

Profile of Dr. Jianxin Jiang



Dr. Jianxin Jiang joined the army and studied clinical medicine at the Third Military Medical University in 1980, which is now Army Medical University. After graduation, he devoted himself to military medical research. He traveled to the Ludwig Boltzmann Trauma Institute in Austria as a visiting scholar from 1991 to 1993 and received a doctorate in field surgery. He was elected as the director of the State Key Laboratory of trauma, burn, and combined injury in 2015, the director of the trauma medical center of Army Medical University in 2019, and the director of the Key Laboratory of Combined Field Injury in 2022. He is a chief scientist of the National Basic Research Program of China (973 Project). He was previously the chairman of the Chinese Trauma Society from 2007 to 2010. Now, he is the Secretary-General of the Asian Trauma Society, a member of the Academic Degrees Committee of the State Council, and editor-in-chief of the *Chinese Journal of Traumatology* (English Version). He was elected as academician of the Chinese Academy of Engineering in 2021.

Dr. Jiang has focused on military medical research for 35 years. His main research area includes explosive blast injury and traumatic infection. He has established modern

explosive weapon injury theory, solved the protection problems caused by explosive blast waves, and systematically established a technical system for diagnosing and treating explosive injuries. He proposed a new theory of etiology by traumatic infection, which revealed that endogenous infection is an important way for severe injury complicated with infection and is the mechanism of pathogen immune escape. He has also proposed new mechanisms, such as “trauma sensitization” and the molecular genetics of traumatic sepsis. His team has established a new technical system for pre-warning, preventing, diagnosing, and treating traumatic infections. His outstanding research findings have enabled the prevention and treatment of sepsis in China to reach the international advanced level.

Outstanding contributions to the prevention and treatment of explosive blast injury

Dr. Jiang proposed the new theory of the “overstretch effect” of lung explosive blast injury. For the first time, two core issues of the critical wave band and the injury mechanism caused by explosive waves were clearly defined, which was highly praised by international experts (Cernak et al., 2001; Chen et al., 2020; Wang et al., 2020; Yang et al., 2011). The protective material developed by Dr. Jiang’s lab effectively protects against lung blast injury, and its protective effect reaches a high level (450 kPa, 30 ms). Through a large number of animal experiments with highly explosive weapons and in combination with clinical treatment, the diagnostic and grading standards, treatment principles, treatment processes, and national military standards of explosive blast injuries were created (Xue et al., 2020). He carried out a comprehensive treatment plan for severe lung blast injury, and the survival rate was 87.5%. This comprehensive treatment plan was used to rescue subjects from several explosion accidents, such as the “6.13 Shiyang” gas explosion accident and the “1.7 Chongqing Wulong” explosion accident. No

patient died because of the use of the comprehensive treatment plan. He has also started a new field of research on blast injury in special environments and defined the propagation law, injury characteristics, dose-effect relationships, and clinical characteristics of underwater and high-altitude blast waves. He formulated the treatment principles for blast injury in sea areas and at high altitudes. This work has filled a gap in health service support in strategic areas in China (Wang et al., 2000).

Keen insight into the new field of the molecular genetics of trauma infection

Dr. Jiang's research has revealed individual differences in the prognosis of trauma at the genomic level and discovered that genetic background can be used to determine the body's reaction and susceptibility to infection after trauma (Chen et al., 2010; Zeng et al., 2009). His team has completed several multi-center clinical studies with large sample sizes (10 centers and 5,762 cases) and detected a series of specific gene polymorphisms that can be used to pre-warn of sepsis and target drug development (Zeng et al., 2012a; Zeng et al., 2015; Zeng et al., 2012b). Dr. Jiang developed the theory of "trauma sensitization," which indicates that the effect of pathogenic bacteria during trauma is significantly enhanced. Lactic acidosis is the main cause of the pathogenic effect of trauma-sensitized pathogens (Jiang et al., 1995). In addition, he has put forward the new theories of "bacterial toxin translocation," "immune escape of pathogenic bacteria," and the "ALK-STING pathway," which cause endogenous infection after trauma. This study was rated as highlight research and was highly praised by renowned immunologists Dr. Michael L. Dustin and Dr. Pablo F. Céspedes of Oxford University (Li et al., 2016; Lin et al., 2019; Zeng et al., 2017). These theories renewed the traditional understanding of the incidence of traumatic infection and were highly praised by renowned experts in the field (Kingwell, 2017).

Pioneer who greatly improved the prevention and treatment of war wound infections

Based on the theory of traumatic molecular genetics, Dr. Jiang established a molecular genetics detection method for early warning of traumatic sepsis. The coincidence rate of the early warning diagnosis was 85.7% (Gu et al., 2010). This achievement earned a national invention patent and has been used in high-throughput rapid pathogen detection to solve the technical problem of detecting pathogens in the field. The detection accuracy of pathogens is more than 95%. This method has been popularized and applied by many military hospitals. Under his leadership, his team has de-

veloped several anti-infective agents for the wound surface (such as compound coral ginger liquid and Polituo spray) to prevent wound infections in the field. These agents were used during the medical rescue at the Wenchuan earthquake and were widely praised. Dr. Jiang led the development of six treatment guidelines for traumatic sepsis and four expert consensus on the preventive use of post-traumatic antibiotics. Due to his outstanding contributions in this field, Dr. Jiang has won many national and military science and technology progress awards.

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