WIV Newsletter
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# Take a look at the largest virus bank in Asia

Recently, the National Health Commission of China officially designated the China Center for Virus Culture Collection (CCVCC) in Wuhan Institute of Virology (WIV), Chinese Academy of Sciences (CAS) as a "National-Level Culture Collection Center", which is an important milestone in the development of the Center's innovative construction.

The species and samples of pathogenic microorganisms are important strategic resources for ensuring national social security, economic security and biological safety. As a national-level culture collection center, the CCVCC will be oriented to national strategic needs and will play an indispensable and important supporting role in the fields of national security, life science research, public health and virology study.

CCVCC was established in 1979 and was registered under World Federation for Culture Collections (WFCC) in 1989. In 2015, the Center joined the European Virus Archive goes global (EVAg) project funded by European Commission's Horizon 2020 and successfully passed the highest rating of EVAg quality management system in October 2017. Therefore, it is a center focusing on virus resource collection, virus biotechnology, systematic virology and bioinformatics research. As an integrated center, it is also the largest virus bank in Asia.


Wuhan Institute of Virology, CAS in Central China's Hubei province preserves more than 1,500 different strains of virus. Image by China Daily


With the official operation of the Wuhan National Biosafety (P4) laboratory of CAS, CCVCC has fully possessed the qualifications and conditions for collecting the bacteria species with the biohazard classification from level 1 to 4. In the future, the Center will receive, test, store and manage bacteria species in accordance with relevant national regulations, and legally provide the bacteria species to units engaged in experimental activities of pathogenic microorganisms. In addition, the Center will play a significant role in the technical research and training practice in the related area.

# Scientists highlighted the oligomeric state as the functional form of GP41 in baculovrius replication cycle

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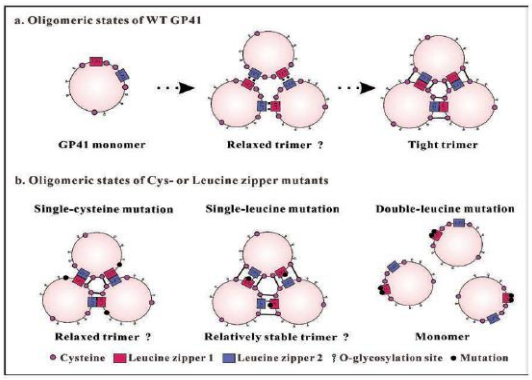


In baculovirus, a large double stranded enveloped DNA virus, so far only a single protein, named GP41, has been identified as an O-glycosylated tegument protein. Baculoviruses are specific for insects and have been widely used as biocontrol agents of insect pests, as well as efficient gene expression and gene delivery vectors for human therapy. GP41 was originally identified as an O-linked glycoprotein and most likely to occupy the space between the nucleocapsid and the envelope of the ODV, i.e. within the tegument. Whether GP41 is associated with BVs, however, remains controversial.

In a present study, the research group led by Prof. WANG Hualin in Wuhan Institute of Virology of the Chinese Academy of Sciences pointed out a close correlation between GP41 oligomerization and its function, therefore highlighted the oligomeric state as the functional form of GP41 in baculovrius replication cycle. In this study, for the first time the gp41 gene of AcMNPV was knocked-out by using the λ-Red homologous recombination method, and its function during the virus replication cycle was comprehensively investigated. GP41 was found to be not only essential for nucleocapsid egress from the nucleus to produce BV, but was also indispensable for ODV morphogenesis, therefore the nature of GP41 was further investigated. When GP41 was found as dimers and trimers in infected cells and as trimers in both BVs and ODVs, the scientists set out to investigate whether or not disulfide bridging and protein-protein interactions were involved in the oligomerization of GP41 and what the consequences of specific mutations in GP41 to prevent oligomerization would be on the morphogenesis and assembly of BV and ODV.

This work was supported by the Strategic Priority Research Program of the Chinese Academy of Sciences, the National Natural Science Foundation of China, the Key Research Program of Frontier Sciences of the Chinese Academy of Sciences, the Virology Key Frontier Science Program of State Key Laboratory of Virology and a grant to JMV from State Key Laboratory of Virology And Wuhan Institute of Virology.

Link: *http://jvi.asm.org/content/early/2018/04/05/JVI.02083-17.full.pdf+html*

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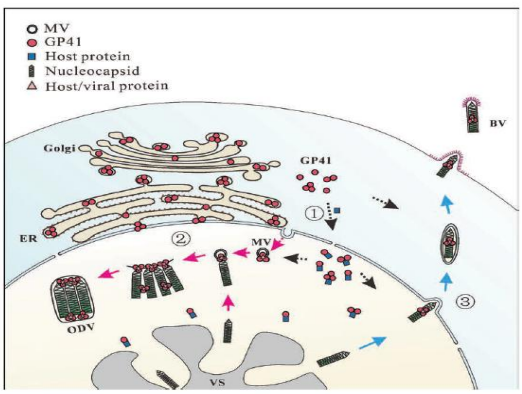
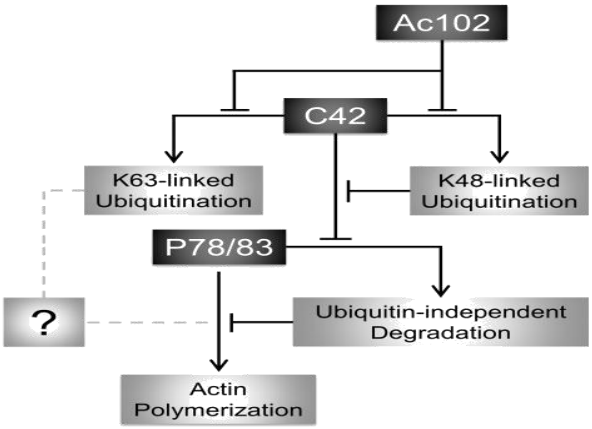


# Scientists revealed that Ac102 and C42 form a regulatory cascade to control viral NPF activity

Actin is one of the most functionally important proteins in eukaryotic cells. Morphologically, actin can be found in two forms: a monomeric form called globular actin (G-actin) and a polymeric form called filamentous actin (F-actin).

G-actin can polymerize to form F-actin, and nucleation promoting factor (NPF) is the initiator of this process. Many viral pathogens harness the host actin polymerization machinery to assist in virus propagation. Autographa californica multiple nucleopolyhedrovirus (AcMNPV) induces actin polymerization in host cells. P78/83, a viral NPF, is responsible for this process. Previously, the scientists identified that BV/ODV-C42 (C42) binds to P78/83 and protects it from degradation.

In a recent report, the research group led by Prof. CHEN Xinwen in Wuhan Institute of Virology of the Chinese Academy of Sciences determined that another viral protein, Ac102, is involved in modulating C42 ubiquitination and consequently ensures P78/83 activity as an NPF to initiate actin polymerization. This regulatory cascade represents a novel mechanism by which a virus can harness the cellular actin cytoskeleton to assist in viral propagation.




In this study, the scientists identified that Ac102 is a novel regulator of actin polymerization during AcMNPV infection. Knockout of ac102 from the AcMNPV genome resulted in nuclear actin polymerization deficiency, as well as abnormal morphogenesis and distribution of capsid structures in the nucleus. These phenotypical changes are heavily dependent on the Ac102-C42 interaction but are not correlated with the nuclear accumulation of actin. Further investigation indicated that Ac102 suppresses K48-linked ubiquitination of C42 and consequently potentiates P78/83 availability as an NPF to induce actin polymerization.

In summary, their study revealed a novel regulatory cascade consisting of Ac102 and C42, which extends our understanding of how baculovirus manipulates the host actin polymerization machinery to maximize its value to viral propagation.

The results have been published in Journal of Virology entitled "Ac102 Participates in Nuclear Actin Polymerization by Modulating BV/ODV-C42 Ubiquitination during Autographa californica Multiple Nucleopolyhedrovirus Infection".

This work was supported by grants from the National Natural Science Foundation of China.

Link: *http://jvi.asm.org/content/early/2018/03/30/JVI.00005-18.long*

# Scientists from Japan visited WIV, CAS

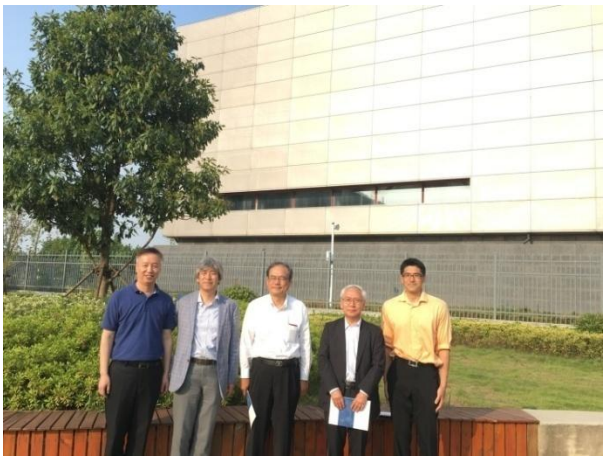
On May 17th 2018, Prof. Ichiro Kurane, the Former Director General of National Institute of Infectious Diseases (NIID), Japan, Prof. Masayuki Saijo, the Director of the Department of Virology 1 from NIID, Prof. Koichi Morita and Dr. Daisuke Hayasaka from Nagasaki University, visited Wuhan Institute of Virology (WIV), Chinese Academy of Sciences (CAS).

Prof. Yanyi WANG, the Deputy Director General of the WIV, met with the Japan Scientists. Prof. Rongge YANG, Prof. Zhihong Hu, Prof. Bo ZHANG, Prof. Xi ZHOU and relevant scientific representatives from WIV participated the meeting.

Prof Yanyi WANG extended a warm welcome on behalf of the Institute and made a brief introduction of WIV for the participants. She pointed out that for a long time WIV and NIID have laid a solid cooperation foundation. The both sides have close scientific collaboration on infectious diseases. Scientists from NIID often came to WIV for academic exchanges and bilateral cooperation. The both sides had jointly held the Third China-Japan Science Forum on Diseases Prevention and Control. In particular, Prof. Rongge YANG went to NIID on June 4th, 2008 on behalf of WIV. NIID and WIV signed the memorandum of cooperation officially, and decided to collaborate on infectious diseases. Then Prof. Masayuki Saijo gave the participants a report about the NIID. He hoped that with the efforts of both parties, further cooperation and exchanges in the field of infectious diseases and public health will proceed smoothly.

Afterwards, the participants discussed in depth the issues of the two sides in terms of interested areas, their own advantages, project cooperation and promotion plans. All the participants believed that we will continue to achieve more and greater achievements in cooperation in related fields.

After the meeting, the Japan Scientists visited Wuhan National Biosafety Laboratory of CAS. The cooperation plan had been further discussed between the both sides.



# Jean-Michel Hubert visited Wuhan National Biosafety Laboratory of CAS

On May 22nd 2018, Mr. Jean-Michel Hubert, the General Coordinator of French-Sino cooperation on prevention and control of emerging infectious diseases visited Wuhan National Biosafety Laboratory (Wuhan P4 Lab) of Chinese Academy of Sciences (CAS), accompanied by Mr. Philippe MAURIN, the Scientific Attaché in Consulate General of France in Wuhan. Prof. Zhiming YUAN, the Director of Wuhan P4 Lab, met with the French guests. Prof. Donglin SONG, the Deputy Director of NBL, Mr. René COURCOL, the Technical Expert for the P4 project and relevant representatives from Wuhan Institute of Virology (WIV) participated the meeting.

At the meeting, Prof. YUAN introduced the operation, maintenance and management status of Wuhan P4 laboratory from aspects of laboratory accreditation, activity qualification permitting and scientific research projects. Mr. COURCOL made a report on the progress of quality control construction work in Wuhan P4 Laboratory. He will try assisting WIV in creating a high-level national biosafety laboratory that combines biosafety management and quality control in the future.

Mr. HUBERT pointed out that the establishment of a quality control system is a guarantee for the efficient operation of laboratory. It is a key area for the prevention and control of infectious diseases in China and France. It is also an important support for laboratory to develop the strain preservation. He hoped the both sides could continue to strengthen cooperation in this field.

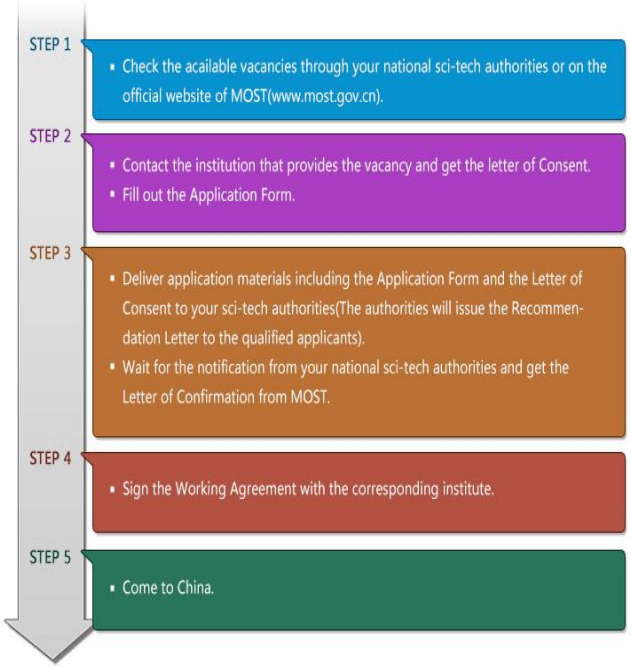
Besides, the two sides conducted in-depth exchanges around the launch of joint scientific research project. The project cooperation will be started as soon as possible. At last, the participants discussed and reached consensus on the next committee meeting of Sino French cooperation on prevention and control of emerging infectious diseases. The meeting will be held in China this year.

## Cooperation

# Call for application: MOST Talented Young Scientist Program

The Talented Young Scientist Program (TYSP) from Mistry of Science and Technology (MOST) supports talented young scientists, scholars and researchers from Afro-Asian countries to work in Chinese research institutes, universities or enterprises. TYSP aims to promote communication among Afro-Asian science and technology talents, nurture young science and technology leaders, and foster long-term international cooperation among research institutes, universities and enterprises in Afro-Asian countries. Ministry of Science and Technology of China (MOST) will provide each scientist with RMB ¥12500 per month for accommodation, insurance and other living expenditure during the program.

For more details: *http://tysp.cstec.org.cn/en/index.aspx*




## Science Tips

# Past failures shadow current hopes of testing drugs during an Ebola outbreak

While public health authorities and international organizations are trying to stop the Ebola outbreak in the Democratic Republic of the Congo (DRC), scientists have a rare chance to test new therapies on people infected with the virus, both to potentially help them and to gather data for the future. The DRC is considering testing several candidate Ebola drugs and antibodies that are in development. But the Ebola epidemic that exploded across West Africa several years ago showed that such trials are difficult to set up and conduct.

As the West African epidemic was winding down, Science took stock of each clinical study that researchers had conducted—or attempted to carry out—in the three most affected countries: Guinea, Liberia, and Sierra Leone. It was a thin harvest—except for a study of a vaccine produced by Merck, none of the trials yielded conclusive results. Some were able to enroll only a handful of patients, even though there were more than 28,000 cases; others suffered from not having a control group.

The DRC decided to use the Merck vaccine, which was shown to work in a large study in Guinea and is expected to be licensed by next year. Since 21 May, more than 1000 people have received it, and the

## Science Tips

study is expanding. An expert panel convened by the World Health Organization (WHO) said on 17 May that four unproven treatments merit being tested during the current outbreak under an "ethical framework" dubbed the Monitored Emergency Use of Unregistered and Investigational Interventions (MEURI). Two of those—an Ebola monoclonal antibody concoction called ZMapp and the antiviral drug favipiravir—were also tested in the West African outbreak. (Studies published in 2016 describe more detailed results from the trials of ZMapp and favipiravir.)

The two other treatments that passed MEURI muster are the antiviral drug GS-5734 and the monoclonal antibody cocktail REGN-EB3. The evidence for using these, the panel noted, was "well below the usual level evidence for formulating recommendations." And a monoclonal antibody known as mAb114, the panel said, was too early in clinical development to meet MEURI standards. The WHO panel did not mention any of the other potential therapies tested earlier in West Africa—the antivirals brincidofovir and TKM-Ebola, the immune-modulator interferon, and the antibody-rich blood and plasma of survivors.

Whether scientists will learn more during this outbreak, which to date has identified 53 patients (25 of whom have died), will again depend on many variables. Most importantly, only the vaccine study has made it through the ethical and scientific approval process in the DRC, and the outbreak may well end before any of the trials get started. The antibody treatments can also require repeated infusions, and those aren't feasible in the remote DRC locales where the bulk of the cases have surfaced.

Source: *Science*

## Express News

### Upcoming event – The 8th International Symposium on Emerging Viral Diseases

The 8th International Symposium on Emerging Viral Diseases will be held on October 20-22, 2018 in Wuhan, China.

This symposium will focus on four aspects:

- Emerging Viral Pathogen
- Virus-Host Interactions
- Antiviral Immunity
- Arbovirus

The registration website:
http://www.whiov.ac.cn/isevd/