



## Agenda of Mini-symposium

| Time        | Speaker               | Topic   |
|-------------|-----------------------|---|
| 8.50-9.00   | Thierry Burnouf       | Welcome and purpose of the Mini-symposium   |
| 9.00-9.30   | David Blum            | Biomedical Materials, Tissue Engineering and Tau: fostering Taiwan-France collaboration in neurodegeneration  |
| 9.30-9.50   | Chaur-Jong Hu         | Experience with Amyloid on Tau splicing and phosphorylation   |
| 9.50-10.10  | Kun-Ju Lin            | Recent update in Tau PET imaging  |
| 10.10-10.25 | Hua-Shan Liu          | Applications of magnetic resonance imaging technique in brain disease   |
| 10.25-10.45 |                       | COFFEE BREAK  |
| 10.45-11.00 | Hung-Ming Chang       | Early-life sleep deprivation significantly predisposes the hippocampal neurons to oxidative damage: potential implication for the development of cognitive dysfunction in adult age |
| 11.00-11.15 | Chih-Wei Peng         | Engineering approaches to understand and develop neuromodulation strategies for function restoration in neurological diseases   |
| 11.15-11.30 | Tzu-Sen Yang          | Probing real-time activation of NF-kappa B signaling circuits by low level laser therapy (LLLT) in single living cells  |
| 11.30-11.45 | Chien-Chung Chen      | Novel hollow fiber substrate for cell encapsulation for potential improved long-term cell therapy of neurodegenerative diseases   |
| 11.45-12.00 | Tsungrong Kuo         | Surfaced Enhanced Raman Scattering Platform for Tau Protein Detection   |
| 12.00-12.15 | Wei-Chen Huang        | Next-generation Brain-Machine Interfaces: Materials Design and Fabrication of Ultra-compliant Biomedical Implants   |
| 12.15-12.30 | Thierry Burnouf       | Use of human platelet lysates as a source of multiple neurotrophins for the treatment of neurological disorders   |
| 12.30-13.00 | Roundtable discussion | Next steps into fostering Taiwan-France collaboration in neurodegeneration  |



**David Blum, PhD**

**CBME Visiting Professor  
inserm Research Director,  
UMR Inserm UMR-S1172,  
Jean-Pierre Aubert Research Centre,  
Université Lille-Nord de France, France**

***Biomedical Materials, Tissue Engineering and Tau: fostering Taiwan-France collaboration in neurodegeneration***

Tau is an important protein for neuronal plasticity and its function is impaired in a growing number of neurodegenerative disorders leading to both cognitive, motor and even developmental alterations. It is therefore important to develop novel approaches to reinstate normal Tau functions but also to circumvent neuronal plasticity impairments induced by Tau dysfunctions. This symposium is aimed to reinforce the collaboration between TMU and our Inserm laboratory in the field of medical bioengineering.

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**Chaur-Jong Hu, MD, PhD  
Professor  
Department of Neurology  
Taipei Medical University Shuang Ho  
Hospital  
Centre for Neurotroma and  
neuroregeneration**

***Experience with Amyloid on Tau splicing and phosphorylation***

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**Kun-Ju Lin, PhD**

**Molecular Imaging Center,  
Chang Gung Memorial Hospital**

***Recent update in Tau PET imaging***

The development of tau-specific positron emission tomography (PET) tracers allows imaging in vivo the regional load of tau pathology in Alzheimer's disease (AD) and other tauopathies. Exploring the patterns of tau deposition in vivo for different pathologies will allow discrimination between neurodegenerative diseases, and monitoring of disease progression. In this talk, we will summarize recent findings on the most promising tau PET tracers to date, discuss what has been learnt from these findings.

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**Hua-Shan Liu, PhD**

**School of Biomedical Engineering,  
College of Biomedical Engineering,  
Taipei Medical University**

***Application of magnetic resonance imaging technique in brain diseases***

Introduction of multimodal MR imaging techniques in various brain diseases based on my previous and current research work.

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**Hung-Ming Chang, PhD,**

**Department of Anatomy and Cell Biology,  
Graduate Institute of Medical Science,  
Taipei Medical University**

***Early-life sleep deprivation significantly predispose the hippocampal neurons to oxidative damage: Potential implication for the development of cognitive dysfunction in adult stage***

Chronic sleep deprivation during early life may play a detrimental role in neuronal development closely associated with the performance of the cognitive activity. However, the molecular mechanism of early life sleep deprivation in shaping the neuro-cognitive development in later life remain largely unknown. Therefore, exploring the potential impacts of early life sleep deprivation on the expression of molecules participating in the neuro-cognitive development is worthy of further investigation in this interesting field of research.

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**Chih-Wei Peng, PhD,**

**School of Biomedical Engineering,  
College of Biomedical Engineering,  
Taipei Medical University**

***Engineering approaches to understand and develop neuro-modulation strategies for function restoration in neurological diseases***

I will introduce my previous study regarding brain electrical neuromodulation. I will also discuss some possible future work such as brain neural modulation to improve memory or motor function, with possible impact on Tau protein

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**Tzu-Sen Yang, PhD**

**Graduate Institute of BioOptomechatronics,  
College of Biomedical Engineering,  
Taipei Medical University**

***Probing real-time activation of NF-kappa B signaling circuits by low level laser therapy (LLLT) in single living cells***

Recent studies in animal models of Alzheimer's and Parkinson's disease have reported that low-level near infrared light (NIR) therapy has neuroprotective effects, slowing the underlying death of neurons. It has become widely recognized that upon LLLT mitochondria are a likely site for the initial effects of light; specifically the cytochrome C oxidase enzyme (unit four in the mitochondrial respiratory chain) absorbs photons and increases its activity leading to increased ATP production, modulation of reactive oxygen species and induction of transcription factors. In this talk, we focus on characterizing the effects of LLLT dose on ROS formation and NF-kB activation. We anticipate that the proposed LLLT on single living cells can be an effective treatment strategy.

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**Tsung-Rong Kuo, PhD,**

**Graduate Institute of Nanomedicine and Medical Engineering,  
College of Biomedical Engineering,  
Taipei Medical University**

***Surfaced Enhanced Raman Scattering Platform for Tau Protein Detection***

The development of the reliable and sensitive method for the early detection of Alzheimer's disease is the most important issue for the improvement of the treatment efficiency. We have prepared SERS substrates by silver nanocrystals and gold islands for the detections of Alzheimer's disease biomarkers included A $\beta$ 1-42 and A $\beta$ 1-42. The biomarker of Tau protein is our next target for the detection of Alzheimer's disease. We also hope that our SERS platform could be used for the detections of different disease biomarkers.

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**Chien-Chung Chen, PhD**

**Graduate Institute of Biomedical Materials and Tissue Engineering,  
College of Biomedical Engineering,  
Taipei Medical University**

***Novel hollow fiber substrate for cell encapsulation for potential improved long-term cell therapy of neurodegenerative diseases***

Cell therapy is a promising disease treatment potentially treating in a long term way. However, the challenge facing is tremendous, including the viability and effective of participate cells, as well as the immunoresponse of the host towards the implanted functional cells. To this front, advanced cell protection can be provided by novel substrate. Encapsulated cell therapy is then proposed and in this case, we propose potentially the treatment for neuron degeneration disease, such as Parkinson disease.

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**Wei-Chen Huang, PhD**

**Graduate Institute of Biomedical Materials and Tissue Engineering,  
College of Biomedical Engineering,  
Taipei Medical University**

***Next-Generation Brain-Machine Interfaces: Materials Design and Fabrication of Ultra-compliant Biomedical Implants***

Design and fabrication of multifunctional biointerfaces is beneficial for the development of next-generation brain-machine interfaces. The presentation will introduce the strategies including creating novel biomimetic materials, nonconventional microelectronic fabrication techniques, and comprehensive device integration to develop ultra-compliant brain implants and peripheral neural implants.

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College of Biomedical Engineering



**Thierry Burnouf, PhD,**

**Graduate Institute of Biomedical Materials and Tissue Engineering,  
College of Biomedical Engineering,  
Taipei Medical University**

***Use of human platelet lysates as a source of multiple neurotrophins for the treatment of neurological disorders***

The purpose of the presentation is to introduce the therapeutic prospects seen in using specialized platelet lysates as a biotherapy of neurological (TBI)/neurodegenerative disorders based on intracranial and/or intranasal administrations, and understand the contribution that Tau study can bring in designing more effective therapeutic products and follow efficacy in some pre-clinical models.