

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

# DNA METABOLISM, GENOMIC STABILITY & HUMAN DISEASE

June 3–June 7, 2024

Arranged by

Antony Carr, *University of Sussex*

Daochun Kong, *Peking University*

Zhenkun Lou, *Mayo Clinic*

Patrick Sung, *University of Texas Health Science Center at San Antonio*

Stephen West, *The Francis Crick Institute*



Cold Spring Harbor Conferences Asia  
Cold Spring Harbor Laboratory



## DNA METABOLISM, GENOMIC STABILITY & HUMAN DISEASE

Monday, June 3 – Friday, June 7, 2024

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Monday	7:00 pm	1 Keynote Session
Tuesday	9:00 am	2 DNA Repair
Tuesday	2:00 pm	<b>Poster Session</b>
Tuesday	3:00 pm	<i>Chinese Tea and Beer Tasting</i>
Tuesday	7:00 pm	3 DNA Replication
Wednesday	9:00 am	4 DNA Replication and Replication Stress
Wednesday	2:00 pm	<i>Visit to Old Suzhou*</i>
Wednesday	7:00 pm	5 Cell Cycle and Checkpoints
Thursday	9:00 am	6 Mutagenesis and Genome Instability
Thursday	2:00 pm	7 Human Disease and Therapy
Thursday	6:00 pm	Cocktails and Banquet
Friday	9:00 am	8 RNA and DNA Repair

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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, June 3—7:00 PM

**SESSION 1** KEYNOTE SESSION

**Introduction by: Daochun Kong**, Peking University, Beijing, China

**Double strand break repair—Structures, functions and insights into cancer therapy**

Stephen C. West [45'+10']

Presenter affiliation: The Francis Crick Institute, London, United Kingdom.

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**Introduction by: Patrick Sung**, University of Texas Health Science Center, San Antonio, Texas, USA

**Replication-coupled and canonical DNA double strand breaks are processed by distinct mechanisms**

Andre Nussenzweig [45'+10']

Presenter affiliation: National Institutes of Health, Bethesda, Maryland.

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TUESDAY, June 4—9:00 AM

**SESSION 2** DNA REPAIR

**Chairpersons: Wei Yang**, National Institutes of Health, Bethesda, Maryland, USA

**Patrick Sung**, University of Texas Health Science Center, San Antonio, Texas, USA

**Promotion of DNA end resection by the BRCA1-BARD1 tumor suppressor complex in homologous recombination**

Sameer Salunkhe, James M. Daley, Chaoyou Xue, Nozomi Tomimatsu, Hardeep Kaur, Vivek Raina, Eric Greene, Sandeep Burma, Patrick Sung [20'+6']

Presenter affiliation: University of Texas Health Science Center at San Antonio, San Antonio, Texas.

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**V(D)J Recombination—From RAG to Rich (NHEJ)**

Wei Yang, Lan Liu, Xuemin Chen, Marty Gellert [20'+6']

Presenter affiliation: National Institutes of Health, Bethesda, Maryland. 4

**Rtt105 stimulates Rad51-ssDNA assembly and orchestrates Rad51 and RPA actions to promote homologous recombination repair**

Xuejie Wang, Xiaocong Zhao, Xuefeng Chen [15'+5']

Presenter affiliation: Wuhan University, Wuhan, China. 5

**Cryo-EM structure of the Spo11 core complex bound to DNA**

You Yu, Juncheng Wang, Kaixian Liu, Zhi Zheng, Meret Arter, Corentin Claeys Bouuaert, Stephen Pu, Dinshaw Patel, Scott Keeney [12'+3']

Presenter affiliation: Memorial Sloan Kettering Cancer Center, New York, New York. 6

**Break**

**The role of histidine phosphorylation in DNA dealkylation repair and cancer**

Yihan Peng, Huadong Pei [20'+6']

Presenter affiliation: Georgetown University Lombardi Comprehensive Cancer Center, Washington, D.C. 7

**Molecular basis of RAD51 modulator FIGL1**

Xiaodong Zhang [20'+6']

Presenter affiliation: Imperial College London, London, United Kingdom; The Francis Crick Institute, London, United Kingdom. 8

**DNA polymerase  $\delta$  subunit Pol32 links nucleosome assembly with Okazaki fragment processing**

Jiale Wu, Chaoqi Yang, Guojun Shi, Guanzhong Jiao, Jianxun Feng, Qing Li [12'+3']

Presenter affiliation: Peking University, Beijing, China. 9

**Mechanism of ssDNA accessibility regulated by orchestrating multi-molecular RPA dynamics**

Jiawei Ding, Zhi Qi [12'+3']

Presenter affiliation: Center for Quantitative Biology, Peking-Tsinghua Center for Life Sciences, Beijing, China. 10

**POSTER SESSION**

- APE1 regulates STING-type I interferon signaling in cancer cells by its redox activity**  
Qian Chen, Mengxia Li  
Presenter affiliation: Cancer Center of Daping Hospital, Army Medical University, Chongqing, China. 11
- Meiotic protein SYCP2 confers resistance to DNA-damaging agents through R-loop-mediated DNA repair**  
Boya Gao, Yumin Wang, Lee Zou, Li Lan  
Presenter affiliation: Duke University School of Medicine, Durham, North Carolina. 12
- DNA break repair machinery maintains immediate early transcriptional response by regulating the activity of enhancers**  
Gang He, Salma Akter, Shunichi Takeda  
Presenter affiliation: Shenzhen University, Shenzhen, China. 13
- BRCA1 plays a critical role in the tolerance of alovudine, by promoting homologous recombination**  
MD Bayejid Hosen, Ryotaro Kawasumi, Kouji Hirota  
Presenter affiliation: Tokyo Metropolitan University, Tokyo, Japan. 14
- Redistribution of hotspots of 8-oxo-G/AP sites mediated transcriptional alteration is a novel mechanism in EGFR-TKI resistance of NSCLC**  
Xinming Jing, Mengxia Li  
Presenter affiliation: Cancer Center of Daping Hospital, Chongqing, China. 15
- Fork coupling directs DNA replication elongation and termination**  
Yang Liu, Zhengrong Zhangding, Xuhao Liu, Tingting Gan, Chen Ai, Jinchun Wu, Haoxin Liang, Mohan Chen, Yuefeng Guo, Rusen Lu, Yongpeng Jiang, Xiong Ji, Ning Gao, Daochun Kong, Qing Li, Jiazhi Hu  
Presenter affiliation: Peking University, Beijing, China. 16
- Ablating Ku70 phosphorylation disrupts the repair of non-ligatable DNA double-strand break ends resulting in increased radiation-induced genomic instability and carcinogenesis**  
Huiming Lu, Shih-Ya Wang, Daniel J. Laverty, Janapriya Saha, Jinsung Bae, Zachary D. Nagel, Anthony J. Davis  
Presenter affiliation: UT Southwestern Medical Center, Dallas, Texas. 17

- A conserved thumb domain insertion in DNA polymerase epsilon supports processive DNA synthesis**  
 Sohail Ahmad, Siying Zhang, Xiangzhou Meng  
 Presenter affiliation: Shanghai Jiao Tong University, Shanghai, China. 18
- Insights into the Schlafen gene family—Functional parallels in mice and humans**  
Anfeng Mu, Minoru Takata, Takaaki Yasuhara  
 Presenter affiliation: Kyoto University, Kyoto, Japan. 19
- Towards the genomic sequence code of DNA fragility**  
Patrick Pflughaupt, Aleksandr B. Sahakyan  
 Presenter affiliation: University of Oxford, Oxford, United Kingdom. 20
- Primase promotes the competition between transcription and replication on the same template strand resulting in DNA damage**  
 Weifeng Zhang, Qianwen Sun  
 Presenter affiliation: Tsinghua University, Beijing, China; Tsinghua-Peking Center for Life Sciences, Beijing, China. 21
- PoI $\zeta$  promotes cellular tolerance against floxuridine (FUdR) through translesion synthesis and intra-S checkpoint activation**  
Mubasshir Washif, Ryotaro Kawasumi, Kouji Hirota  
 Presenter affiliation: Tokyo Metropolitan University, Hachioji-Shi, Japan. 22
- Mechanisms of DNA single strand break repair during replication**  
Shuheng Wu, Yawei Song, Jiajie Yang, Zilv Mei, Jiaqi Gao, Wei Wu  
 Presenter affiliation: Center for Excellence in Molecular Cell Science, Shanghai, China. 23
- Artificial chromosome reorganization reveals high plasticity of yeast genome**  
Xueting Zhu, Tiantian Ye, Xin Gu, Zhijing Wu, Jin-Qiu Zhou  
 Presenter affiliation: Center for Excellence in Molecular Cell Science, Shanghai, China. 24
- Targeting topoisomerase II $\beta$  as a strategy in kidney aging curing**  
Man Zhu, Bo Xian, Hao Li, Yi Zheng, Jing Yang  
 Presenter affiliation: University of Electronic Science and Technology of China, Chengdu, China. 25

TUESDAY, June 4—3:00 PM

**Chinese Tea and Beer Tasting**

**SESSION 3**      DNA REPLICATION

**Chairpersons:** **Dana Branzai**, IFOM ETS, Milan, Italy  
**Jiazhi Hu**, Peking University, Beijing, China

**Ctf4-orchestrated and recombination-mediated DNA damage bypass during replication**

Dana Branzai [20'+6']

Presenter affiliation: IFOM ETS, Milan, Italy; Istituto di Genetica Molecolare, Pavia, Italy.

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**Okazaki fragment maturation—DNA flap dynamics for cell proliferation and survival**

Binghui Shen [20'+6']

Presenter affiliation: Beckman Research Institute of City of Hope, Duarte, California.

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**The structure-specific nuclease Rad27 maintains the stability of the ribosomal RNA gene locus**

Mariko Sasaki [15'+5']

Presenter affiliation: National Institute of Genetics, Shizuoka, Japan.

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**Break**

**Molecular mechanism of RNA primer removal by RNase H at lagging strand telomere**

Tiantian Ye, Li-Juan Fu, Jin-Qiu Zhou [20'+6']

Presenter affiliation: CAS Center for Excellence in Molecular Cell Science, Shanghai, China; ShanghaiTech University, Shanghai, China.

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**Fork coupling directs DNA replication elongation and termination**

Yang Liu, Zhengrong Zhangding, Xuhao Liu, Tingting Gan, Chen Ai, Jinchun Wu, Haoxin Liang, Mohan Chen, Yuefeng Guo, Rusen Lu, Yongpeng Jiang, Xiong Ji, Ning Gao, Daochun Kong, Qing Li, Jiazhi Hu [20'+6']

Presenter affiliation: Peking University, Beijing, China.

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**R-loop functions in *Brca1*-associated mammary tumorigenesis**

Rong Li [20'+6']

Presenter affiliation: The George Washington University, Washington, D.C.

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**SESSION 4**      DNA REPLICATION AND REPLICATION STRESS

**Chairpersons:**    **Andres Aguilera**, Universidad de Sevilla, Seville, Spain  
                          **Qing Li**, Peking University, Beijing, China

**Sources of DNA replication stress in cancer cells**

Lee Zou [20'+6']

Presenter affiliation: Duke University, Durham, North Carolina. 32

**Differential role of histone modifications on transcription-replication conflicts and genome integrity**

Ivan Nuñez-Martin, Javier Marqueta-Gracia, Belen Gomez-Gonzalez,  
Andres Aguilera [20'+6']

Presenter affiliation: Andalusian Center of Molecular Biology (CABIMER), Universidad de Sevilla, Seville, Spain. 33

**A sophisticated mechanism governs Pol  $\zeta$  activity in response to replication stress**

Chun Li, Shuchen Fan, Ye Wang, Yueyun Cui, Jianing Wang, Xialu Li [15'+5']

Presenter affiliation: Capital Normal University, Beijing, China; Beijing Key Laboratory of DNA Damage Response, Beijing, China. 34

**A cytosolic DNA/Ca<sup>2+</sup>-dependent signaling pathway for genome protection during replication stress**

Zhongsheng You [15'+5']

Presenter affiliation: Washington University in St. Louis, School of Medicine, St. Louis, Missouri. 35

**Break**

**Mechanisms for the transfer of parental histones to replicating DNA strands and epigenetic inheritance**

Albert Serra-Cardona, Zhiming Li, Shoufu Duan, Xu Hua, Xiaowei Xu, Zhiquo Zhang [20'+6']

Presenter affiliation: Columbia University Irving Medical Center, New York, New York. 36

**Histone chaperone FACT collaborates with the replisome to guide parental histone transfer**

Qing Li [20'+6']

Presenter affiliation: Peking University, Beijing, China. 37



**KDM6A-SND1 interaction maintains genomic stability by protecting the nascent DNA and contributes to cancer chemoresistance**

Jian Wu, Yixin Jiang, Qin Zhang, Xiaobing Mao, Tong Wu, Junhong Han [15'+5']

Presenter affiliation: Sichuan University, Chengdu, China.

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WEDNESDAY, June 5—2:00 PM

**Visit to Old Suzhou**

WEDNESDAY, June 5—7:00 PM

**SESSION 5** CELL CYCLE AND CHECKPOINTS

**Chairpersons:** **Junjie Chen**, The University of Texas MD Anderson Cancer Center, Houston, Texas, USA  
**Hisao Masai**, Tokyo Metropolitan Institute of Medical Science, Tokyo, Japan

**Cellular mechanisms and stability of DNA replication forks in eukaryotes**

Daochun Kong [20'+6']

Presenter affiliation: Peking University, Beijing, China.

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**Novel roles of Claspin in cellular responses to environmental stresses**

Hisao Masai, Chi-Chun Yang, Haowen Hsiao, Zhiying You [20'+6']

Presenter affiliation: Tokyo Metropolitan Institute of Medical Science, Tokyo, Japan.

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**Allosteric activation mechanism of ATR/Mec1 kinase**

Zexuan Zheng, Qingjun Zhang, Gang Cai, Xuejuan Wang [15'+5']

Presenter affiliation: University of Science and Technology of China, Hefei, China; Key Laboratory of Anhui Province for Emerging and Reemerging Infectious Diseases, Hefei, China.

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**Break**

**DNA replication and cell cycle checkpoint control**

Min Huang, Siting Li, Junjie Chen [20'+6']

Presenter affiliation: The University of Texas MD Anderson Cancer Center, Houston, Texas. 42

**DNA damage response drives childhood ALL clonal evolution and its therapeutic implications**

Bin-Bing S. Zhou [20'+6']

Presenter affiliation: Shanghai Jiaotong University, School of Medicine, Shanghai, China. 43

**Karyotype plasticity induced by centromere weakening in fission yeast**

Jing Zhang, Wenzhu Li, Meiling Chen, Xiangwei He [20'+6']

Presenter affiliation: Zhejiang University, Hangzhou, China. 44

**BRCA1 safeguards genome integrity by activating chromosome asynapsis checkpoint to eliminate recombination-defective oocytes**

Lin-Yu Lu [15'+5']

Presenter affiliation: Zhejiang University, Hangzhou, China. 45

THURSDAY, June 6—9:00 AM

**SESSION 6 MUTAGENESIS AND GENOME INSTABILITY**

**Chairpersons:** **Zhenkun Lou**, Mayo Clinic, Rochester, Minnesota, USA  
**Anna Malkova**, University of Iowa, Iowa City, Iowa, USA

**APOBEC mutagenesis in cancer**

Reuben Harris [20'+6']

Presenter affiliation: University of Texas Health San Antonio, San Antonio, Texas. 46

**Unraveling mutagenic potential of break-induced replication**

Anna Malkova, Jerzy Twarowski, Josep Comeron, Jacob Wells, Meng-Chia Tsai [20'+6']

Presenter affiliation: University of Texas Health San Antonio, San Antonio, Texas; University of Iowa, Iowa City, Iowa. 47

**High-resolution genome-wide profiles of DNA damage represent highly accurate predictors of mammalian age**

Huifen Cao, Bolin Deng, Tianrong Song, Jiabian Lian, Lu Xia, Xiaojing Chu, Yufei Zhang, Fujian Yang, Chunlian Wang, Ye Cai, Yong Diao, Philipp Kapranov [15'+5']

Presenter affiliation: Xiamen University, School of Life Sciences, China.

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**DNA nicks coupled with DNA replication induce mutational signatures associated with BRCA1 deficiency**

Anyong Xie [15'+5']

Presenter affiliation: Sir Run Run Shaw Hospital, Hangzhou, China; Institute of Translational Medicine, Hangzhou, China.

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***Break***

**The role of SLFN5 in genome stability and chromothripsis**

Fei Zhao, Sisi Qin, Huanyao Gao, Tongzheng Liu, Wootae Kim, Zhenkun Lou [20'+6']

Presenter affiliation: Mayo Clinic, Rochester, Minnesota.

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**Mitotic activation of the Fanconi anemia pathway induces chromothripsis**

Justin L. Engel, Qing Hu, Peter Ly [20'+6']

Presenter affiliation: University of Texas Southwestern Medical Center, Dallas, Texas.

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**Genome instability and structurally divergent regions—A Peek into primate genomes**

Yafei Mao [20'+6']

Presenter affiliation: Bio-X Institutes, Key Laboratory for the Genetics of Developmental and Neuropsychiatric Disorders, Ministry of Education, Shanghai, China.

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**SESSION 7** HUMAN DISEASE AND THERAPY

**Chairpersons:** **Keith Caldecott**, University of Sussex, Sussex, United Kingdom  
**Caixia Guo**, Chinese Academy of Sciences, Beijing, China

**Identification of genetic vulnerabilities in aneuploid human cells**

Salar Ahmad, Maria Molano, Rahul Bhowmick, Emil Hertz, Niels Mailand, Hector Herranz, [Ian D. Hickson](#) [20'+6']  
Presenter affiliation: Center for Chromosome Stability, Copenhagen, Denmark.

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**Mutant huntingtin protein induces MLH1 degradation, DNA hyperexcision and cGAS-STING-dependent apoptosis**

Xiao Sun, Lu Liu, Chao Wu, Xueying Li, Jinzhen Guo, Junqiu Zhang, Junhong Guan, Nan Wang, Liya Gu, X. William Yang, [Guo-Min Li](#) [20'+6']  
Presenter affiliation: University of Texas Southwestern Medical Center, Dallas, Texas; Chinese Institutes for Medical Research, Beijing, China.

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**Targeting the 3D genome by anthracyclines for chemotherapeutic effects**

Minkang Tan, Shengnan Sun, Andrea Perreault, Douglas H. Phanstiel, Liping Dou, [Baoxu Pang](#) [15'+5']  
Presenter affiliation: Leiden University Medical Center, Leiden, Netherlands.

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**PARP supports the progression of genetic-unstable ALLs and its therapeutic implication**

[Fu Fan](#), Ji-Yuan Teng, Hou-Shun Fang, Hui-Ying Sun, Fan Yang, Hui Li, Bin-Bing S. Zhou [12'+3']  
Presenter affiliation: Shanghai Children's Medical Center, Shanghai, China.

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**Break**

**DNA strand break repair and human disease**

[Keith W. Caldecott](#) [20'+6']  
Presenter affiliation: University of Sussex, Sussex, United Kingdom.

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**Mechanism of transcription-coupled DNA damage in immune diversification**

Fei-Long Meng [20'+6']

Presenter affiliation: Shanghai Institute of Biochemistry and Cell Biology, Chinese Academy of Sciences, Shanghai, China.

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**VGLL3 reduces chemosensitivity by promoting DNA damage response**

Caixia Guo, Wei Wu, Zhenzhen Fan, Xiaolu Ma, Hui Fu, Dongzhou Wang, Hui Zheng, Honglin Wu, Ruiyuan An, Tie-Shan Tang [20'+6']

Presenter affiliation: Chinese Academy of Sciences (China National Center for Bioinformation), Beijing, China.

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**Mechanism of Musashi2 affecting radiosensitivity of lung cancer by modulating DNA damage repair**

Hongjin Qu, Yu Cao, Liming Hu, Bingbing Wan [15'+5']

Presenter affiliation: Shanghai Jiao Tong University, Shanghai, China.

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THURSDAY, June 6—6:00 PM

**COCKTAILS and BANQUET**

FRIDAY, June 7—9:00 AM

**SESSION 8** RNA AND DNA REPAIR

**Chairpersons:** **Dipanjan Chowduary**, Harvard Medical School, Boston, Massachusetts, USA

**Jie Ren**, Chinese Academy of Sciences and China National Center for Bioinformation, Beijing, China

**NEAT1 modulates the TIRR/53BP1 complex to maintain genome integrity**

Susan Kilgas, Aleem Syed, Patrick Toolan-Kerr, Shrabasti Roychoudhury, Aniruddha Sarkar, Sarah Wilkins, Mikayla Quigley, Anna Poetsch, Maria Victoria Botuyan, Georges Mer, Jernej Ule, Pascal Drané, Dipanjan Chowdhury [20'+6']

Presenter affiliation: Harvard Medical School, Boston, Massachusetts.

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**Lsd1 safeguards T-cell development via suppressing endogenous retroelements and interferon responses**

Xi Wang [15'+5']

Presenter affiliation: Capital Medical University, Beijing, China.

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**DNA polymerase  $\epsilon$  harmonizes topological states and R-loops formation to maintain genome integrity in Arabidopsis**

Qin Li, Jincong Zhou, Qianwen Sun [15'+5']

Presenter affiliation: Tsinghua University, Beijing, China; Tsinghua-Peking Center for Life Sciences, Beijing, China.

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***Break***

**Nascent RNA at the crossroads of transcription and replication**

Jie Ren [20'+6']

Presenter affiliation: Chinese Academy of Sciences and China National Center for Bioinformation, Beijing, China; Chinese Academy of Sciences, Beijing, China; Sino-Danish College, Beijing, China.

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**Fanconi anemia (FA) proteins are potential targets for overcoming PARP inhibitor resistance**

Zuer Lu, Dongyi Xu [20'+6']

Presenter affiliation: Peking University, Beijing, China.

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**Genetic evidence for the role of MRE11 in homologous DNA recombination after RAD51 polymerization at double-strand breaks**

Jingwei Xue, Gang He, Shunichi Takeda [15'+5']

Presenter affiliation: Shenzhen University, Shenzhen, Guangdong, China.

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**Exploring advanced frontiers in single-cell bioinformatics—Moving beyond differential expression analysis**

James J. Cai [15'+5']

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

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