

Abstracts of papers presented
at the 2024 Cold Spring Harbor Asia Conference

FUNCTIONS AND REGULATION OF SLEEP

September 9–September 13, 2024

Arranged by

Antoine Adamantidis, *University of Bern*

Shumin Duan, *Zhejiang University*

Maiken Nedergaard, *University of Rochester*

Min Xu, *Chinese Academy of Sciences*

Masashi Yanagisawa, *University of Tsukuba*



Cold Spring Harbor Conferences Asia
Cold Spring Harbor Laboratory



FUNCTIONS AND REGULATION OF SLEEP

Monday, September 9 – Friday, September 13, 2024

Monday	7:00 pm	1 Keynote Session
Tuesday	9:00 am	2 Sleep Regulation: Genes and Molecules
Tuesday	2:00 pm	Poster Session
Tuesday	3:00 pm	<i>Chinese Tea and Beer Tasting</i>
Tuesday	7:00 pm	Keynote Speaker
Tuesday	7:45 pm	3 Rethink Sleep
Wednesday	9:00 am	4 REM Sleep / Cortical Dynamics
Wednesday	10:45 am	5 Sleep Regulation: Glia, Synapse
Wednesday	2:00 pm	<i>Visit to Old Suzhou*</i>
Wednesday	7:00 pm	6 Memory Processing during Sleep
Thursday	9:00 am	7 Circadian Rhythm
Thursday	2:00 pm	8 Sleep Regulation: Circuits
Thursday	6:00 pm	<i>Cocktails and Banquet</i>
Friday	9:00 am	9 Insights from Fly Sleep

Oral presentation sessions are located in the CSHA Auditorium
Poster session and Chinese Tea & Beer Tasting are in the Lake Front Hall.

Cocktail social hour is held outside in the Suz Garden.

Old Suzhou visits depart from the CSHA lobby

**optional tour requires additional fee.*

Meal locations and times are as follows:

Lunch: Main Cafeteria 12:00pm - 1:30pm

Dinner: Main Cafeteria 6:00pm - 7:30pm

Banquet: Suz Garden 7:00pm

More information will be available at CSHA office.

(Map at the end of this abstract book)

PROGRAM

MONDAY, September 9—7:00 PM

SESSION 1 KEYNOTE SESSION

Introduction by: Min Xu, Chinese Academy of Sciences, Shanghai, China

Yang Dan [35'+10']
University of California Berkeley, USA

The how and why of sleep 1

Introduction by: Qinghua Liu, National Institute of Biological Sciences, Beijing, China

Masashi Yanagisawa [35'+10']
University of Tsukuba, Japan

The mystery of sleep—Insights from mouse forward genetics

TUESDAY, September 10—9:00 AM

SESSION 2 SLEEP REGULATION: GENES AND MOLECULES

Chairperson: Masashi Yanagisawa, University of Tsukuba, Ibaraki Japan
Qinghua Liu, National Institute of Biological Sciences, Beijing, China

Understanding sleep—From human behavior and genetics to neural circuits.

Ying-Hui Fu [20'+10']

Presenter affiliation: UCSF Weill Institute for Neurosciences, San Francisco, California. 2

Different SIK3 isoforms regulate sleep

Hiromasa Funato [20'+10']

Presenter affiliation: University of Tsukuba, Tsukuba, Japan; Toho University, Tokyo, Japan. 3

- Tau hyperphosphorylation in locus coeruleus mediates Alzheimer's disease-associated early-onset sleep disruption by causing neuronal hyperexcitability**
 Yi-Ci Zhang, Xue-Ting Zhang, Peng-Yue Chen, Zi-Yue Zhou, Mao-Qing Huang, Xia Min, Dan Chen, Wen Zeng, Zhuo-Hao He, Zhao-Yin Wang, Kai-Wen He [10'+5']
 Presenter affiliation: Shanghai Institute of Organic Chemistry, Shanghai, China; Shanghai Key Laboratory of Aging Studies, Shanghai, China; University of Chinese Academy of Sciences, Beijing, China. 4
- KLF9 regulation of HCN2 in VTA dopaminergic neurons promotes wakefulness**
Feng Liu, Niannian Li, Xiangshan Yuan, Zhenfei Gao, Jinhong Shen, Kejia Wu, Shankai Yin [10'+5']
 Presenter affiliation: Shanghai Jiao Tong University School of Medicine Affiliated Sixth People's Hospital, Shanghai, China. 5
- Break**
- Calcineurin is a central regulator of baseline and homeostatic sleep regulations in mice**
Qinghua Liu [20'+10']
 Presenter affiliation: National Institute of Biological Sciences, Beijing, China. 6
- Prolonged sleep deprivation induces a cytokine storm-like syndrome in mammals**
 Di Sang, Keteng Lin, Yini Yang, Yulong Li, Erquan Zhang [20'+10']
 Presenter affiliation: NIBS, Beijing, Beijing, China. 7
- A physiological role of hydrogen peroxide in sleep regulation in mice**
Danqian Liu [10'+5']
 Presenter affiliation: Chinese Academy of Sciences, Shanghai, China. 8
- A homeostat center for NREM sleep in locus coeruleus**
Can Liu, Xin Yin, Rui Zhou, Shuangfeng Zhang, Fanxi Meng, Zihan Zhang, Bixia Chen, Peng Zuo, Bihan Shi, Lin Chen, Chongyang Wu, Peng Cao, Bin Li, Qi Li, Qinghua Liu [10'+5']
 Presenter affiliation: National Institute of Biological Sciences, Beijing, China; International Institute for Integrative Sleep Medicine, Tsukuba, Japan. 9

POSTER SESSION

- Electrophysiological activity of novel REM sleep-regulating neurons in the dorsal pons in sleep/wake cycles**
Yoshifumi Arai, Mitsuaki Kashiwagi, Mika Kanuka, Takaya Suganuma, Takeshi Kanda, Iyo Koyanagi, Masanori Sakaguchi, Masashi Yanagisawa, Yoshimasa Koyama, Yu Hayashi
Presenter affiliation: The University of Tokyo, Tokyo, Japan; University of Tsukuba, Tsukuba, Japan. 10
- A novel genetically encoded fluorescent sensor for monitoring orexin/hypocretin dynamics**
Shengwei Fu, Jinxia Wan, Shu Xie, Hui Dong, Huan Wang, Yulong Li
Presenter affiliation: Peking University, Beijing, China. 11
- Neuronal and circuit mechanism of comorbid sleep disorder in chronic pain**
Dan Hu, Xiao Hua, Ning Yan, Xin Jia, Ling Zhang
Presenter affiliation: Tongji University, Shanghai, China. 12
- Glutamate signal from MCH neurons involved in memory regulation**
Mengfan Jiao, Pham X. Thang, Jiaqi Cheng, Ronghan Lin, Hanhan Tang, Tong Meng, Yu Ohmura, Akihiro Yamanaka
Presenter affiliation: Chinese Institute for Brain Research, Beijing, China. 13
- Memory representation cells in the auditory neocortex—What happens after one sleep?**
Ruijie Li, Junjie Huang, Hongbo Jia, Xiaowei Chen
Presenter affiliation: Third Military Medical University, Chongqing, China. 14
- Dual neuropeptide network integrating environmental variation to coordinate sleep/wake cycles in *Drosophila***
Hailiang Li, Zhiyi Li, Fang Guo
Presenter affiliation: zhejiang university, Hangzhou, China. 15

Regulation of sleep amount by CRT1 via transcription of *Crh* in mice

Zhihao Liu, Zhiyong Guo, Junjie Xu, Rui Zhou, Bihan Shi, Lin Chen, Chongyang Wu, Haiyan Wang, Xia Wang, Fengchao Wang, Qi Li, Qinghua Liu

Presenter affiliation: National Institute of Biological Sciences, Beijing, China; Tsinghua University, Beijing, China.

16

The role of violet light and *Opn5* in the regulation of sleep/wakefulness

Jiali Ma, Sheikh M. Rahaman, Ronghan Lin, Hanhan Tang, Tong Meng, Akihiro Yamanaka

Presenter affiliation: Chinese Institute for Brain Research, Beijing, China.

17

Testing the serotonin hypothesis of depression by the region-specific disruption of serotonin synthesis and possible interactions with sleep

Yu Ohmura, Birkan Girgin, Hanhan Tang, Ronghan Lin, Tong Meng, Akihiro Yamanaka

Presenter affiliation: Chinese Institute for Brain Research (CIBR), Beijing, Beijing, China.

18

The function and mechanism study of lncRNA *LOC105369165* and its gene polymorphism on sleep fragmentation in OSA patients

Jinhong Shen, Weijun Huang, Haolin Yuan, Ke Lai, Zhenfei Gao, Niannian Li, Jian Guan, Shankai Yin, Feng Liu

Presenter affiliation: Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China.

19

Human *PERIOD3* variants lead to winter depression-like behaviors via glucocorticoid signaling

Haili Wang, Luoying Zhang

Presenter affiliation: Huazhong University of Science and Technology, Wuhan, Hubei, China.

20

The association between cognitive performance and sleep disturbance among the elderly population in the US and China—A mediation analysis of inflammatory biomarkers

Rui-zhi Yang, Jing Weng, Song Lin, Yi-jie Tang, Xiao-dan Wu, Kai Zeng

Presenter affiliation: the First Affiliated Hospital of Fujian Medical University, Fuzhou, China.

21

From hunger to postprandial—Neural dynamics of state-dependent behaviour in insects

Pengyu Zeng, Jiayu Xu, Fang Guo

Presenter affiliation: Zhejiang University, Hang Zhou, China.

22

In vivo DNA repair monitoring during sleep/wake cycles

Yanan Zhao, Wenjie Bian, Oscar C. Gonzalez, Luis de Lecea

Presenter affiliation: Stanford University, Palo Alto, California.

23

Hippocampal-cortical crosstalk during REM sleep for memory

Mingrui Zheng, Yufan Dong, Danqian Liu

Presenter affiliation: Chinese Academy of Science, Shanghai, China.

24

Functional imaging of mouse embryonic brain development in utero

Hangming Zheng, Jiejun Zhu, Dongming He, Mengzhu Sun, Zihao

Chen, Jin Yang, Chengqi Lin, Yun S. Shi, Lei Sun, Zhihai Qiu

Presenter affiliation: Guangdong Institute of Intelligence Science and Technology, Hengqin, Guangdong, China; University of Macau, Macau, China.

25

TUESDAY, September 10—3:00 PM

Chinese Tea and Beer Tasting

TUESDAY, September 10—7:00 PM

KEYNOTE SPEAKER

Introduction by: Min Xu, Chinese Academy of Sciences, Shanghai, China

Maiken Nedergaard [35'+10']

University of Rochester, Rochester, New York, USA

The nightlife of the brain

26

TUESDAY, September 10—7:45 PM

SESSION 3 RETHINK SLEEP

Chairperson: **Antoine Adamantidis**, University of Bern, Bern, Switzerland

Ecological flexibility in avian sleep

Niels C. Rattenborg [20'+10']

Presenter affiliation: Max Planck Institute for Biological Intelligence, Seewiesen, Germany.

27

Dissection of neural circuitry of sleep and defensive behaviors

Liping Wang [20'+10']

Presenter affiliation: CAS Key Laboratory of Brain Connectome and Manipulation, Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China.

28

WEDNESDAY, September 11—9:00 AM

SESSION 4 REM SLEEP / CORTICAL DYNAMICS

Chairpersons: **Akihiro Yamanaka**, Chinese Institute for Brain Research, Beijing, China
 Min Xu, Chinese Academy of Sciences, Shanghai, China

Dopamine-mediated mechanisms underlying REM Sleep initiation and regulation

Emi Hasegawa, Takeshi Sakurai [20'+10']

Presenter affiliation: University of Tsukuba, Tsukuba, Japan.

29

Analyses of the mechanisms and function of REM sleep

Yu Hayashi [20'+10']

Presenter affiliation: University of Tokyo, Tokyo, Japan; University of Tsukuba, Tsukuba, Japan.

30

REM sleep is associated with distinct global cortical dynamics and controlled by occipital cortex

Ziyue Wang, Xiang Fei, Xiaotong Liu, Yanjie Wang, Yue Hu, Wanling Peng, Ying-wei Wang, Siyu Zhang, Min Xu [10'+5']

Presenter affiliation: Institute of Neuroscience, Shanghai, China.

31

Cortical neural dynamics of distinct neural ensembles underlies brain state transitions

Yuexin Yang, Han Lu, Zengcai V. Guo [10'+5']

Presenter affiliation: Tsinghua University, Beijing, China.

32

Decoding cortical dynamics during sleep stage transitions

Yina Wei, Manli Luo [10'+5']

Presenter affiliation: Zhejiang Lab, Research Center for Frontier Fundamental Studies, Hangzhou, China.

33

WEDNESDAY, September 11—10:45 AM

SESSION 5 SLEEP REGULATION: GLIA, SYNAPSE

Chairperson: Shumin Duan, Zhejiang University, Hangzhou, China

The neuro-astrocyte connection—Understanding their role in sleep regulation

Carolina Gutierrez Herrera [20'+10']

Presenter affiliation: University of Bern, Bern, Switzerland.

34

Synaptic strength in prefrontal cortex encodes homeostatic sleep need

Shoi Shi [20'+10']

Presenter affiliation: University of Tsukuba, Ibaraki, Japan.

35

Control of adenosine and sleep homeostasis in the basal forebrain, neurons or astrocytes?

Wanling Peng, Xiaotong Liu, Guofen Ma, Zhaofa Wu, Ziyue Wang, Xiang Fei, Meiling Qin, Lizhao Wang, Yulong Li, Siyu Zhang, Min Xu [10'+5']

Presenter affiliation: Shanghai Jiao Tong University School of Medicine, Shanghai, China.

36

A mechanistic link between synaptic function and sleep regulation in mice

Zhiyong Guo, Zhihao Liu, Xia Min, Kaiwen He, Qi Li, Qinghua Liu [10'+5']

Presenter affiliation: Peking University, Beijing, China; National Institute of Biological Sciences, Beijing (NIBS), Beijing, China.

37

WEDNESDAY, September 11—2:00 PM

Visit to Old Suzhou

WEDNESDAY, September 11—7:00 PM

SESSION 6 MEMORY PROCESSING DURING SLEEP

Chairpersons: **Antoine Adamantidis**, University of Bern, Bern, Switzerland
Min Xu, Chinese Academy of Sciences, Shanghai, China

Spatio-temporal dynamics of cortical micro-circuit during REM sleep - structure & functions

Antoine Adamantidis [20'+10']

Presenter affiliation: University of Bern, Bern, Switzerland. 38

Memory regulation by the MCH neurons during REM sleep

Akihiro Yamanaka [20'+10']

Presenter affiliation: Chinese Institute for Brain Research, Beijing, Beijing, China. 39

Neural control of hippocampus-dependent memory consolidation during sleep

Min Xu [20'+10']

Presenter affiliation: Chinese Academy of Sciences, Shanghai, China. 40

Wakefulness regulation of memory—Structure and activity

Yadong Li [10'+5']

Presenter affiliation: Shanghai Jiao Tong University School of Medicine, Shanghai, China. 41

Influence of glucose administration and fasting on sleep-related brain oscillations

Yu Lun, Manfred Hallschmid, Jan Born, Niels Niethard [10'+5']

Presenter affiliation: Institute of Medical Psychology and Behavioral Neurobiology, Tübingen, Germany. 42

Impact of sleep deprivation on fear extinction memory—The role of miR-185-5p-GBP2 pathway

Meimei Guo, Feiyang Zhang, Yi Zhang, Jiazhi Jiang, Lesheng Wang, Wei Wei, Xiang Li [10'+5']

Presenter affiliation: Zhongnan Hospital of Wuhan University, Wuhan, China; Wuhan University, Wuhan, China. 43

SESSION 7 CIRCADIAN RHYTHM

Chairpersons: **Fang Guo**, Zhejiang University, Hangzhou, China
Luoying Zhang, Huazhong University of Science and Technology, Wuhan, China

Nutrient abundance signals the changing of the seasons by phosphorylating PER2

Daniel C. Levine, Rasmus H. Reeh, Thomas Mandrup-Poulsen, Ying-Hui Fu, Louis J. Ptacek [20'+10']

Presenter affiliation: UCSF, San Francisco, California.

44

Human PERIOD3 Variants Modulate Seasonal Adaptation of Circadian Rhythm via CRYPTOCHROME2

Luoying Zhang [20'+10']

Presenter affiliation: Huazhong University of Science and Technology, Wuhan, China.

45

Novel clock neuron subtypes regulate temporal aspects of sleep

Dingbang Ma, Michael Rosbash [10'+5']

Presenter affiliation: Chinese Academy of Sciences, Shanghai, China.

46

Upstream open reading frames dynamically modulate CLOCK protein translation to regulate circadian rhythm and sleep

Ke Shui, Qinyu Li, Luoying Zhang [10'+5']

Presenter affiliation: Huazhong Agricultural University, Wuhan, China; Huazhong University of Science and Technology, Wuhan, China.

47

Break

Circadian regulation of zebrafish sleep by melatonin

Andrew Hill, Andrey Andreev, Jasmine S. Emtage, Marina N.

Lecoecuche, David A. Prober [20'+10']

Presenter affiliation: California Institute of Technology, Pasadena, California.

48

Cognitive hyperplasticity drives insomnia

Sheng Huang, Chengji Piao, Zhiying Zhao, Christine B. Beuschel, Oriane Turrel, David Toppe, Stephan J. Sigrist [10'+5']

Presenter affiliation: Freie Universität Berlin, Berlin, Germany; Charité Universitätsmedizin, Berlin, Germany.

49

Phospho-proteomic analysis reveals hypophosphorylation at synapses as a consequence of sleep in *Drosophila*

Chengji Piao, Sheng Huang, Ewelina Dutkiewicz, Laxmikanth

Kollipara, Albert Sickmann, Stephan Sigrist [10'+5']

Presenter affiliation: Freie Universität Berlin, Berlin, Germany; Charité Universitätsmedizin, Berlin, Germany.

50

A genetic model for understanding chronic social isolation-induced sleep loss

Wanhe Li [10'+5']

Presenter affiliation: Texas A&M University, College Station, Texas.

51

THURSDAY, September 12—2:00 PM

SESSION 8 SLEEP REGULATION: CIRCUITS

Chairpersons: **Antoine Adamantidis**, University of Bern, Bern, Switzerland

Zhi-Li Huang, Fudan University, Shanghai, China

Neuromodulation of sleep states

Luis de Lecea [20'+10']

Presenter affiliation: Stanford University, Stanford, California.

52

Neuronal subtypes and circuits in sleep-wake regulation—Insights from the basal ganglia

Zhi-Li Huang, Ya-Dong Li, Ze-Ka Chen, Feng-Fei Ding, Wei-Min Qu [20'+10']

Presenter affiliation: Fudan University, Shanghai, China.

53

Silencing dopamine neurons during sleep restores normal sleep pattern in parkinsonian mice

Chengbo Meng, Guohong Cui [10'+5']

Presenter affiliation: NIH/NIEHS, Durham, North Carolina.

54

Adolescent sleep shapes social novelty preference in mice

Wen-Jie Bian [10'+5']

Presenter affiliation: Stanford University, Stanford, California; Wu Tsai Neurosciences Institute, Stanford, California; Westlake Laboratory of Life Sciences and Biomedicine, Hangzhou, China; Westlake University, Hangzhou, China.

55

Medial habenula cholinergic neurons modulate hyperalgesia induced by sleep deprivation
Xiang-Sha Yin, Bai-Rong Chen, Xi-Chun Ye, Yun Wang [10'+5']
Presenter affiliation: Peking University, Beijing, China. 56

Break

Slow-wave sleep engages brainstem circuitry to prevent stress-induced anxiety behavior
Shumin Duan [20'+10']
Presenter affiliation: Zhejiang University, Hangzhou, China. 57

Sleep regulation—Neural circuit control and immune modulation
Haitao Xiang, Jie Fang, Shixue Cheng, Chenyan Ma [10'+5']
Presenter affiliation: Shenzhen Medical Academy of Research and Translation, Shenzhen, China. 58

A preoptic neuronal population encodes and controls sleep homeostasis
Huateng Cao, Jin Zhao, Yijin Xiu, Siwen Pan, Shajin Huang, Qian Zhang, Zhe Zhang [10'+5']
Presenter affiliation: Institute of Neuroscience, Chinese Academy of Sciences, Shanghai, China; Center for Excellence in Brain Science and Intelligence Technology, CAS, Shanghai, China. 59

Stability of hypothalamic neuronal activity in sleep and wake regulation
Yudong Yan, Niccolò Calcini, Thomas Rusterholz, Antoine Adamantidis [10'+5']
Presenter affiliation: Inselspital University Hospital Bern, Bern, Switzerland; University of Bern, Bern, Switzerland. 60

Sleep and cardiovascular regulation
Yuanyuan Yao [10'+5']
Presenter affiliation: Shenzhen Medical Academy of Research and Translation, Shenzhen, China. 61

THURSDAY, September 12—6:00 PM

COCKTAILS and BANQUET

SESSION 9 **INSIGHTS FROM FLY SLEEP**

Chairperson: **Luoying Zhang**, Huazhong University of Science and Technology, Wuhan, China
 Ying-Hui Fu, University of California, San Francisco, USA

Enhanced sleep reveals a role for pigment dispersing factor in mediating memory impairments in mushroom body ablated flies.

Paul J. Shaw, Jeffrey M. Donlea, Bruno Van Swinderen, Wei-jun Tan, Stephane Dissel [20'+10']

Presenter affiliation: Washington University in Saint Louis, Saint Louis, Missouri.

62

A microcircuit for linking sleep and memory in *Drosophila melanogaster*

Chang Liu [10'+5']

Presenter affiliation: Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China.

63

Sleep deprivation impairs pattern separation via disrupted sparse coding in *Drosophila*

Chien-Chun Chen, Antonio Ortega, Erik Tedre, Sha Liu [10'+5']

Presenter affiliation: VIB, Leuven, Belgium; KU Leuven, Leuven, Belgium.

64

An obstructive sleep apnea polygenic risk score is associated with MCI-to-AD progression and amyloid deposition

Jingjing Liang, Sadiya Hussainy, Gray Wu, Natalie Bautista, Mao Ding, Xinglong Wang [10'+5']

Presenter affiliation: University of Arizona, Tucson, Arizona.

65

Break

Circadian and homeostatic neural circuit mechanisms regulating sleep in *Drosophila*

Wenjing Ye, Lili Sun, Yue Tian, Fang Guo [20'+10']

Presenter affiliation: Zhejiang University, Hangzhou, China.

66

Bidirectional regulation of sleep by *Teneurins* via dopaminergic signaling

Li Song, Jiangtian Peng, Luoying Zhang [10'+5']

Presenter affiliation: Huazhong University of Science and Technology, Wuhan, China.

67

Glossopharyngeal airway collapse is the main factor leading REM-related oxygen desaturation in patients with obstructive sleep apnea

Yingqian Zhou, Guoping Yin, Xin Cao, Jinkun Xu, Jingying Ye [10'+5']

Presenter affiliation: Beijing Tsinghua Changgung Hospital, School of Clinical Medicine, Tsinghua University, Beijing, China.

68