



A clean bill of animal health

The animal science programme at Huazhong Agricultural University (HZAU), started in 1898 and was the first national education platform on animal husbandry. It now encompasses genetics and breeding, nutrition and feed science, production and husbandry engineering, as well as the rearing of animals specifically for commercial use. In its 120 years of development, the programme has been integral to China's animal production industry, innovating technologies to respond to international challenges.

Swine breeding is a traditional strength at HZAU. In the 1970s, Xiong Yuanzhu,



HZAU researchers are getting to the core causes of swine diseases.

the late HZAU professor and CAS member, invented synchronizing selection technology to develop new types of white swine. In recent years, his team identified genes and molecular signalling pathways for beneficial commercial traits, including lean meat and anti-stress factors. Their work has won 30-plus national, ministerial and provincial awards.

Research in animal nutrition and feed technology is growing rapidly. HZAU researchers established a more precise system to feed pigs more efficiently, along with a food quality monitoring process which improves animal production. Using immunoglobulin Y, a major antibody found in birds, researchers developed an anti-diarrhoea feed additive that improves sow feeding efficiency. Other breakthroughs include new products that help prevent mildew and remove heavy metal from feed.

HZAU animal science researchers are also committed to protecting local breeding resources. Their technologies have improved animal breeding and management systems for chickens, water buffalo and swine.

With increasing global fears about food security, HZAU is focused on innovative and sustainable technologies to improve animal husbandry. Its animal science college has an excellent reputation forged through extensive international collaborations and advanced research platforms. There are plans to expand its distinguished faculty team and seize on emerging areas, such as big data in animal husbandry, whole-genome selection and stem cell genome editing, making it a world-class college in animal science. ■

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A safe path from the farm to the table

The sheer volume of global population movement means that major animal diseases, such as avian flu, pose the threat of a human pandemic. Committed to protecting health, promoting the animal husbandry industry and ensuring food safety, the veterinary medicine programme at HZAU translates

basic research results into animal disease prevention and control technologies.

A national leader in the field, the programme covers research and education in basic, preventive and clinical veterinary medicine, as well as veterinary public health and food safety. With a strong faculty team, a national key laboratory and quality research platforms, the programme has widely

recognized research strengths in swine diseases, zoonotic diseases, drug residue detection, and food safety evaluation.

HZAU's pathology and immunology studies aim to pinpoint causes of diseases, especially those that can spread to humans. Their discoveries of mechanisms, including identifying pathogens for infectious digestive disorders in swine and other livestock, help control the spread of diseases. Based on these results, they have developed more than 30 new vaccines and diagnostic kits, gaining five national key new product certificates, 26 new veterinary drug certificates, and many national and provincial awards, including a first prize of the National Science and Technology Progress Award. Commercialization of their research results has been a boon for China's animal disease prevention industry.

Using *in vitro* and *in vivo* comparative metabolism approaches, researchers have studied chemical residues from veterinary drugs, informing food safety evaluations. They have developed technologies and products for detecting mycotoxin and illegal substances, and have established standard drug residue detection methods, winning several awards and 48 patents.

The animal hospital of HZAU has made breakthroughs in veterinary imaging technologies and disease diagnosis and treatment techniques.

HZAU plans to enhance the integration of basic biological research with health studies and extend its work on swine diseases to cattle, poultry, and animals kept as pets. Construction of new facilities will factor in measures to improve biosafety for animal studies. ■

Champion of a national staple

China's pork industry has seen rapid development in recent decades. However, various disease epidemics have posed grave threats.

In 1989, Chen Huanchun obtained his doctorate in veterinary medicine from the University of Munich and returned to HZAU to conduct research on animal infectious diseases.

Focusing on the most devastating swine diseases, both viral and bacterial, Chen's research group studied disease etiology and epidemiology, the structure and functions of pathogenic proteins, and the interactions of pathogens with host and environment. Having elucidated the ecological distribution, molecular evolution, and genetic variation of these pathogens, Chen's team further developed new vaccines, diagnostic reagents, and

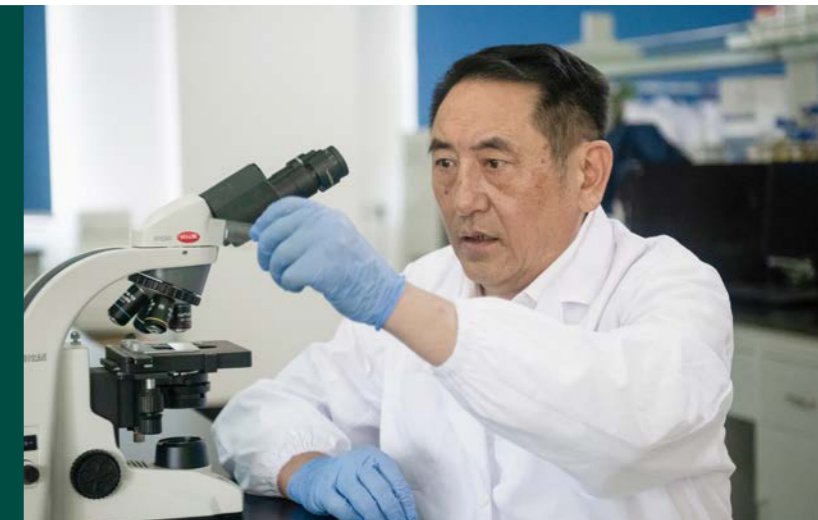
veterinary drugs. Their efforts contributed to the vast improvement of China's swine industry.

In recent years, Chen and his team have conducted vital research on zoonotic diseases that can spread to humans, such as the *H1N1* and *H5N1* influenzas. For example, by exploring the epidemiology of animal tuberculosis in China, they discovered that 45% of dairy tuberculosis is caused by infection of *Mycobacterium*. The team delineated the first global protein interaction map and the gene transcriptional regulation network of *Mycobacterium tuberculosis*, leading to the identification of key regulatory factors for tuberculosis control. Their research on new diagnostic methods, gene-deficient vaccines and new drug screening have contributed to the

prevention and control of animal tuberculosis.

In this decade, Chen's team has developed 19 new vaccines, 12 diagnostic kits and three micro-ecological preparations, winning 26 new veterinary drug registration certificates. These products are widely used in veterinary clinical and animal husbandry practice, having effectively prevented and controlled animal diseases. Chen also proposed biological prevention and treatment, scientific management, and antibiotic-free breeding in the process of animal production.

To recognize his influence and contribution, Chen was elected as a member of the Chinese Academy of Engineering in 2003. He continues to work toward the healthy development of animal husbandry, food safety, and public health. ■



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