Sclerosi Multipla e correlazione con dati neuroradiologici di infiammazione e degenerazione

Epidemiology and Clinical Research (LASERC)
• Action Observation Treatment (AOT) in pazienti con diagnosi di demenza di alzheimer lieve: correlati cognitivi ed applicabilità nella pratica clinica: studio randomizzato controllato
• A comprehensive preventive program for dementia tailored on the neuropsychological profile of persons with Mild Cognitive Impairment: cognitive stimulation, physical intervention and healthy nutrition, a randomized controlled trial (GR-2013-02356043)
• Delirium Day
• N-terminal truncated AßpE3-42 Oligomers and Glutaminyl Cyclase Activity in the Early Diagnosis and Clinical Progression of Typical and Atypical Alzheimer’s Disease. A cohort study. (GR-2011-02349822)
• Studio esplorativo, randomizzato e controllato in aperto, sull’efficacia di Glialia® in pazienti con stroke in riabilitazione post-acuta.

Experimental Neuropsychobiology Lab
• A2013.02.02: Analisi dei processi immuno-inflammatori e valutazione del loro impatto sulla progressione di malattia in pazienti affetti da malattie neuropsichiatriche
• A2015.03.01: Effetto degli inibitori della colinesterasi sul sistema immunitario dei pazienti affetti da malattia di Alzheimer Delirium Day
• Palmitoylethanolamide to target inflammation in neurodegenerative diseases: a study focused on peripheral immune cell
• RC A2013.01.02. Analisi dei processi immuno-infiammatori e valutazione del loro impatto sulla progressione di malattia in pazienti affetti da malattie neurodegenerative.

**Experimental Neuropsychophysiology Lab**

• Cortical dynamics of motor inhibitory control: neurophysiological investigations and clinical applications
• Cortical plasticity in Alzheimer’s disease: a TMS-EEG study
• Dopaminergic therapy for Alzheimer’s disease patients
• Evaluation by means of cortical excitability TMS / EEG in the early stages of Parkinson’s disease
• Fronto-parietal network: assessing cerebral dynamics by means of TMSEEG
• L-dopa induced dyskinesias in Parkinson’s disease
• Magnetic stimulation of the precuneus to improve memory in the early stage of Alzheimer’s disease
• Promoting motor re-learning in patients with stroke by enhancing non invasively associated cerebellar-cortical plasticity
• The neural markers of post-stroke recovery: tracking the early dynamics of cortical reorganization with a novel longitudinal multimodal approach

**Genomic Medicine Lab (UILDM)**

• Development of a medical device for personalized diagnosis of agerelated macular degeneration (AMD)
• Phenotypic and molecular characterization of FSHD families: a systematic approach towards trial readiness (GUP13012)

**Neuropsychiatry Lab**

• A longitudinal multidimensional study of clinical, neuropsychological, neuroradiologic phenotypes and genetic traits in patients at the onset of psychiatric illness
• Anosognosia in preclinical and clinical Alzheimer disease as an early predictive marker of illness outcome: impact of precocious clinical diagnosis and rehabilitative intervention
• Clinical, neuropsychological, neuroradiologic and genetic evaluation of patients with Attention Deficit/Hyperactivity Disorder (ADHD) compared with control subjects
• Clinical, neuropsychological, neuroradiologic and genetic evaluation of patients with Obsessive-Compulsive Disorder compared with control subjects
• Diagnostic, psychopathological, neuropsychological and morphological phenotyping in patients diagnosed with schizophrenia
• mHealth platform for Parkinson's disease management - PD_Manager (The EU Framework Programme for Research and Innovation - HORIZON 2020)
• Modelling recovery after TBI through the longitudinal evaluation of neuroradiologic, neuroinflammatory and behavioral parameters
• Multidimensional assessment of neuropsychological, psychopathological, neuroradiological and genetic features in patients with Mild Cognitive Impairment, Alzheimer disease and comparison with control subjects: longitudinal analysis of the clinical course's predictors
• PICASO: A Personalised Integrated Care Approach for Service Organisations and Care Models for Patients with Multi-Morbidity and Chronic Conditions
• Study of epidemiology of behavioral and cognitive symptoms in patients with movement disorders with and without Deep Brain Stimulation
Neuropsychology of Memory Lab
• Dopaminergic modulation of declarative memory in individuals with Parkinson’s disease
• Mental time travel toward past visual experiences cannot be made without the recollection of associated semantic memories: a study on temporal lobe epilepsy patients.
• Relationship between different aspects of apathy and neuropsychological functioning in dementia
• Subjective organisation of word-list learning in different forms of dementia
• The selective impairment explicit semantic knowledge in Alzheimer’s disease: a classical and crossmodal semantic priming paradigm

Technology and Training Methods for Disability Care Lab
• I SUPPORT - ICT-Supported Bath Robots
• RADIO - Robots in assisted living environments

RESEARCH LINE B Innovative Methodologies for Rehabilitation

Computational Methods and Biomechanics of the Hand Lab
• Changes in structure and recruitment of muscle synergies after cortical and cerebellar lesions
• Cognitive Interaction in Motion (CogIMon)

Visual-Motor Control and Space Microgravity Physiology Lab
• ARIANNA: Accident Risk Attenuation in Space Navigation

RESEARCH LINE C Preclinical Neuroscience

Cellular Neurobiology Lab
• NADINE (Nanotechnology-based Diagnostics In Neurological diseases and Experimental oncology)
• PATH for ALS P2X7 Antagonists as THerapy for Amyotrophic Lateral Sclerosis

Epigenetic Genome Reprogramming Lab
• EPIGEN Role of the epigenome in the neuromuscular physiopathogenesis
• MODHEP Systems biology of liver cancer: an integrative genomic-epigenomic approach

Epigenetics and Signal Transduction
• Dissecting the epigenetic landscape of rhabdomyosarcoma: role of p38alpha kinase in the control of Polycomb Repressive Complex 2
• Epigenetic modifiers in rhabdomyosarcoma

Experimental and Behavioral Neurophysiology Lab
• Effetti neuroprotettivi dell’arricchimento ambientale e dietetico su correlati di neuroplasticità a livello comportamentale e biochimico

Experimental Neurorehabilitation Lab
• The endocannabinoid system as a therapeutic target to counteract remote degeneration after spinal cord injury

Molecular and Cellular Neurobiology Lab
• Regulation of alternative pre-mRNA processing in the pathogenesis of Ewing Sarcoma
Molecular Neurobiology Lab
• Risk and Modifying factors in Fronto Temporal Dementia

Molecular Neuroscience Lab
• Unraveling the mystery of Alzheimer’s Disease-related synaptic degeneration

Neuroanatomy Lab
• Neuroglobin: Neurodegeneration and neuroprotection, role of estrogen hormones induced neuroglobin expression
• Neuroprotective effects of PARP-1 inhibitors

Neurobiology of Behavior Lab
• Big effects of Small RNAs: the role of miR-34 in Stress-induced psychopathologies
• Post-natal stress affects response to rewarding and aversive stimuli in a genotype-dependent manner in adulthood
• Prelimbic prefrontal cortical norepinephrine modulates extinction of maladaptive memory
• Sepiapterin modulation on neurobehavioral phenotypes and peripheral markers in hyperphenylalaninemia
• The induction of inflammation as result of exposure to traumatic events in childhood: the impact on the vulnerability to psychiatric diseases and traumatic brain injury

Neurobiophysics Lab
• Analysis of the cortical electrical activity in the G93A genetic model of Amyotrophic Lateral Sclerosis

Neurochemistry Lab
• OligoALS - New strategies to remove protein aggregates in ALS

Neurochemistry of Lipids Lab
• Targeting macrophage plasticity and polarization in multiple sclerosis: in/ex vivo veritas

Neuroembriology Lab
• Deciphering the link between alternative splicing and cell cycle progression in human cancer cells
• Role of alternative splicing in neurodegenerative disease

Neurogenetics Lab
• Clinical, genetic and functional studies on Joubert syndrome and related disorders (JSRD): a model to understand the complexity of ciliopathies
• Pediatric ataxias and Public Health: epidemiological studies and disease registry, characterization of genetic determinants and implementation of protocols for diagnosis, management, and rehabilitation using innovative low cost, widely accessible technologies
• Understanding the basis of cerebellar and brainstem congenital defects: from clinical and molecular characterisation to the development of a novel neuroembryonic in vitro model

Neuroimmunology and Synaptic Plasticity Lab
• NARSAD Young Investigator Grant Investigation of the modulatory role of NRGI/ErbB signalling on the glutamatergic transmission in dopaminergic mesencephalic neurons: potential relevance for schizophrenia
• The role of inflammatory cytokines in the pathophysiology of mood disturbances in multiple sclerosis
Neuroimmunology Lab
• Altered host-virus interaction as cause of multiple sclerosis: focus on Epstein-Barr virus and antiviral immune response
• Comorbidità fra la malattia celiaca e la sclerosi multipla
• Does gut flora influence autoimmune responses in Multiple Sclerosis? The MAIT cell story

Neurophysiology and Plasticity Lab
• Optogenetic dissection of Striatum-Globus pallidus connection in a model of DYT1 dystonia
• RF-2010-2311657: Recovery of cholinergic neurotransmission dysfunction in DYT1 dystonia - Ripristino della funzione colinergica nella distonia DYT1
• Targeting lipid biology for DYT1 dystonia

Neurophysiology Lab
• Cell-type and subunit specific alterations of NMDA receptors in striatum at early stages of Parkinson’s disease
• Mitochondrial targeting in LRRK2-associated parkinsonism (PARK8)
• Role of serotonin in modulating L-DOPA-induced dyskinesia

Proteomics and Metabonomics Lab
• Extracellular Signaling in Neuroblastoma through Exosomes for novel drug Targets discovery (ESNET) GR-2011-02350301
• Hydrogen sulphide as a new player of Amyotrophic Lateral Sclerosis
• Looking for new insight on Omega-3 fatty acids role on cognitive decline and brain dysfunctions in age-related disorders GR-2011-02351086
• The mitochondrial Italian Human Proteome Project initiative (mt-HPP)

Signal Transduction Lab
• GR-2010-2312868 Role of ATM kinase in ErbB2 signaling: a novel therapeutic target to hit ErbB2-positive breast cancer stem cells?

RESEARCH LINE D Cognitive and Motor Neurorehabilitation

Experimental Neurorehabilitation Lab
• Fattori prognostici per l’efficacia della terapia robotica nel recupero della deambulazione in pazienti con ictus
• Instrumental analysis of fall-risk in patients with stroke

Developmental Dyslexia
• Differenze individuali nella fluenza di lettura: effetto dell’età e della dislessia evolutiva

Electrophysiology of Cognitive Processes Lab
• Benefits of exercise on cognitive processes: possible applications in rehabilitation
• Neural bases of complex actions planning

Neuropsychology of Attention Lab
• Disturbances of number representation in right brain damage (RBD)
• Functional origin and neural bases of the number-space interaction: fMRI investigations
• Predictive components of attentional orienting in right brain damage and in the healthy brain
• Roles of the temporal-parietal junction (TPJ) and the superior parietal lobule (SPL) in the re-orienting of spatial attention
Neuropsychology of Visual-Space and Navigation Disorders Lab

- Alterazioni della rappresentazione corporea in pazienti amputati: uno studio di localizzazione e connettività funzionale
- Confronto tra compiti di presa di decisione in situazioni di vita quotidiana e in situazioni di gioco: uno studio su pazienti neurologici e su individui sani
- Guardare con gli occhi della mente: Sistemi neurali distinti per oggetti, ambienti e mappe geografiche
- Rappresentazione mentale della città in pazienti cerebrolesi
- Utilizzo dei punti di repere ambientali: ruolo del linguaggio

RESEARCH LINE E Translational Clinical Research

Ataxia Research Lab

- Anatomo-functional correlates of cerebro-cerebellar interactions as assessed by Diffusion Tensor Imaging
- Cerebellar-cortical circuits in Autism Spectrum Disorders: new perspectives for treatment implementation
- Cerebellar transcranial direct current stimulation and social behavior

Microbial Biofilm Lab

- Biofilm growth and antibiotic resistance of bacteria isolated from patients undergoing neuro-rehabilitation.

Multiple Sclerosis Lab

- Effetto della stimolazione spinale a corrente continua sul dolore nella sclerosi multipla: valutazione clinica, neurofisiologica e dell’attività del sistema endocannabinoide
- Il ruolo della Stimolazione Elettrica Funzionale per il recupero della deambulazione nei pazienti con malattie neurologiche
- Registro Italiano Sclerosi Multipla

Neuroelectric Imaging and BCI Lab (NEILab)

- BrainHack-Bringing the arts and sciences of brain and neural computer interface together

Post-Coma Cranial Trauma Lab

- Disturbi del sonno in pazienti con grave cerebrolesione acquista: natura e possibili effetti sull’outcome riabilitativo
- Effetti della grave cerebrolesione acquista (GCA) sulla sfera sessuale, in relazione alla vita di coppia
- Efficacia del Supporto Psicologico al Caregiver del Paziente con GCA
- Empatia e disturbi emozionali nel paziente con esiti di grave cerebrolesione acquista, e il loro possibile effetto sulla qualità della vita del paziente e della sua famiglia
- Evoluzione della personalità dopo Grave Cerebrolesione Acquista (GCA)
- La tecnica della scrittura nei pazienti con esiti di grave Trauma Cranico: impiego della narrazione per promuovere il benessere cognitivo e psicologico
- Le neuroimmagini morfo-funzionali con risonanza magnetica ad alto campo (3 Tesla) nelle Gravi Cerebrolesioni Acquisite (sindromi postcomatose)
- Ri-prendersi cura dei propri figli dopo una grave cerebrolesione acquista
- Studio dell’effetto framing in pazienti con GCA
Robotic Neurorehabilitation Lab

- **HANK**: European advanced exoskeleton for rehabilitation of Acquired Brain Damage (ABD) and/or spinal cord injury’s patients
- Neurophysiological approach to evaluate cerebro-cerebellar interactions. Characterization of a cerebellar connectivity EEG index
- **SYMBITRON**: Symbiotic man-machine interactions in wearable exoskeletons to enhance mobility for paraplegics

Social Neuroscience Lab

- And yet they MOve: immobile patients re-enter the physical world through embodiment in avatar or robot surrogates
- Anosognosia for bucco-facial and limb apraxia
- Autistic traits influence interpersonal motor coordination in a joint-action task
- Come together: Human-avatar on-line interactions boost joint-action performance in apraxic patients
- Sensorimotor illusions and representation of the body in healthy people with spinal cord injury
- The role of sensory feedback in the control of external devices via braincomputer interfaces

Spinal Cord Injury Rehabilitation (SPIRE)

- Antibodies against Nogo-A to enhance regeneration and functional recovery after acute spinal cord injury, a multicenter European clinical proof of concept trial-NISCI
- EMSCI European Multicenter Study about Spinal Cord Injury
- SCI-ARMI Spinal Cord Injury - Ability Realization Measurement Index

RESEARCH LINE F Functional Neuroimaging

Functional Neuroimaging Lab

- Analisi dei correlati strutturali e funzionali in pazienti con ADHD e definizione del profilo clinico e neuropsicologico
- Le basi neurali dell’effetto boost attenzionale
- Indagine delle caratteristiche neuroanatomiche, cognitive e comportamentali della sindrome di Ehlers-Danlos, tipo ipermobile [JHS/EDS-HT]: implicazioni per la diagnosi e il trattamento
- Morphofunctional visual pathways evaluation in multiple sclerosis: possible identification of neurodegenerative biomarkers
- MRI examinations in patients with pacemaker or ICD: a personalized tool for the risk assessment
- Neurobiological bases of social cognition deficits observed in patients with myotonic dystrophy type 1 and type 2
- The cerebellar role in Alzheimer disease
- Tra riserva celebrale e riserva neurale. Ruolo dei marcatori di neuroimmagine nell’individuare modelli dinamici di resilienza cognitiva e cerebrale