



## 【校級神經醫學研究中心 110 年 9 月份月會】 會議紀錄

時 間：110年9月8日(星期三) 12:10-13:30  
地 點：視訊會議-Google Meet  
主 席：蔣永孝 主任(藍亭 副主任代理)

### TMU Neuroscience Research Center Monthly Meeting Record for September, 2021

**Chair:** Vice Director Timothy Lane

Recorded by: Professor J. Y. Wang,

**Host:** The Sleep Medicine Team

Secretary C. N. Huang

**Time:** 2021/9/8 (Wednesday) 12:10-13:30

**Place:** Net meeting via Google Meet

#### Meeting Agenda (議程) :

1. Opening by Vice Director Timothy Lane 藍亭副主任
2. “Long-term neurocognitive dysfunction after early-adolescent sleep deprivation” presented by Dr. Chih-Hao Yang 楊志豪老師

## 1. Opening

In the opening, Vice Director Timothy Lane welcomed the Sleep Medicine Team and the speaker Dr. Chih-Hao Yang. Then the leader of the Sleep Medicine, Dr. Hsin-Chien Lee (李信謙主任) introduced Dr. Yang. Dr. Lee and Dr. Yang have been cooperating for 5 years in a Program Project funded by the Ministry of Science and Technology (MOST). During the first 3 years, they were looking at the impact of sleep deprivation of the mother on their offspring. Now (these 3 years) they are trying to understand how sleep deprivation has a long-term effect on development. Dr. Lee is in charge of the human part, unfortunately, due to the COVID-19, they cannot collect enough human data. Now the only results are from the animal studies conducted by Dr. Yang.

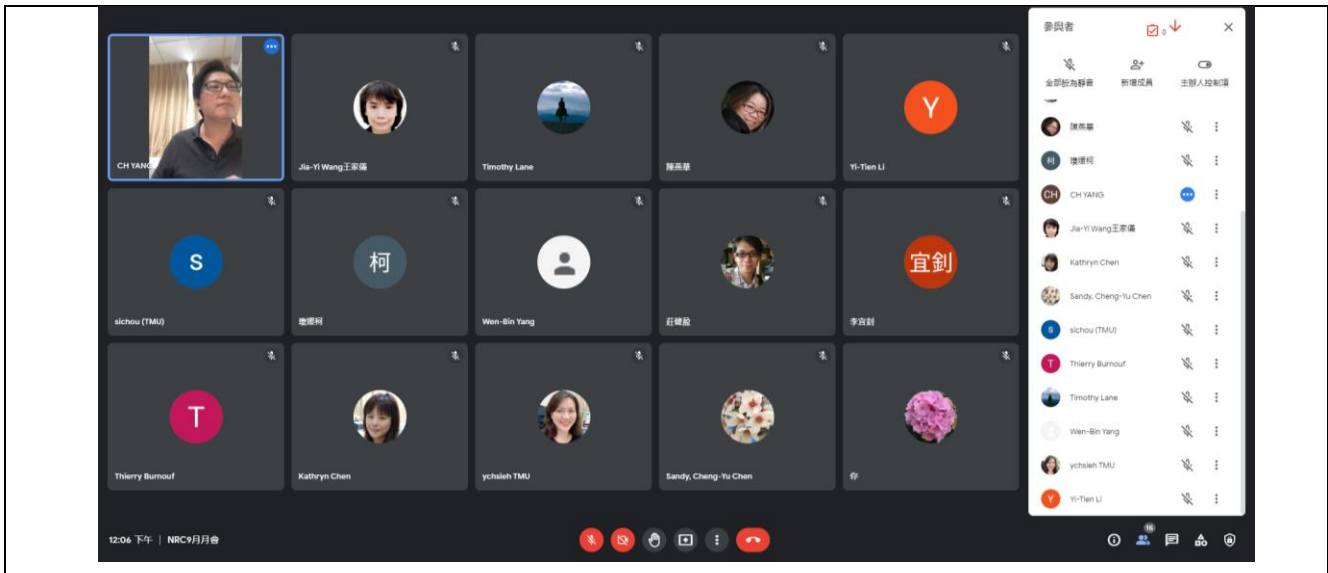
藍亭副院長首先歡迎睡眠團隊及今天的講者楊志豪老師，接著由睡眠團隊召集人李信謙主任介紹講者。李主任表示今年已經是他跟楊志豪老師合作的第五年了，前三年他們試著了解母體睡眠剝奪對於後代的影響，這三年則想知道睡眠剝奪對於長期發育的影響。但目前因為新冠肺炎疫情的影響，李主任負責的人體研究部分暫時無法收案，所以目前的研究成果都是由楊志豪老師的動物實驗得來。

## 2. Forum hosted by the Sleep Medicine Team

- 1) **Long-term neurocognitive dysfunction after early-adolescent sleep deprivation presented by Dr.**

**Chih-Hao Yang** 楊志豪老師

Brief summary of Dr. Yang's speech:



Group photo of the September monthly meeting. (Sep 8th, 2021)

Sleep is a vital component to maintain the health of all living organisms which represents the key machinery for individuals to physically and mentally repair itself. Most of the deleterious impact of sleep loss has been studied exclusively in adults while the delayed onset or long-term consequence of chronic sleep deprivation during early-life time, such as adolescent period has so far largely been ignored. It has been well-recognized that adolescent period is a sensitive stage that critical for the functional maturation of central nervous system. During this stage, the brain is extremely vulnerable and flexible that senses the daily environmental changes and responds dynamically with functional and structural adaptation. Growing number of individuals would use the certain form of electronics like a television, computer, or mobile devices at nights within an hour before getting into bed. Since the smartphone users are getting younger in recent days which raise the concerns about chronic late-night usage induced sleep deprivation during the adolescent period. So it is a critical question to investigate if chronic sleep deprivation during the early juvenile stage might potentially result in long-term impact on neurocognitive performance or emotional regulation in their later life?

By using an iPad based sleep deprivation model we established, we found that continued sleep deprivation during early adolescence (P21 to P35) could result in delayed onset of pathological phenotypes of neurocognitive performance and exaggerated emotional stress responses in laboratory animals. Meanwhile, by using the polysomnographic recordings, we further provided evidence showing a gradually occurrence of irregular sleep-wake pattern after the experience of early-adolescent sleep deprivation. Biochemical analyses and functional validation by pharmacological approaches indicated that microglia mediated neuroinflammatory events in the hypothalamus pathologically contribute to the observed irregular sleep-wake pattern and neurocognitive impairment at their later life. Findings of the study have the potential that eventually provide feasible therapeutic strategies for the treatment of sleep related disorders in clinic.

The screenshot shows a Zoom meeting interface. At the top, it says '錄製中' (Recording) and 'CH CH YANG正在分享螢幕畫面' (CH CH YANG is sharing screen). The main content is a slide titled 'Summary' with a timeline from 0 to 8 months. A red dashed box highlights 'Early-adolescent sleep deprivation' between P21 and P35. Below the timeline, three groups are labeled: 'Young Adults' (at 2 months), 'Mature Adults' (at 4 months), and 'Elderly' (at 8 months). A yellow arrow points down from 'Mature Adults' to 'Neurocognitive function', and another yellow arrow points up to 'Aberrant emotional control'. The Zoom interface includes a list of participants on the right (CH YANG, david lee, Jia-Yi Wang王家儀, and 還有另外 16 位使用者) and a bottom bar with icons for mute, video, chat, and call.

Long-term neurocognitive dysfunction after early-adolescent sleep deprivation presented by Dr. Chih-Hao Yang (Sep 8th, 2021)

## 2) Discussion

Dr. Lee added the comments that the new model is very important because in the first three years they did the sleep deprivation on the maternal parts to see the impact on the offspring. The animal studies did show that sleep deprivation in the mother mouse, did have a very strong impact on their offspring. However, similar impacts are not seen in humans. The reason might be that the traditional models are too stressful, it cannot happen in human subjects. Now, the iPad model is the more appropriate one, but it has other problems. When doing sleep deprivation, there are two major problems. One is that no matter animal or human, sleep deprivation will always change their sleep-wake pattern, even delay their sleep time or become an early awakening. Although they used the dim light of the iPad in the study, the light can still activate the neural system in the nighttime, which is not appropriate and not good for health. Besides sleep deprivation, there are many other factors that may influence the results such as the intensity of the blue light (iPad) and melatonin section.

Dr. Yang also said that because of the COVID-19 pandemic, the clinical study is postponed now. If they could find some evidence as well from the human in the future, which could relate to the animal study and pull them together to make the results more convincing to others.

會議結束時間為 13:20。