



WIV NEWSLETTER

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Trends and Policy I:

Chinese Science Gets Mass Transform



The CAS, which employs 60,000 people, opens 2014 congress in Beijing.

Change is coming to the institute that has been at the heart of China's scientific development. The Chinese Academy of Sciences (CAS) is making unprecedented structural reforms to foster collaboration and research.

The initiative — which was designed by Bai — follows an appeal by Chinese president Xi Jinping in July 2013 for the CAS to become a world leader in science, namely, taking the lead in the leap-forward development of science and technology, in the establishment of national innovative talent base, in the founding of national high-level S&T think tank, and in building a scientific base at advanced international standards.

Bai has grouped research into four categories. The first category is devoted to establishing centers of excellence focused on basic science, and will target areas in which China has a chance to dominate. The plan is to take the count up to 20 centers by 2020. A second category will target areas with underdeveloped commercial potential, including microsatellites, marine information technology and drug development. A third category will establish collaborations around large-scale facilities. The fourth category, still in its design phase, will be devoted to initiatives that assist local development and

sustainability.

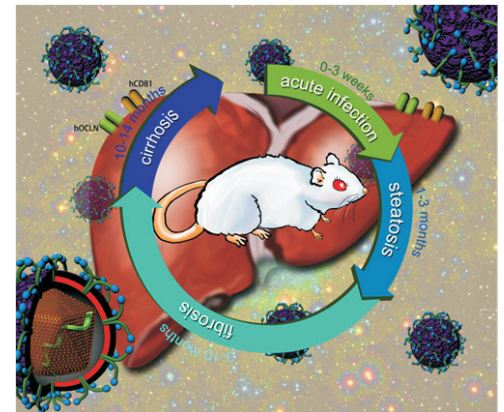
<http://www.nature.com/news/chinese-science-gets-mass-transformation-1.15984>

Sensational Beats I:

An Authentic Mouse Model of Persistent Hepatitis C Virus Infection Becomes Available

Researchers from WIV and Institute of Biophysics, CAS, published a cover story on Cell Research, titled Persistent hepatitis C virus infections and hepatopathological manifestations in immune-competent humanized mice, which reported the world's first immune-competent humanized mice that allow the natural infection of HCV. Almost 40 years ago, HCV was identified by researchers in NIH. There are about 200 million people carrying HCV around the world, among which, there are over 40 million patients in China alone. The majority of HCV infection develops chronic infection, which causes steatosis, cirrhosis and hepatocellular carcinoma. However, understanding HCV chronicity and pathogenesis has been hampered by its narrow host range, mostly restricted to human and chimpanzees.

Endeavor to infect a variety of humanized mice has not been able to achieve persistent HCV infection unless the essential innate immune responsive genes are knocked out. Nevertheless, such immune-compromised humanized mice still lacked HCV infection-induced hepatopathogenesis. Prof. Hong Tang and Prof. Xinwen Chen reported that transgenic mice in ICR background harboring both human CD81 and occludin genes (C/OTg) are permissive to HCV infection at a chronicity rate comparable to humans. In this mouse model, HCV accomplishes its replication cycle, leading to sustained viremia and infectivity for more than 12 months post infection with expected fibrotic and cirrhotic progression. Host factors favorable for HCV replication, and inadequate innate immune-response may contribute to the persistence. Lastly, NS3/4 protease inhibitor telaprevir can effectively inhibit de novo RNA synthesis and acute HCV infection of C/OTg mice. Thus, their most advanced mouse model can recapitulate chronic HCV infection with complete replication cycle and hepatopathologic manifestations. This is for the first time scientists can engineer the immune-competent mice to be permissive to HCV infection. This model will open a new venue to study the mechanisms of chronic hepatitis C and develop better treatments.



Mouse Model of Persistent HCV Infection

Contact:

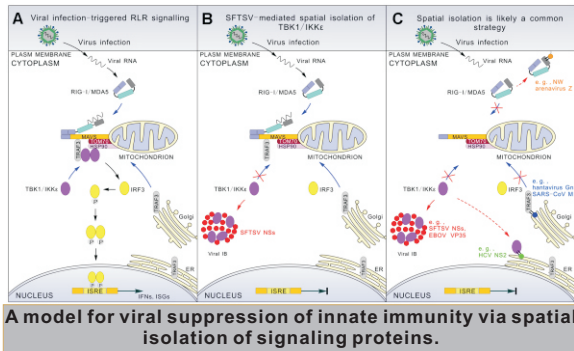
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Sensational Beats II:

Research Advances on Viral Suppression of Innate Immunity



bodies (IBs) in SFTSV-infected cells, which was suggested to be induced by the viral NSs protein. Furthermore, NSs captures host kinases TBK1/IKK ϵ irreversibly into viral IBs and thus leads to a spatial isolation of the kinases from mitochondrial platforms, depriving TBK1/IKK ϵ of the chance to participate in antiviral complex assembly and blocking the antiviral signalling pathway (Figure 1). The study proposes the new role of viral IBs as virus-built 'jail' imprisoning host factors and hence interfering with corresponding cellular processes, and presents a novel and likely also general mechanism of viral immune evasion through spatial isolation of critical signaling molecules from the mitochondrial antiviral platform.

Sensational Beats III:

The Development and Application of Mosquito Larvicide

Recently, the project: the Development and Application of Mosquito Larvicide, which is hosted by WIV, has received positive response from local people and successfully got through the examination and inspection conference held in Xinjiang Province.

Xinjiang Province, especially in the downstream areas of Irtysh River, known as one of the four largest mosquito kingdoms in the world, has always been harassed by mosquitos. For instance, there are at least 1700 mosquitos per cubic meter in the downstream areas of Irtysh River in summer. The implementation of the project (the Development and Application of Mosquito Larvicide) discovers the three major mosquito larva breeding sites, identifies the growth and decline rule of mosquito larva and adult, develops the technological biopesticide mosquito-prevention system, effectively reduces the mosquito density, and establishes the mosquito bio-control demonstration zone.

The successful implementation of the project has greatly improved the living environment of the local residents, realized local people's hopes to avoid the mosquito interference, and enhanced local people's confidence in guarding the frontiers, which play an important role in consolidating the frontiers of China.



Anti-mosquito Spray

Sensational Beats IV:

The Interface between MTase and RdRP of NS5 is Essential for Flavivirus Replication



Prof. Bo Zhang

The research group, led by Chinese researcher Bo Zhang from Center for Emerging Infectious Diseases (CEID) in WIV, CAS, has made progress on replication mechanism of flaviviruses with their collaborator Prof. Peng Gong. NS5 is a multifunctional, viral protein that contains methyltransferase (MTase) and an RNA-dependent RNA polymerase (RdRP). A conserved interface between MTase and RdRP was first identified in the full-length NS5 crystal structure of JEV. In their study, they used the infectious clones and replicon systems of both JEV and DENV-2 to perform functional mutagenesis analyses and demonstrated for the first time that interface is critical for RNA replication of flavivirus. Interestingly, some replication-impaired variants generated a common compensatory NS5 mutation outside the interface (L322F), providing novel routes to further explore the crosstalk between MTase and RdRP. Their functional validation of the conserved MTase-RdRP interface consolidated its potential as a potential target for anti-flavivirus drug development.



Prof. Peng Gong

Progress and Innovation:

Key Laboratory of Etiology and Biosafety for Emerging and Highly Infectious Diseases

Key Laboratory of Etiology and Biosafety for Emerging and Highly Infectious Diseases, Wuhan Institute of Virology, Chinese Academy of Sciences (Laboratory Code: 2014DP173064) was approved to establish recently.

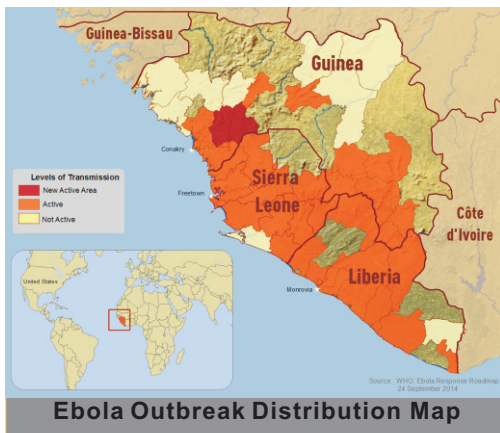
The laboratory is dedicated to advancing the public health and the national security through innovative research on etiology and biosafety for emerging and highly infectious diseases (EID). As part of Center for Emerging Infectious Diseases, CAS, the laboratory has thirteen research groups specialized in different fields of EID, such as rapid detection, molecular epidemiology and early warning, pathogenic mechanism, prevention and control strategies (therapeutic antibody, vaccine, and drug development and assessment), and biosafety&biosecurity.

Based on WIV's high-level biosafety platform, the establishment of this laboratory will further demonstrate CAS's global influence on emerging infectious diseases, highly infectious pathogen, and high-level biosafety. Complying with the requirements of CAS's key laboratory, this laboratory will strive to be the authoritative research base for China's emerging and highly infectious pathogenic microorganism and a high-tech hub, laying a theoretical and technological foundation for the prevention, control, diagnosis, and treatment of China's emerging and highly infectious pathogen.



Lab's Director Prof. Zhengli Shi Delivered the Report on the Lab Application

Hot Spot:
Ebola



The 2014 Ebola outbreak first began in Guinea in March 2014. Since its initial outbreak, the virus has spread to Liberia, Sierra Leone, and Nigeria. The 2014 Ebola outbreak is the most severe in recorded history since 1976 in regards to both the number of human cases and fatalities. According to WHO Ebola virus disease outbreak news, Ebola virus has infected more than 6263 people and killed 2917 humans until September 21, 2014. There are five countries involved in the battle to Ebola virus, including Sierra Leone, Guinea, Liberia, Nigeria, and Senegal. So far, it doesn't appear to be slowing down. The number of Ebola virus infection and death is keeping increasing. Ebola virus is more inimical to humans than perhaps any known virus on Earth. Now, the alarm for the prevention and control of Ebola is being sounded around the world. Scientists from WIV have done a lot of previous research on high infectious diseases such as Ebola virus and other viral hemorrhagic fever, which means we are ready for the prevention and control of Ebola virus. After so many years' exploration and research, we have wide knowledge about Ebola virus, full of capability and confidence in dealing with it technologically.

Upcoming Events:

The 6th Symposium of Emerging Viral Diseases Control

Viral diseases pose great threat to human health. Therefore, the research on emerging and viral diseases has grown to be the focus of life science study. To further strengthen academic exchange and cooperation between scientists in the field of virology at home and abroad, the 6th Symposium of Emerging Viral Diseases Control will be held on 29-31 October, 2014 by WIV in Wuhan.

The cutting-edge issues of emerging viral diseases discipline development will be focused, including pathogenic biology, molecular epidemiology, the interaction between virus and host, animal models with emerging virus, and antiviral drugs and vaccines. Various forms will be employed in the symposium to reflect the newest research findings in the field of emerging viral diseases, such as oral presentations, group discussions, posters, etc. An open and qualified communication platform will be established for all the participants to discuss the status quo and trends of epidemiology and viral diagnosis technology in the hope of enhancing the exchange and cooperation.

Warmly welcome scientists and students at home and abroad to attend the symposium!

Organizer



Co-organizer



Key Laboratory of Etiology and Biosafety for Emerging and Highly Infectious Diseases

