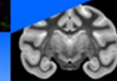


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2024***

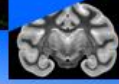
A journey through epilepsy: from the neurobiology to advance therapy		Organizer: Dr Vincent MAGLOIRE vincent.magloire@inserm.fr
<p>Epilepsy is a devastating neurological disease that affects approximately 0.5 - 1% of the population worldwide and in ~30% of cases, seizures continue despite optimal medication. Pharmacoresistant epilepsy is associated with high rates of comorbidities and increased mortality.</p> <p>This NeuroConference Serie aims at giving an overview of the research done in epilepsy from its neurobiology to the development of advanced therapy. On the first day, we will discuss what is epilepsy and what is an epileptic neuronal network. On the second day, we will continue our journey by looking at various processes occurring in an epileptic brain that permit seizures as well as affect normal brain functions such as memory, sleep or even the respiratory system. Finally, on the last day, we will explore potential new genetic approaches to treat pharmaco-resistant epilepsy.</p> <p>By the end of the conference, you should have a better understanding of what type of neurophysiological processes and brain functions are affected in this neurologic disease. In addition, you will be aware of a range of new cutting-edge genetic approaches that are been developed to rescue an epileptic network.</p>		
Wed Oct 2	An overview of epilepsy from synapse to patients: a neural network disease	
	14.00-15.00	Dr Vincent MAGLOIRE (TIGER, Centre de Recherche en Neurosciences de Lyon, Bron) Title: What is an epileptic network? A neurobiological perspective
	15.15-16.15	Dr Elif KOKSAL ERSOZ (COPHY, Centre de Recherche en Neurosciences de Lyon, Bron) Title: What is an epileptic network? A computational perspective
	16.30-17.30	Dr Julien JUNG (EDUWELL, iEEG, Centre de Recherche en Neurosciences de Lyon, Bron) Title: What is an epileptic network? A clinical perspective.
Amphi Neurocampus CRNL (CH Le Vinatier, Bat. 462, 95 bd Pinel, Bron)		



<p>Thu Oct 3</p>	<p>Epileptogenesis and ictogenesis processes</p>		<p>Amphi Neurocampus CRNL (CH Le Vinatier, Bat. 462, 95 bd Pinel, Bron)</p>
	<p>9.30-10.30</p>	<p>Dr Wanda GRABON / Dr Laurent BEZIN (TIGER, Centre de Recherche en Neurosciences de Lyon, Bron)</p> <p>Title: Neuroinflammation in epileptogenesis: harmful or protective?</p>	
	<p>10.45-11.45</p>	<p>Dr Jean-Bernard MANENT (Institut de neurobiologie de la méditerranée, Marseille)</p> <p>Title: From genes to abnormal epileptic networks: the example of cortical and subcortical heteropia</p>	
	<p>12.00-13.00</p>	<p>Dr Elena DOSSI (Centre interdisciplinaire de recherche en biologie, Collège de France, Paris)</p> <p>Title: Ictogenesis in cortical microcircuits: what can we learn from human epileptic tissues?</p>	
	<p>Beyond seizures: impact of epilepsy on brain functions</p>		
	<p>15.00-16.00</p>	<p>Dr Laetitia CHAUVIERE (Institute for Molecular and Behavioral Neuroscience, University of Cologne, Cologne, Germany)</p> <p>Title: Memory processes alteration in epilepsy</p>	
	<p>16.15-17.15</p>	<p>Dr Amanda ALMACELLAS BARBANOJ (Institute of Neurology, University College London, UK)</p> <p>Title: Malformations of cortical development, epilepsy and co-morbidities.</p> <p>ONLINE speaker</p>	
<p>17.30-18.30</p>	<p>Pr Sylvain RHEIMS (TIGER, Centre de Recherche en Neurosciences de Lyon, Hospices Civils de Lyon, Bron)</p> <p>Title: Epilepsy, central respiratory dysfunction and risk of SUDEP</p>		
<p>Fri Oct 4</p>	<p>Advance Therapy for refractory epilepsy</p>		<p>Amphi Neurocampus CRNL (CH Le Vinatier, Bat. 462, 95 bd Pinel, Bron)</p>
	<p>9.30-10.30</p>	<p>Dr Christophe HENRICH (Stem Cell and Brain Research Institute, Bron)</p> <p>Title: Reprogramming reactive glia into GABAergic interneurons: a new avenue to reduce epileptic seizures</p>	
	<p>10.45-11.45</p>	<p>Dr Amy RICHARDSON (Institute of Neurology, University College London, UK)</p> <p>Title: Gene therapy for epilepsy harnessing chloride regulation</p> <p>ONLINE speaker</p>	
<p>12.00-13.00</p>	<p>Dr Gareth MORRIS (Division of Neuroscience, Manchester University, UK)</p> <p>Title: miRNA in epilepsy and their potential to treat epilepsy</p> <p>ONLINE speaker</p>		

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		Organizers:		
		<p>Marine MONDINO (CRNL), Marion RICHARD (CRNL) & Jérôme SALLET (SBRI)</p> <p>marine.mondino@ch-le-vinatier.fr marion.richard@univ-lyon1.fr jerome.sallet@inserm.fr</p>		
<p><i>Several neuromodulation methods are currently being used in humans to modify brain activity in physiological contexts to better understand brain function, or in pathological contexts to alleviate symptoms. However, the exact way in which these methods modify neuronal activity at the cellular level is still not clearly characterized. This Neuroconference theme will present five different neuromodulation techniques (FUS, TMS, tTIS, tACS and tDCS), some of their applications and current knowledge of their underlying mechanisms, highlighting the advantages and limitations of each technique.</i></p>				
Thu Oct 10	Focus on FUS (Focal Ultrasound Stimulation)			Amphi Neurocampus CRNL (CH Le Vinatier, Bat. 462, 95 bd Pinel, Bron)
	14.00-14.30	<p>Dr Jérôme SALLET (Stem Cell and Brain Research Institute, Lyon)</p> <p>Introduction and history of neuromodulation methods</p>		
	14.30-15.30	<p>Dr Jérôme SALLET (Stem Cell and Brain Research Institute, Lyon)</p> <p>Title: Testing causality in brain networks using transcranial ultrasound neurostimulation</p>		
	15.45-16.45	<p>Dr W. Apoutou N'DJIN (Laboratory of Therapeutic Applications of Ultrasound, Lyon)</p> <p>Title: Biophysical mechanisms underlying UltraSound Neurostimulation</p>		
	17.00-17.30	Discussion		
Fri Oct 11	Therapeutic applications of Neurostimulation: neurological and psychiatric diseases			Amphi Neurocampus CRNL (CH Le Vinatier, Bat. 462, 95 bd Pinel, Bron)
	14.00-15.00	<p>Dr Adam WILLIAMSON (International Clinical Research Center, Brno, Czech Republic & Karolinska Institutet, Sweden)</p> <p>Title: Clinical Results of Non-invasive Deep Brain Stimulation in Epilepsy and Parkinson's patients using Temporal Interference</p> <p style="text-align: right; color: blue;">ONLINE speaker</p>		
	15.15-16.15	<p>Dr Jérôme BRUNELIN (Centre de Recherche en Neurosciences de Lyon, Lyon)</p> <p>Title: Investigating and treating schizophrenia with noninvasive brain stimulation (TMS/tDCS/tACS/tRNS)</p>		
	16.30-17.00	Discussion		



Tue Oct 15	Mechanisms underlying neuromodulation effects (1/2)			
	9.00-10.00	<p>Dr Andrea ANTAL (Non-Invasive Brain Stimulation Laboratory, Dept. of Neurology, Goettingen University)</p> <p>Title: Neurophysiological, cellular and molecular mechanisms of action of tACS and tRNS.</p> <p style="text-align: right;">ONLINE speaker</p>	Amphi Neurocampus CRNL (CH Le Vinatier, Bat. 462, 95 bd Pinel, Bron)	
	10.15-11.15	<p>Dr Dezso NEMETH (Centre de Recherche en Neurosciences de Lyon, Lyon)</p> <p>Title: Modulating learning and memory processes by non-invasive brain stimulation (tACS/tDCS/TMS)</p>		
	11.30-12.30	<p>Pr Vincent VAN WAES (LINC, Université de Bourgogne Franche Comté)</p> <p>Title: Interest of animal models in deciphering the biological effects of neurostimulation techniques</p> <p style="text-align: right;">ONLINE speaker</p>		
	12.30-13.00	Discussion		
Wed Oct 16	Mechanisms underlying neuromodulation effects (2/2)			
	9.00-10.00	<p>Dr Nir GROSSMAN (Imperial College, London, UK)</p> <p>Title: Non-invasive temporal interference deep brain stimulation</p> <p style="text-align: right;">ONLINE speaker</p>	Amphi Neurocampus CRNL (CH Le Vinatier, Bat. 462, 95 bd Pinel, Bron)	
	10.15-11.15	<p>Dr Marine MONDINO (Centre de Recherche en Neurosciences de Lyon, Lyon)</p> <p>Title: Mechanisms of action of tDCS</p>		
	11.30-12.30	<p>Dr Marine VERNET (Centre de Recherche en Neurosciences de Lyon, Lyon)</p> <p>Title: Exploring cortical connectivity, oscillations and plasticity underlying cognition through the TMS-EEG combination.</p>		
	Focus on TMS (Transcranial Magnetic Stimulation)			Amphi Neurocampus CRNL (CH Le Vinatier, Bat. 462, 95 bd Pinel, Bron)
	14.00-15.00	<p>Dr Cécilia NEIGE (Centre de Recherche en Neurosciences de Lyon, Lyon)</p> <p>Title: Investigating corticospinal excitability and brain networks with TMS</p>		
	15.15-16.15	<p>Dr Estelle RAFFIN (Ecole Polytechnique Fédérale de Lausanne, Suisse)</p> <p>Title: Coupling EEG with TMS to investigate the neural effects of NIBS</p> <p style="text-align: right;">ONLINE speaker</p>		
16.30-17.00	Discussion			
Mon Oct 21	10.00-12.00	Student debate	Amphi Neurocampus CRNL (CH Le Vinatier, Bat. 462, 95 bd Pinel, Bron)	

ABSTRACTS

Dr Adam WILLIAMSON (International Clinical Research Center, Brno, Czech Republic & Karolinska Institutet, Sweden)

Title: Clinical Results of Non-invasive Deep Brain Stimulation in Epilepsy and Parkinson's patients using Temporal Interference

Temporal Interference Stimulation (TIS) is an innovative non-invasive brain stimulation technique which enables targeted modulation of deep brain structures by applying high-frequency electrical fields. In this study, we present clinical results from two patient cohorts: those with medication-refractory mesiotemporal epilepsy (MTLE) and those with Parkinson's disease (PD).

In the epilepsy cohort, TIS targeted the hippocampus in 13 patients implanted with stereoelectroencephalography (sEEG) depth electrodes. TIS at an envelope frequency of 130 Hz significantly reduced interictal epileptiform discharges (IEDs) and high-frequency oscillations (HFOs), including fast ripples, suggesting its potential as a non-invasive alternative for neuromodulation in epilepsy.

In the Parkinson's cohort, TIS targeted the subthalamic nucleus (STN) in 7 patients. The results demonstrated a significant reduction in pathological beta oscillations, similar to those achieved by conventional deep brain stimulation (DBS), indicating that TIS can effectively modulate motor symptoms in PD patients without the need for invasive surgery.

These findings highlight TIS as a promising tool for non-invasive deep brain stimulation, offering potential therapeutic benefits for patients with epilepsy and Parkinson's disease, particularly for those who are not candidates for traditional surgical interventions. Further research is warranted to explore long-term outcomes and refine stimulation parameters for individualized treatment.

Dr Nir GROSSMAN (Imperial College, London, UK)

Title: Non-invasive temporal interference deep brain stimulation

Electrical brain stimulation is a key technique in research and clinical neuroscience studies and is also in increasingly widespread use from a therapeutic standpoint. However, to date, all methods of electrical stimulation of the brain either require surgery to implant an electrode at a defined site or involve the application of non-focal electric fields to large fractions of the brain. We recently discovered a strategy for sculpting electrical fields to enable focused yet noninvasive neural stimulation at depth using temporal interference (TI) of kHz electric fields with a difference frequency within the range of neural activity. We reported the TI brain stimulation concept and its validation in rodents in 2017 (Grossman et al, Cell 2017) and in humans in 2023 (Violante et al., Nature Neuroscience, 2023). The TI stimulation was awarded the Neuromodulation Prize by Science (Grossman, Science 2018). In this presentation, I will introduce the concept of non-invasive TI brain stimulation, its systematic validations in animal models and humans, insights into the mechanism of TI neural stimulation, and ongoing translation into therapy for Alzheimer's disease.