



## 【校級神經醫學研究中心 110 年 2 月份月會】

### 會議紀錄

時間：110年2月24日(星期三) 12:10-13:30

地點：現場會議-君蔚樓2樓會議室

同步視訊會議-Google Meet

主席：蔣永孝 主任 (藍亭副主任代理)

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

**Chair:** Vice Director Timothy Lane

Recorded by: Professor J. Y. Wang,  
Secretary C. N. Huang

**Host:** The Child Development Team

**Time:** 2021/2/24 (Wednesday) 12:10-13:30

**Place:** Conference room at 2<sup>nd</sup> Floor, Dream-Way Building, Taipei Medical University (and net meeting via Google Meet held simultaneously).

### Meeting Agenda (議程):

1. Opening by Vice Director Timothy Lane
2. “Adverse experience and infant brain development” by Dr. Pilyoung Kim (Department of Psychology, University of Denver, USA)
3. “The effects of parental mental health on preschoolers’ biomarkers and health – using hair cortisol and heavy metal levels for examination” by Yen-Tzu Fan (范晏慈, Ph.D. student in the Child Development Team)

### 1. Opening

Prof. Lane first welcomed Dr. Kim came to Taipei Medical University and attended our NRC meeting. Prof. Chen, the leader of the Children Development Team, introduced Dr. Kim. Dr. Kim is an Associate Professor in the Department of Psychology at the University of Denver. She is also the co-director of the Brain, AI, Child center. Prof. Chen’s team is running a MOST project cooperated with Dr. Kim. The topic is “The effect of sleep and biological stress under COVID-19 threat on infant brain development”. 藍亭副主任首先歡迎老師來到台北醫學大學並且參加我們的月會，然後請婦幼神經心智團隊的召集人陳怡樺老師介紹今天的講者，Dr. Kim 是美國丹佛大學心理學系的副教授，同時也是 Brain,



NRC February monthly meeting. (2/24, 2021)

AI, Child center 的主任。目前陳怡樺老師及 Dr. Kim 的團隊有共同執行科技部計畫-新冠肺炎下之睡眠與生物壓力對嬰兒大腦發展的影響—台灣與美國母嬰自懷孕至產後之追蹤比較。

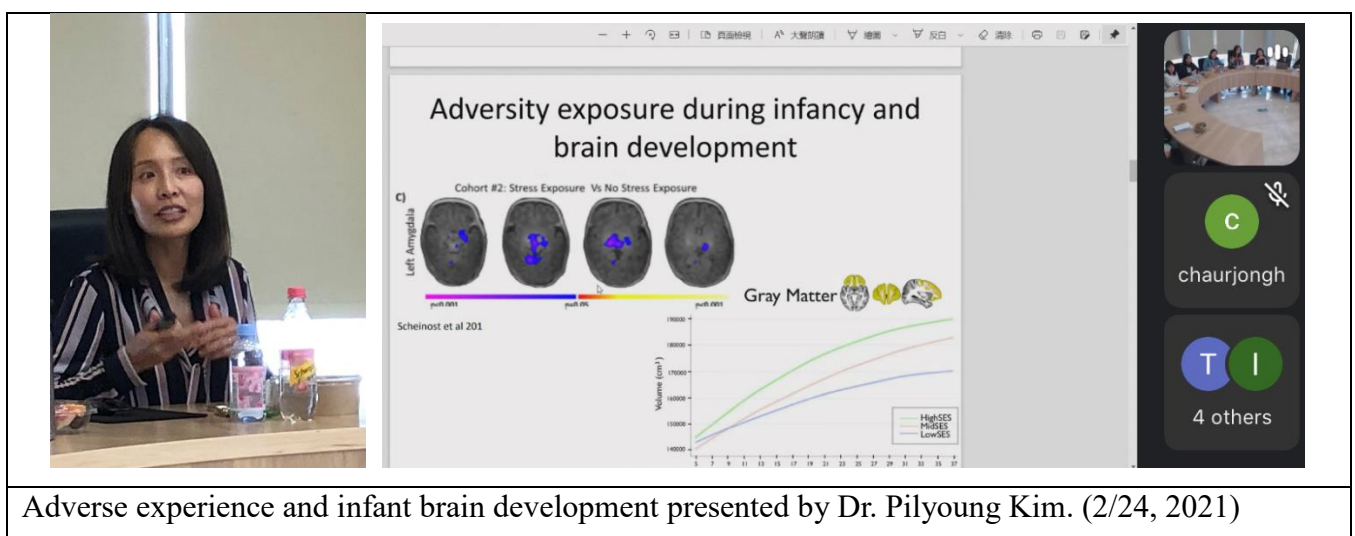
## 2. Forum

### 1) Adverse Experience and Infant Brain Development

The summary of Dr. Kim's speech:

Adverse childhood experiences (ACEs), like abuse, neglect, and household dysfunction, can have lasting effects on obesity, depression, heart disease, drug use problem, etc. Those experiences influence thought the whole brain regions but we only focused on a couple of brain areas that are particularly very involved in stress and emotion regulation. When we're exposed to stress, the amygdala is important to detect threat and stress in our environment and induce emotional reactivity. But if an individual is exposed to repeated and chronic stress, then people may have hyperreactivity to threats. It means that people will be ineffectively brain activation in the prefrontal cortex (PFC) after their amygdala responded. As a result, people have a harder time regulating negative emotional reactions to stress anxiety, or depression. Therefore, amygdala-PFC are used as early neural risk markers for emotion dysregulation.

We found that higher maternal anxiety symptoms were related to the negative functional connectivity between the amygdala and anterior cingulate cortex (ACC). Then negative amygdala-ACC functional connectivity was associated with higher cognitive development scores among infants. These results showed that negative functional connectivity may be a form of a more mature functional connectivity profile due to exposure to environmental adversities. In another study, we also focused on mothers' social economic risk which was measured as a lower educational level. We looked at the similarities between the mothers' functional connectivity and the neonates' functional connectivity. The results showed that the lower the maternal educational level the more similarities between a mother's functional connectivity and infants' functional connectivity.



The image shows a Zoom meeting interface. On the left, a woman with dark hair, wearing a striped shirt, is speaking. The main part of the screen displays a presentation slide titled "Adversity exposure during infancy and brain development". The slide includes four brain scan images labeled "Left Amygdala" with a color scale from blue (p=0.001) to red (p=0.05). Below the scans is a line graph showing "Volume (cm³)" on the y-axis (ranging from 140000 to 190000) and age on the x-axis (ranging from 7 to 37). The graph shows three lines representing different socioeconomic status (SES) groups: HighSES (green), MidSES (orange), and LowSES (blue). The HighSES line shows the highest volume, followed by MidSES, and then LowSES. The graph is attributed to "Scheinost et al 2011". On the right side of the Zoom window, there is a video feed of a group of people in a meeting room, and a list of participants including "chaurjongh" and "4 others".

Adverse experience and infant brain development presented by Dr. Pilyoung Kim. (2/24, 2021)

## 2) The effects of parental mental health on preschoolers' biomarkers and health – using hair cortisol and heavy metal levels for examination by Yen-Tzu Fan

Parental psychological pressure is believed to have a negative impact on children's growth and neurodevelopment, including depression that leads to infant insecurity and young children's cognitive abilities. Hair cortisol is an important biomarker of chronic psychological stress and disease. In recent years, studies have shown that mother's cortisol concentration can lead to neurological development problems in infants. Therefore, exploring the mental health of parents and children's health is an important topic in the growth of children. In addition, heavy metal exposure is an important issue nowadays, and families can have different risks of heavy metal exposure related to diet, environmental exposure, and socio-economic status. Many studies have shown that exposure to heavy metals such as arsenic, cadmium, mercury, and lead can increase the risk of cancer, allergies, cardiovascular disease, endocrine disorders, and neurological disorders.

The purpose of this study is to explore the connection between parental psychological status, heavy metal exposure, and cortisol concentration on children's health, moreover, the risk of unfavorable children's development. The questions discussed in this study include (1) What is the most important factor that leads to children's stress, heavy metal exposure, and debilitating problems? (2) Do fathers and mothers have the same or different impacts on children? (3) Does the mental health of parents affect the accumulation of cortisol and heavy metal concentrations in children?

The results are summarized as follows:

1. Children has higher risks to accumulate HMs than parents.
2. The concentration of hair cortisol concentration (HCC) in the father and HMs in the mother will affect the HCC concentration in children.
3. HCC is a good biomarker for mother's emotional status and stress, but not for father.
4. Father: negative emotion & worse partner relationships will increase the children stress.

The more concentration of HMs (As, Hg) in the children, the more risks of children health problems.

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### Research questions

**Parental factors**

- Parental mental health
- HM exposures
- Parental stress (HCC)

?

**Health biomarkers**

- HM exposure levels
- Children stress (HCC)
- Health problems

Potential risks for adverse physical and mental development

- The major factors contributing to children stress, HMs, or health?
- Paternal and maternal impacts
  - Similar or different?
- Parental mental health → level of children's HCC or HMs?

The effects of parental mental health on preschoolers' biomarkers and health – using hair cortisol and heavy metal levels for examination presented by Yen-Tzu Fan. (2/24, 2021)

### 3) Discussion

The speakers and students discussed how to distinguish the maternal stress and anxiety. In addition, Dr. Tzu- Yu Hsu also attended the net meeting and discussed with Dr. Kim regarding parental stress could also facilitate the infant's neuro growth.

參加的學生與講者討論如何分辨受試者的情緒，如抑鬱跟焦慮。徐慈妤老師也參加線上的會議，並和 Dr. Kim 討論父母的壓力是否也會促進孩童神經成長。



### 3. NRC Future Directions Meeting

The meeting will be held with the Taipei Neuroscience Institute and the date will be changed to Mar 6, 2021. Please reserve your time for the meeting.

本中心共識營將與台北神經醫學中心於3月6日共同舉辦，請各位成員踴躍參與。

#### *NRC Future Directions Meeting 神經醫學研究中心共識營*

Date 日期: 2021/03/06

Time 時間: 12:30~18:00 (registration from 12:00 開始報到)

Location 地點: Grand View Resort Beitou (No. 30, Youya Road, Beitou District, Taipei City)  
北投麗禧溫泉酒店 (台北市北投區幽雅路30號)

Dinner 晚宴: 18:30~20:00

會議結束時間為 13:20。