

Abstracts of papers presented
at the 2025 Cold Spring Harbor Asia Conference

MYCOBACTERIAL PATHOGENESIS AND HOST RESPONSE

March 17–March 21, 2025

Arranged by

Marcel Behr, *McGill University, Canada*

Baoxue Ge, *Tongji University School of Medicine, China*

Jennifer Philips, *Washington University in St. Louis, USA*

Lalita Ramakrishnan, *University of Cambridge, UK*

Kevin Urdahl, *Seattle Children's Research Institute, USA*

Sho Yamasaki, *Osaka University, Japan*



Cold Spring Harbor Conferences Asia
Cold Spring Harbor Laboratory



MYCOBACTERIAL PATHOGENESIS & HOST RESPONSE

Monday, March 17 – Friday, March 21, 2025

Monday	7:00 pm	1 The Host-Pathogen Interface in Tuberculosis
Tuesday	9:00 am	2 Tissue Biology and TB Pathogenesis
Tuesday	2:00 pm	Poster Session
Tuesday	3:00 pm	<i>Chinese Tea and Beer Tasting</i>
Tuesday	7:00 pm	3 Pathogen Contributions to Virulence
Wednesday	9:00 am	4 Mycobacterial Lipids and Immune Response
Wednesday	2:00 pm	<i>Visit to Old Suzhou*</i>
Wednesday	7:00 pm	5 Mycobacteria and the Macrophage Niche
Thursday	9:00 am	6 Comparative Biology: Hosts and Bacteria
Thursday	2:00 pm	7 Vaccines and Antimicrobial Defense
Thursday	6:00 pm	<i>Cocktails and Banquet</i>
Friday	9:00 am	8 Granuloma Biology and Immunity

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, March 17—7:00 PM

SESSION 1 THE HOST-PATHOGEN INTERFACE IN TUBERCULOSIS

Chairpersons: **Baoxue Ge**, Tongji University School of Medicine, Shanghai, China
Carl Feng, University of Sydney, Sydney, Australia

Immunity in TB—Host defense and pathogen evasion

Baoxue Ge [20'+10']

Presenter affiliation: Tongji University School of Medicine, Shanghai, China.

1

Host and pathogen contributions to TB susceptibility and mortality in Thailand

Surakameth Mahasirimongkol [20'+10']

Presenter affiliation: Ministry of Public Health, Nonthaburi, Thailand.

2

Mapping the immune landscape in human tuberculosis lungs

Carl G. Feng, Wei Xiao, Andrew J. Sawyer, Xinchun Chen [20'+10']

Presenter affiliation: University of Sydney, Sydney, Australia.

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TUESDAY, March 18—9:00 AM

SESSION 2 TISSUE BIOLOGY AND TB PATHOGENESIS

Chairpersons: **Marcel Behr**, McGill University, Montreal, Canada
Amy Barczak, The Ragon Institute of Mass General Brigham, MIT and Harvard, Cambridge, Massachusetts, USA

Insights into the biological basis for female resistance to TB disease

Manish Gupta, Jessica Shen, Shichun Lun, Joseph Hoffmann, Geetha Srikrishna, Eileen Scully, Sabra Klein, William Bishai [20'+10']

Presenter affiliation: Johns Hopkins School of Medicine, Baltimore, Maryland.

4

Early days—Tracking mycobacterial lung infection with intravital microscopy

Ashley Kwak, Hojjat Ghasemi Goojani, Andreanne Lupien, Fiona McIntosh, Ajitha Thanabalasuriar, Marcel Behr [20'+10']

Presenter affiliation: McGill University, Montreal, Canada.

5

Contributors to tissue injury and pathologic remodeling in TB infection

Julie Boucau, Jennie Ruelas Castillo, Threnesan Naidoo, Neha Jain, Kievershen Nargan, Adrie J. Steyn, Amy K. Barczak [20'+10']

Presenter affiliation: The Ragon Institute of Mass General Brigham, MIT, and Harvard, Cambridge, Massachusetts; Massachusetts General Hospital, Boston, Massachusetts.

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Break

The means and consequences of *Mycobacterium tuberculosis* bloodborne dissemination

Lauren M. Cross, Vitaly V. Ganusov, Elya Shamskhov, Benjamin H. Gern, Michael Y. Gerner, Kevin B. Urdahl [20'+10']

Presenter affiliation: Seattle Children's Research Institute, Seattle, Washington; University of Washington, Seattle, Washington.

7

The lung-draining lymph node in *Mycobacterium tuberculosis* infection switches from a site of T cell priming to a niche for pathogen persistence via myeloid dynamics

Elya A. Shamskhov, Courtney Plumlee, Fergal Duffy, Sara Cohen, Kevin Urdahl, Michael Gerner [10'+5']

Presenter affiliation: University of Washington, Seattle, Washington; Seattle Children's Research Institute, Seattle, Washington.

8

Host complement lectin pathway limits mycobacterial growth in vivo by inhibiting ferroptosis

Hao Wang, Sizhu Luo, Jianwei Yang, Selvara Gurudeeban, Jianxin Liu, Geyang Luo, Dongqing Wei, Shumei He, Shulin Zhang, Bo Yan [10'+5']

Presenter affiliation: Center for Tuberculosis Research, Shanghai Public Health Clinical Center, Shanghai, China.

9

Mycobacterial infection increases *alas2*high erythropoiesis and Rras-dependent erythrophagocytosis to hijack iron

Hongyu Cheng, Hua Yang, Baoxue Ge [10'+5']

Presenter affiliation: Shanghai Pulmonary Hospital, Tongji University School of Medicine, Shanghai, China.

10

β -glucan-induced monocyte-derived alveolar macrophages confer protection against *Mycobacterium tuberculosis*

J. Tucker Andrews, Miguel Mercado, Ananya Ranaraja, Zijing Zhang, Fischer Huey, Yuet-Kin Leung, Daniel Voth, Nan Zhang, Jie Sun, Shumin Tan, Yasir Ahmed-Braimah, Lin-Xi Li, Lu Huang [10'+5']
Presenter affiliation: University of Arkansas for Medical Sciences, Little Rock, Arkansas.

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TUESDAY, March 18—2:00 PM

POSTER SESSION

Hindering the dance to death—Mycobacterial infection triggered S-nitrosylation of PknG facilitates its secretion and phosphorylation of macrophage substrates to hinder macrophage altruism

Saradindu Saha, Sadhana Roy, Arnab Hazra, Somdeb BoseDasgupta
Presenter affiliation: Indian Institute of Technology Kharagpur, Kharagpur, India.

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Interaction between *Mycobacterium tuberculosis* virulence factors and hosts

Jie Chen, Yujia He
Presenter affiliation: ShanghaiTech University, Shanghai, China.

13

***Mycobacterium tuberculosis* impairs host survival signal to boost its intracellular growth by inhibiting PSS1-mediated synthesis of phosphatidylserine**

Pengfei Cui
Presenter affiliation: Tongji university, Shanghai, China.

14

Exploring antibody-drug conjugates for targeted TB therapy

Hendra Gunosewoyo, Tricia Naicker, Thavendran Govender
Presenter affiliation: Curtin University, Perth, Australia.

15

Coronin1 induced Coronin1 expression leads to hindered mycobacterial phagosome maturation

Arnab Hazra, Somdeb BoseDasgupta
Presenter affiliation: Indian Institute of Technology Kharagpur, Kharagpur, India.

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**Innate immune evasion memory of *Mycobacterium tuberculosis*—
Low pH triggers DNA methylation**

Jingping Huang, Cheng Peng, Qiu Chen, Lin Wang, Baoxue Ge

Presenter affiliation: School of Medicine, Shanghai, China; Shanghai Pulmonary Hospital, Shanghai, China.

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***Mycobacteria* induces linoleic acid to boost its survival in macrophages by upregulating CTLA-4 surface trafficking on Treg cells**

Shenzhi Li, Hongyu Cheng, Hua Yang, Baoxue Ge

Presenter affiliation: Shanghai Key Laboratory of Tuberculosis, Shanghai, China; Key Laboratory of Pathogen-Host Interaction, Ministry of Education, Shanghai, China.

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Involvement of cathepsins protein in *Mycobacterial* infection and its potential as an anti-TB therapeutic target

Dongxu Li

Presenter affiliation: ShanghaiTech University, Shanghai, China.

19

Increased long-term central memory T cells (TCM) in patients with retreatment pulmonary tuberculosis

Zhonghua Liu

Presenter affiliation: Shanghai Pulmonary Hospital, Shanghai, China.

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***Mycobacterium tuberculosis* hinders mtDNA accessibility to evade host immunity**

Chen Qiu, Peng Cheng

Presenter affiliation: Tongji university, Shanghai, China.

21

Molecular mechanism and clinical diagnostic value of alternative splicing of inflammasome in *mycobacterium tuberculosis* immune escape

Hongxia Ruan, Binwu Ying

Presenter affiliation: West China Hospital, Sichuan University, Chengdu, Sichuan, China.

22

Identification of a phenyl ester covalent inhibitor of caseinolytic protease and analysis of the ClpP1P2 inhibition in *mycobacteria*

Genhui Xiao, Yumeng Cui, Liangliang Zhou, Chuya Niu, Bing Wang, Jinglan Wang, Shaoyang Zhou, Miaomiao Pan, Chi Kin Chan, Yan Xia, Lan Xu, Yu Lu, Shawn Chen

Presenter affiliation: Global Health Drug Discovery Institute, Beijing, China.

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New roles for taurine in promoting anti-tuberculosis immunity and therapy

Peng Wang, Hongyu Cheng, Wei Sha, Baoxue Ge, Hua Yang
Presenter affiliation: Shanghai Pulmonary Hospital, Tongji University School of Medicine, Shanghai, China. 25

TCR sequencing for TB-IGRA in Mycobacterium infections

Degang Yang, Yuling Shi
Presenter affiliation: Shanghai Skin Disease Hospital, Tongji University School of Medicine, Shanghai, China. 26

Toxoplasma gondii-derived bioactive peptide promotes anti-mycobacterial host defense

Chul-Su Yang
Presenter affiliation: Hanyang University, Ansan, South Korea. 27

A genome-wide association study identified PRKCB as a causal gene and therapeutic target for Mycobacterium avium complex disease

Ruijuan Zheng, Weijun Fang, Baoxue Ge, Wei Sha
Presenter affiliation: Shanghai Pulmonary Hospital, Shanghai, China; Tongji University School of Medicine, Shanghai, China. 28

TUESDAY, March 18—3:00 PM

Chinese Tea and Beer Tasting

TUESDAY, March 18—7:00 PM

SESSION 3 PATHOGEN CONTRIBUTIONS TO VIRULENCE

Chairpersons: **Michael Glickman**, Memorial Sloan-Kettering Cancer Center, New York, New York, USA
Shumin Tan, Tufts University School of Medicine, Boston, Massachusetts, USA

Chalkophore mediated respiratory oxidase flexibility in *M. tuberculosis* virulence

Michael S. Glickman [20'+10']
Presenter affiliation: Sloan Kettering Institute, New York, New York. 29

Illuminating the integration of *Mycobacterium tuberculosis* potassium homeostasis with its cholesterol metabolism

Shumin Tan [20'+10']

Presenter affiliation: Tufts University School of Medicine, Boston, Massachusetts.

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Mycobacterial biotin synthases require an auxiliary protein to convert dethiobiotin into biotin

Di Qu, Peng Ge, Laure Botella, Sae Woong Park, Hana Lee, Natalie Thornton, James M. Bean, Inna V. Krieger, James C. Sacchettini, Sabine Ehrt, Courtney C. Aldrich, Dirk Schnappinger [10'+5']

Presenter affiliation: Weill Cornell Medicine, Cornell University, New York, New York.

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Identifying the enzymes responsible for N-terminal acetylation of mycobacterial virulence factors

Patricia Champion [20'+10']

Presenter affiliation: University of Notre Dame, Notre Dame, Indiana.

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An additional proofreader contributes to DNA replication fidelity in mycobacteria

Mingzhi Deng, Qingyun Liu, Shujun Cui, Guoping Zhao, Sarah M. Fortune, Liangdong Lyu [10'+5']

Presenter affiliation: Fudan University, Shanghai, China.

33

Suppressed host ribosome biogenesis promotes *Mycobacterium tuberculosis* growth

Shanshan Liu, Pengfei Cui, Yicheng Sun, Hua Yang, Lin Wang, Baoxue Ge [10'+5']

Presenter affiliation: Shanghai Pulmonary Hospital, Shanghai, China; Tongji University School of Medicine, Shanghai, China.

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SESSION 4 MYCOBACTERIAL LIPIDS AND IMMUNE RESPONSE

Chairpersons: **Branch Moody**, Brigham and Women's Hospital, Boston, Massachusetts, USA
Lu Zhang, ShanghaiTech University, Shanghai, China

Recognizing the unsolved nature of *M. tuberculosis* lipidome facilitates virulence factor discovery

Yashodhan Nair, David J. Young, Jesus G. Asensio, Marcel Behr, Adriaan J. Minnaard, Branch Moody [20'+10']

Presenter affiliation: Brigham and Women's Hospital, Boston, Massachusetts. 35

Host immune system targeting mycobacterial lipids

Sho Yamasaki [20'+10']

Presenter affiliation: Osaka University, Osaka, Japan. 36

Mechanism and inhibition of the *Mycobacteria tuberculosis* cell wall biosynthesis

Lu Zhang [20'+10']

Presenter affiliation: ShanghaiTech University, Shanghai, China. 37

Break

Human T cells broadly recognize multiple mycobacterial lipids

Nanami Kamata, Yuki Sakai, Minori Asa, Hayato Kasai, Sho Yamasaki [10'+5']

Presenter affiliation: Osaka University, Suita, Japan. 38

A conserved human CD4⁺ T cell subset recognizing a Mincle ligand, trehalose monomycolate (TMM), produces IFN γ and cytotoxic effectors

Yuki Sakai, Minori Asa, Go Hirai, Sho Yamasaki [10'+5']

Presenter affiliation: Osaka University, Suita, Japan. 39

Evasion of caspase 8-dependent CD8⁺ T cell cytotoxicity by *Mycobacterium tuberculosis* blocks secretion of antimicrobial metabolites

Hongyu Cheng, Jingxiang Wang, Jingping Huang, Shenzhi Li, Baoxue Ge [10'+5']

Presenter affiliation: Tongji University, Shanghai, China. 40

Structural studies of anti-TB drug targets and implications for drug development

Haitao Yang [10'+5']

Presenter affiliation: ShanghaiTech University, Shanghai, China.

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WEDNESDAY, March 19—2:00 PM

Visit to Old Suzhou

WEDNESDAY, March 19—7:00 PM

SESSION 5 MYCOBACTERIA AND THE MACROPHAGE NICHE

Chairpersons: **Amit Singh**, Indian Institute of Science, Bangalore, India
Jennifer Philips, Washington University School of Medicine, St. Louis, Missouri, USA

Bioenergetic reprogramming of macrophages reduces drug tolerance in *Mycobacterium tuberculosis*

Amit Singh, Vikas Yadav [20'+10']

Presenter affiliation: Indian Institute of Science, Bangalore, India.

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Macrophage-T cell interactions promote SLAMF1 expression for enhanced TB defense

G. V. R. Krishna Prasad, Steven J. Grigsby, Gideon A. Erkenwick, Cynthia Portal, Ekansh Mittal, Guozhe Yang, Samuel M. Fallon, Fengyixin Chen, Thais Klevorn, Neharika Jain, Makedonka Mitreva, Amanda J. Martinot, Joel D. Ernst, Jennifer A. Philips [20'+10']

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

43

TNF receptor 2 is responsible for TNF-mediated necrosis of infected macrophages and increased susceptibility to tuberculosis

Francisco Jose Roca Soler [20'+10']

Presenter affiliation: Biomedical Research Institute of Murcia (IMIB-Arrixaca), University of Murcia, Murcia, Spain.

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Host deubiquitinase USP8 promotes *Mycobacterium tuberculosis* infection by enhancing ESCRT membrane repair, limiting xenophagy, and reducing oxidative stress

Pallavi Chandra, Jennifer A. Philips [10'+5']

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

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A *Mycobacterium tuberculosis* surface protein promotes pyroptosis-dependent pathogenicity and dissemination

Yajie Shen, Jixi Li [10'+5']

Presenter affiliation: Fudan University, Shanghai, China.

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THURSDAY, March 20—9:00 AM

SESSION 6 COMPARATIVE BIOLOGY: HOSTS AND BACTERIA

Chairpersons: **Michele Miller**, Stellenbosch University, Tygerberg, South Africa
Laurent Kremer, Université de Montpellier, Montpellier, France

Bridging TB insights across species—Comparative immunology, epidemiology, and pathogenesis of *Mycobacterial* infections in wildlife

Michele Miller, Peter Buss, Paul van Helden, Sven Parsons, Lin-Mari deKlerk-Lorist, Leanie Kleynhans, Wynand Goosen, Tanya Kerr [20'+10']

Presenter affiliation: Stellenbosch University, Tygerberg, South Africa.

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The arms race between mycobacteria and their viruses—Host defense and phage's anti-defense

Zheng-Guo He, Xiaohui Li, Yakun Li [20'+10']

Presenter affiliation: Wuhan University, Wuhan, China; Guangxi University, Nanning, China.

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Break

Role and structure of surface glycolipids in the smooth-to-rough morphotype transition and pathogenesis of *Mycobacterium abscessus*

Laurent Kremer [20'+10']

Presenter affiliation: Montpellier Infectious Diseases Research Institute, Montpellier, France.

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Single-cell transcriptomics of blood identified *IFIT1*+ Neutrophil subcluster expansion in NTM-PD patients

Peng Wang, Guo-ling Yang, Yi-fan He, Yan-heng Shen, Hai-peng Liu, Wei Sha [10'+5']

Presenter affiliation: Shanghai Pulmonary Hospital, Tongji University School of Medicine, Shanghai, China.

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The mycobacterial virulence factor Erp mediates virulence by fine-tuning its cell envelope barrier function

Jonathan K. Shanahan, Jan Böhning, Christian Bortolini, Sudagar S. Gurucha, Gurdyal S. Besra, Bart W. Hoogenboom, Tanmay A. Bharat, Lalita Ramakrishnan [10'+5']

Presenter affiliation: University of Cambridge, MRC, Cambridge, United Kingdom.

51

Fasting-induced ketogenesis sensitizes bacteria to antibiotic treatment

Shujun Cui, Danyang Chong, Yi-Xin Wang, Minggui Wang, Guo-Ping Zhao, Liang-Dong Lyu [10'+5']

Presenter affiliation: Fudan University, Shanghai, China.

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THURSDAY, March 20—2:00 PM

SESSION 7 VACCINES AND ANTIMICROBIAL DEFENSE

Chairperson: **Kevin Urdahl**, Seattle Children's Research Institute, University of Washington, Seattle, Washington, USA

Exploiting inducible bacterial lysis for developing tuberculosis vaccine

Alexander Smith, Hongwei Su, Joshua Wallach, Dirk Schnappinger, Sabine Ehrt, JoAnne Flynn [10'+5']

Presenter affiliation: Weill Cornell Medicine, New York, New York; Zhejiang University, Hangzhou, China.

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Recombination BCG manipulates innate immune memory to enhance anti-TB immunity

Cheng Peng, Qiu Chen, Jingping Huang, Wenyi Bu, Xuan Wu, Yongjia Duan, Lin Wang, Baoxue Ge [10'+5']

Presenter affiliation: Shanghai Pulmonary Hospital, Tongji University School of Medicine, Shanghai, China.

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IV-BCG reprograms monocytes to induce tissue resident CD4 T cells in mice

Siwei Feng, Hao Cai, Ya-Ting Wang [10'+5']

Presenter affiliation: Tsinghua University, Beijing, China.

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CD4 T cell and lung epithelial cell crosstalk regulates *Mtb* lesion formation

Kim Foster, Sara Cohen, Josepha Klas, Karolina Maciag, Courtney Plumlee, Michael Gerner, Ben Gern, Kevin Urdahl [10'+5']

Presenter affiliation: University of Washington, Seattle, Washington; Seattle Children's Research Institute, Seattle, Washington.

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KEYNOTE SPEAKER

Gasdermin activation and pyroptosis in anti-microbial defenses and sepsis

Feng Shao [35'+10']

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

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THURSDAY, March 20—6:00 PM

COCKTAILS and BANQUET

FRIDAY, March 21—9:00 AM

SESSION 8 GRANULOMA BIOLOGY AND IMMUNITY

Chairpersons: **Adrie Steyn**, University of Alabama at Birmingham, Birmingham, Alabama, USA
Bo Yan, Fudan University, Shanghai, China

Unraveling the cellular and genetic landscape of latent and active tuberculosis—A multi-disciplinary approach

Adrie J. Steyn [20'+10']

Presenter affiliation: University of Alabama at Birmingham , Birmingham, Alabama; Africa Health Research Institute, Durban, South Africa.

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Granuloma structure and dynamics during Mycobacterial infection

Charlie J. Pyle, Ana M. Xet-Mull, Thabo Mpotje, Davis Ferreira, Jadee Neff, Sara E. Miller, Clare M. Smith, Mohlopheni J. Marakalala, Jason E. Stout, David M. Tobin [20'+10']

Presenter affiliation: Duke University School of Medicine, Durham, North Carolina.

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Break

A novel macrophage subtype in mycobacterial granulomas helps maintain immune control by limiting excessive inflammation

Bo Yan [20'+10']

Presenter affiliation: Shanghai Public Health Clinical Center, Fudan University, Shanghai, China.

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Dissecting cell-extrinsic mechanisms of IFN γ -mediated immunity to *Mtb*

Karolina Maciag, Courtney R. Plumlee, Sara B. Cohen, Benjamin H. Gern, Kevin B. Urdahl [10'+5']

Presenter affiliation: University of Washington, Seattle, Washington; Seattle Children's Research Institute, Seattle, Washington.

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