



Trends & Policy

China will support Africa in establishing and improving the public health system

On 14 Apr. 2015, Foreign Minister Wang Yi held talks with Minister of International Relations and Cooperation Maite Nkoana-Mashabane of South Africa in Pretoria. After the talks, they met journalists jointly.



In response to a question about China's expectation of the 6th Ministerial Conference of the Forum on China-Africa Cooperation, Foreign Minister Wang Yi said, "On the basis of further promoting the different areas of cooperation under the framework of this forum and according to the actual requirement of Africa, China is going to increase the bilateral cooperation in three areas. First, China is willing to support Africa in speeding up the pace of industrialization; Second, China is willing to support Africa in establishing and improving

the public health system; Third, China is willing to support Africa in maintaining the regional peace and stability."

On the second area, China has always been a staunch supporter of African public health. Last year, there was an outbreak of Ebola hemorrhagic fever in West Africa. China has extended a helping hand by training a large number of African health workers and supporting the construction of medical facilities. With the joint efforts of Africa and International community, the outbreak has been under control. However, this crisis also warns us that establishing and improving the African public health system, which cannot be postponed, has a prior claim to the attention of international community. To cope with this issue, China is willing to give full play to our advantages to help Africa enhance disease prevention and control capabilities quickly, together with the international community. The issue and the specific plan are supposed to be further discussed between China and Africa on the following forum.

China inaugurates the first bio-containment level 4 laboratory in Wuhan

National Health and Family Planning Commission of PRC and Chinese Academy of Sciences inaugurated the bio-containment level 4 laboratory (P4) in Wuhan, Hubei Province, on Jan. 31, 2015. Referring to the international construction standards of bio-containment level 4 laboratory and China's related construction standards, the laboratory, which is one of the mega scientific facilities funded by National Development and Reform Commission, was designed by French and China, and was installed and built by Chinese part. The facility is an essential platform for research and development against high contagious and infectious diseases, the first entity ever in China's history since its foundation.

Mr. Zhu Chen, Vice Chairman of the Standing Committee of NPC, Mr. Bin Li, Minister of the National Health and Family Planning Commission, Mr. Chunli Bai, President of Chinese Academy of Sciences, Mr. Jean-Marie Le Guen, Secrétaire d'État chargé des Relations avec le Parlement, Mr. Alain MERIEUX, President of MERIEUX Foundation, and officials from other departments attended the inauguration ceremony, which was hosted by Mr. Yaping Zhang, Vice President of Chinese Academy of Sciences.



According to Wuhan Institute of Virology, the P4 Laboratory is a specialized core facility for studies on highly contagious and fatal diseases like Ebola virus disease. Therefore, the facility must provide the biosafety protection to the investigators and environment at the highest standard possible on earth. Only a few developed countries have P4 laboratories, before the inauguration of Wuhan P4 laboratory. China started to build such a facility ever since SARS outbreak. Engineers and workers worked together to have accomplished the complex, even more advanced than its parental facility in Lyon, France.

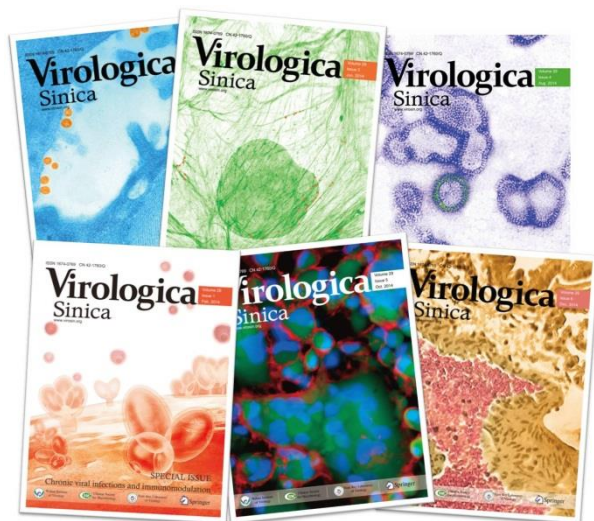
Virologica Sinica is included in the database of SCI

On 18th May 2015, *Virologica Sinica*, the academic journal sponsored by WIV and Chinese Society for Microbiology, aiming at presenting the cutting-edge basic and applied research on viruses all over the world, is included in the database of Science Citation Index (SCI), making it the first journal to be included in the field of virology in China, which is an obvious milestone of recognition and encouragement for the journal.

Virologica Sinica, inaugurated in 1986, publishes the peer-reviewed original research papers and reviews, as well as commentaries and letters to the editor, to encompass the latest developments in all branches of virology.

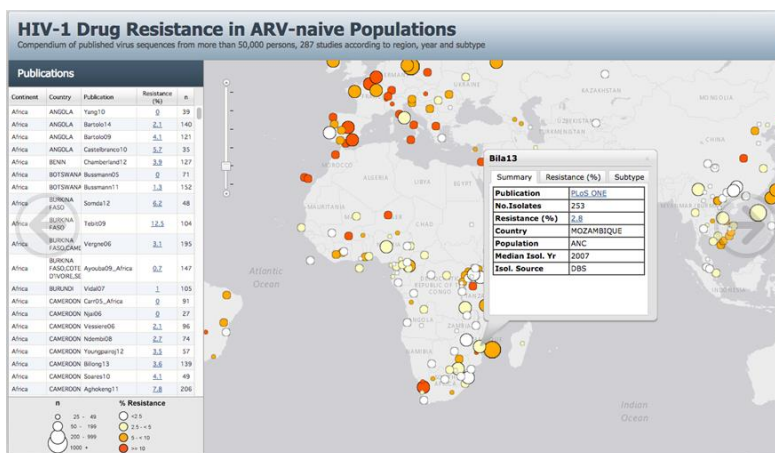


With continuous efforts of the journal's editorial board, the journal's academic quality and international influence have been enhanced significantly. In 2014, the authors come from more than 30 countries and regions, and the readers were from 116 countries and regions worldwide. Undoubtedly, after being included in the database of SCI, *Virologica Sinica* will serve as a new effective platform for the exhibition of scientific research achievements and international exchanges.



Progress in Transmitted HIV-1 Drug Resistance

Recently, the research group led by Prof. Rongge Yang, as the only Chinese team, has made important progress in research on transmitted HIV-1 Drug Resistance with other international experts on HIV/AIDS. The research paper, *Geographic and Temporal Trends in the Molecular Epidemiology and Genetic Mechanisms of Transmitted HIV-1 Drug Resistance: An Individual-patient-and sequence-level meta-analysis*, has been published on *PLoS Med*, which is an international well-known journal.



Regional and subtype-specific mutational patterns of HIV-1 transmitted drug resistance (TDR) are essential for informing first-line antiretroviral (ARV) therapy guidelines and designing diagnostic assays for use in regions where standard genotypic resistance testing is not affordable. In order to understand the molecular epidemiology of TDR and to identify the HIV-1 drug-resistance mutations responsible for TDR in different regions and virus subtypes, the research team reviewed all GenBank submissions of HIV-1 reverse transcriptase sequences with or without protease and identified 287 studies published between 2000 and 2013. These studies comprised 50,870 individuals from 111 countries.

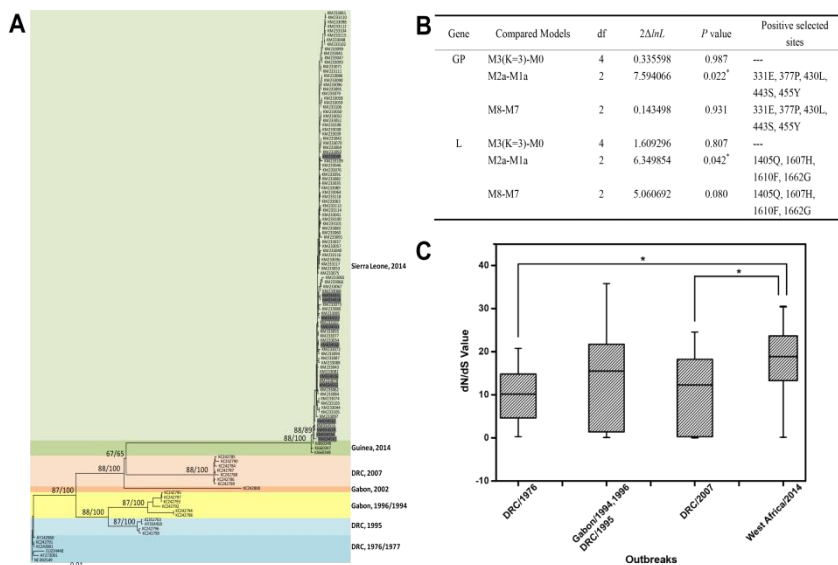
The study found that most TDR strains in sub-Saharan Africa and South/Southeast Asia arose independently, suggesting that ARV

regimens with a high genetic barrier to resistance combined with improved patient adherence may mitigate TDR increases by reducing the generation of new ARV-resistant strains. A small number of reverse transcriptase inhibitor resistance mutations were responsible for most cases of high-level resistance, suggesting that inexpensive point-mutation assays to detect these mutations may be useful for pre-therapy screening in regions with high levels of TDR. In the context of a public health approach to ARV therapy, a reliable point-of-care genotypic resistance test could identify which patients should receive standard first-line therapy and which should receive a protease-inhibitor-containing regimen, which can offer the crucial strategic basis for optimizing the current clinical treatment plan of HIV/AIDS all around the world.

Research Advances on Molecular Evolution of Ebola Virus

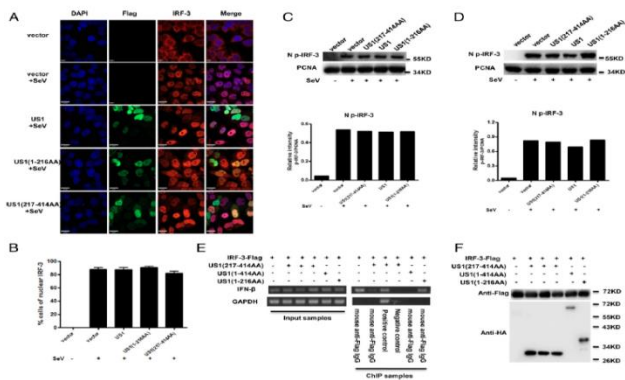
The research group, led by Chinese researcher Bo Zhang from Center for Emerging Infectious Diseases (CEID) in WIV, CAS, has made progress in identifying the pattern of molecular evolution for Zaire ebolavirus (ZEBOV) in the 2014 outbreak in West Africa. The findings have been published on *Infection Genetics and Evolution*, an influential international journal on infectious diseases. To investigate the evolutionary properties of ZEBOV in this outbreak, the research group examined amino acid mutations, positive selection, and evolutionary rates on the basis of 123 ZEBOV genome sequences.

The estimated phylogenetic relationships within ZEBOV revealed that viral sequences from the same period or location formed a distinct cluster. Analysis of the seven protein regions of ZEBOV revealed evidence of positive selection acting on the GP and L genes. Interestingly, all putatively positive-selected sites identified in the GP are located within the mucin-like domain of the solved structure of the protein, suggesting a possible role in the immune evasion properties of ZEBOV. Compared with earlier outbreaks, the evolutionary rate of GP gene was estimated to significantly accelerate in the 2014 outbreak, suggesting that more ZEBOV variants are generated for human-to-human transmission during this sweeping epidemic.



This study reveals the genetic characteristics and the epidemiological dynamics for ZEBOV in the 2014 outbreak in West Africa, which is of great significance for the investigation on the molecular epidemiology of ZEBOV and the related vaccine design.

Progress in Mechanism of Herpes Simplex Virus Type 2 Mucosal Infection and Vaccine Design

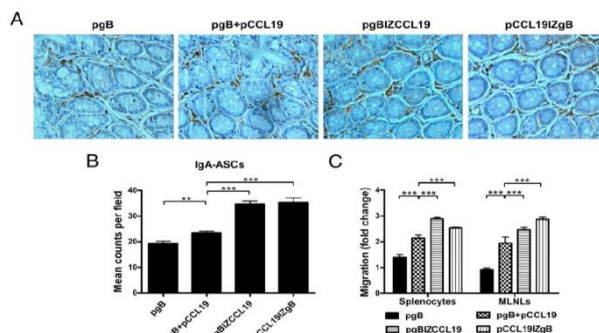


The research group, led by Chinese researcher Qinxue Hu has made progress on mechanism of herpes simplex virus type 2 (HSV-2) mucosal infection and vaccine design. Two related papers have recently been published in *The Journal of Immunology*.

HSV-2 is the major cause of genital herpes, and its infection increases the risk of HIV-1 acquisition and transmission. After initial infection, HSV-2 can establish latency within the nervous system and thus maintains lifelong infection in humans. It has been suggested that HSV-2 can inhibit type I IFN signaling, but the underlying mechanism has yet to be determined. In one study, they demonstrate that productive HSV-2 infection suppresses Sendai virus (SeV) or polyinosinic-polycytidylic acid-induced IFN- β production. They further reveal that US1, an immediate-early protein of HSV-2, contributes to such suppression, showing that US1 inhibits IFN- β production at both mRNA and protein levels. The findings highlight the significance of HSV-2 US1 in inhibiting IFN- β production and provide insights into the molecular mechanism by which HSV-2 evades the host innate immunity, representing an unconventional strategy exploited by a dsDNA

virus to interrupt type I IFN signaling pathway.

There is a lack of an HSV-2 vaccine, in part as the result of various factors that limit robust and long-term memory immune responses at the mucosal portals of viral entry. Based on their previous findings, the research group hypothesized that using CCL19 in a fusion form to direct an immunogen to responsive immunocytes might have an advantage over CCL19 being used in combination with an immunogen. They designed two fusion constructs by fusing CCL19 to the C- or N-terminal end of the extracellular HSV-2 glycoprotein B (gB) with a linker containing two (Gly4Ser)₂ repeats and a GCN4-based isoleucine zipper motif for self-oligomerization. Their findings indicate that enhanced humoral and cellular immune responses can be achieved by immunization with the gB-CCL19 fusion constructs. They further demonstrate that mice vaccinated with fusion constructs can be well protected from intravaginal lethal challenge with HSV-2, providing information for the design of vaccines against mucosal infection by HSV-2 and other sexually transmitted viruses.



Sensational Beats

Prof. Zhengli Shi wins Special Government Allowances and is given the title of Young and Middle-aged Expert with Outstanding Contributions of Hubei Province

Recently, the Ministry of Education issued a notification, announcing that Prof. Zhengli Shi from WIV is approved to enjoy the 2014 Special Government Allowances of the State Council. In addition, she has been awarded as Young and Middle-aged Expert with Outstanding Contributions of Hubei Province.



The Special Government Allowance, set by the State Council as a reward to high-level professional and technical personnel and high-skilled talents, showing the care and support from the central government and the State Council to the majority of those personnel and talents, has played a significant role in strengthening and improving the qualified personnel development. Aiming at stimulating the rapid development of economy and promoting the innovation, The People's Government of Hubei Province set up Young and Middle-aged Expert with Outstanding Contributions of Hubei Province, which mainly selects the provincial leading and innovation talents in fields of innovation of technology, education and management, and those who make great contributions to border regions, and remote and difficult areas.

Focusing on etiology and mechanism of emerging viruses infection, Prof. Shi's studies on isolation and identification of emerging viruses, molecular epidemiology and mechanism of emerging viruses infection have yielded a series of major achievements. She is the principle investigator of the projects funded by the National Science Foundation of China (NSFC) and Ministry of Science and Technology (MOST), publishing 28 papers in international journals as a first/corresponding author in recent five years.

Sensational Beats

Prof. Yanyi Wang wins Hubei Youth May 4th Medal

Prof. Yanyi Wang of WIV has won the Hubei Youth May 4th Medal, the top award for Hubei youths, which is conferred by the Organization Department of Party Committee of Hubei Province, the Communist Youth League's Hubei Provincial Committee and Hubei Province Youth Federation to set up excellent examples of Hubei youths.

As the Deputy Director of the Center for Virus Pathology (CVP) and Leader of Research Group of Molecule Immunology in WIV, CAS, Prof. Yanyi Wang has published several papers in *Mol. Cell*, *Cell Host Microbe* and *PNAS* as a first or corresponding author. These publications have been cited for more than 1170 times by others. She received the Young Scholar Award from the Chinese Society for Immunology, and was an awardee of the 10,000 Talent Plan—Outstanding Young Talents in 2013. In 2014, She was awarded as one of the Distinguished Young Scholars, which was funded by National Nature Science Foundation of China.



Dr. Jiali Si wins the supporting of CAS to the inflow of talent in the fields of Documentation, Intelligence and Journal Publishing

Dr. Jiali Si, Scientific Editor and Managing Editor of *Virologica Sinica* of WIV, wins the supporting of Chinese Academy of Sciences (CAS) to the inflow of talent in the fields of Documentation, Intelligence and Journal Publishing. The talents scheme offered by CAS, aims to strengthen the construction of talent team and promote the scientific research innovation in the above fields, so as to seize the current opportunity to develop documentation, intelligence and journal publishing.

As the only English journal published domestically in virology, *Virologica Sinica* has been indexed by many international databases, such as PubMed/Medline, Scopus, Biosis and Google Scholar, and is newly accepted by Science Citation Index (SCI) and included in Journal Citation Reports (JCR). In April 2012, Dr. Si started to take charge of the editorial office of the journal. She has played an important role in increasing the academic quality, popularity and international influence of the journal. In recent two years, *Virologica Sinica* was funded by Project for Enhancing International Impact of China STM Journals (PIIJ), and was awarded the Highest International Impact Academic Journals of China in 2014.



CDC-WIV Joint Research Center for Emerging Diseases and Biosafety was established

On 31 Jan. 2015, the opening ceremony of CDC-WIV Joint Research Center for Emerging Diseases and Biosafety was held on the completion commemoration of National Biosafety Laboratory in Wuhan, CAS. Yu Wang, Director of Chinese Center for Disease Control and Prevention (CDC) and Xinwen Chen, Director of WIV, CAS, unveiled the plaque for the center. Zhu Chen, Vice Chairman of the Standing Committee of the National People's Congress, Chairman of Chinese Peasants and Workers Democratic Party, Bin Li, Director of National Health and Family Planning Commission of the People's Republic of China (NHFPC), and Chunli Bai, President of CAS witnessed this ceremony.

In order to implement the spirit of NHFPC and CAS on co-constructing and managing the National Biosafety Laboratory in Wuhan, CDC and WIV set up the joint research center. Under common management by the both sides, the research and management affairs of this center are incorporated into management systems of NHFPC and CAS. By relying on the joint research center, CDC and WIV will fully use their respective advantages, share resources and engage in joint research on emerging infectious diseases and biosafety.



SZCIQ and WIV signed a comprehensive cooperation agreement

On 31 Mar. 2015, Longfei Hu, Deputy Director of Shenzhen Entry-exit Inspection and Quarantine Bureau of the People's Republic of China (SZCIQ), Congxian Xie, Director of Shenzhen International Travel Healthcare Center, and Jialong Ren, Director of Hubei International Travel Healthcare Center, led a delegation to visit WIV and engage with communicative activities on practical investigation. Gengfu Xiao, Deputy Director of WIV, CAS, accompanied by the heads of research and development management and some related academic leaders, warmly received those visiting experts.

First the experts visited Zhengdian Park of WIV, CAS to gain insight into some basic conditions of construction background, design concept and functional orientation on National Biosafety Laboratory in Wuhan, CAS. At the following seminar, Prof. Xiao briefed WIV's general condition, historical development, disciplines distribution and international cooperation situations depending on the high-containment biosafety laboratory, including research on prevention and control of emerging infectious diseases, construction system of management of biosafety and personal training.

On the seminar, as the authorized representatives of WIV and SZCIQ respectively, Prof. Xiao and Director Hu reached a comprehensive cooperation agreement, marking a full range of partnerships between both sides on construction of high-containment biosafety laboratory, prevention and control of emerging and unusual pathogens and coordination on customs clearance of reagents and materials. In the above fields, SZCIQ and WIV will develop cooperation on technology research and development, construction of science innovation stage, exchanges and trainings of talents and sharing of resources and information, so as to achieve the advantage compensation and common development, and ultimately to deal with public health and security events at ports effectively and to play an important role in supporting the national biosafety.



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