

## Elimination of blinding trachoma in China: why is further study necessary?

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Sixty years ago, Prof. Feifan Tang and Xiaolou Zhang first discovered and isolated *Chlamydia trachomatis*, a finding that clarified the cause of trachoma and marked the beginning of a fresh chapter on trachoma research, prevention, and control worldwide (Tang et al., 1956; Tang et al., 1957a; Tang et al., 1957b). After decades of effort and complete implementation of the surgery, antibiotics, facial cleanliness, and environmental improvements (SAFE) strategy, blinding trachoma was eliminated as a public health threat in China in 2015 (Wang et al., 2015). However, China holds a vast territory with imbalanced economic development, and sporadic cases of trachoma have been reported in its remote regions. Therefore, prevention and control of local epidemics and recurrence of sporadic cases will become an important issue.

In order to assess the biological variation between current *Chlamydia trachomatis* and previous pathogenic bacteria, and to evaluate the properties of the remaining sporadic trachoma, such as its pathogenicity, intensity, transmission routes, and so on, Prof. Ningli Wang and his medical corps conducted extensive research on trachoma prevention and treatment in a medically underserved area in 2014–2015.

Their surveys in rural primary schools of Dunhua, Huangyuan, and Huzhu in Qinghai province identified several cases of sporadic trachoma (Li et al., 2016). These cases included 26 students positive for *Chlamydia trachomatis* tested using reverse transcription polymerase chain reaction (RT-PCR). The *ompA* gene sequence of these 26 subjects

had 99% similarity with type B *Chlamydia trachomatis* sequence. Two novel genetic mutations, *CQZ-1* (Qinghai-1) and *CQZ-2* (Qinghai-2), were found (GenBank accession numbers KU737520 and KU737521). A missense mutation in the second conserved region was also observed, in which an adenine (A) was converted to guanine (G) (ACT to GCT). This missense mutation was present in all 26 subjects. Additionally, a missense mutation in which a thymine (T) was converted to cytosine (C) (GCA to GTA) was identified in the fourth variable region of the 887th position, resulting in a change of the 296th amino acid from Ala to Val (A to V); four of the 26 subjects presented with this missense mutation.

Meanwhile, Mei Wang et al. observed that *Chlamydia trachomatis* infections were present with multiple bacteria, particularly *Haemophilus influenzae*, *Staphylococcus aureus*, *Moraxella catarrhalis*, and *Streptococcus pneumoniae* in 57.14% of cases, while single *Chlamydia trachomatis* infections accounted for 42.86% of cases (Wang et al., 2016). Qingfeng Liang et al. reported a high prevalence (34.29%) of infectious conjunctivitis among rural primary school students in the Qinghai province. Lack of water and education regarding good hygiene practices are the most probable explanations for infectious conjunctivitis (Liang et al., 2016).

In conclusion, based on these trachoma study series, a guide for prevention and control of sporadic cases should be established, and cultivated *Chlamydia* from this research may be used worldwide as the standard strain for further research.

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### Biographical Sketch

Ningli Wang, Ph.D., Professor, Director of Beijing Institute of Ophthalmology, President of Ophthalmology Academy of Capital Medical University, President of Chinese Ophthalmological Society, Vice chairman of director of Asia-Pacific Academy of ophthalmology. His pioneering research focuses on the field of glaucoma, which has proposed a new classification system of primary angle-closure glaucoma based on the angle-closure mechanism; proposed new concept that high Trans-Lamina Cribrosa Pressure differences can cause optic nerve damage in glaucoma, and conducted a series of studies to verify these hypotheses; performed a study on the mechanism of glaucomatous posterior retinal neuron damage and proposed the concept that glaucoma is a disorder of the entire visual pathway; discovered the clinical features of pigment dispersion syndrome in the Chinese population is different from that in European and American populations, and developed diagnostic criteria for exfoliation syndrome in Chinese people; designed and spearheaded a number of new ophthalmic technologies, such as non-penetrating trabecular surgery, improved surgical extra-trabeculotomy, Schlemm's forming dilatation, two-phase aqueous drainage

implantation and endoscopic implantation in high myopia. He has been awarded Golden Key and Golden Apple Awards by the Chinese-American Ophthalmological Association, Outstanding Achievement Awards by the Chinese Ophthalmological Society, Achievement Awards by the Asia-Pacific Academy of Ophthalmology (APAO), APAO Arthur Lim Awards, and Senior Clinician Scientist Awards by the World Glaucoma Association (2011).

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