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**中国大陆学者发表的结核病英文文章摘要**

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**1. Int J Biol Macromol. 2025 Jul 17:146101. doi: 10.1016/j.ijbiomac.2025.146101.**

**Online ahead of print.**

Self-assembled ferritin tuberculosis nanovaccines targeting ESAT-6 and CFP-10

elicit potent immunogenicity in mice.

Guo F(1), Dong S(1), Song Y(1), Qian Y(1), Jiang H(1), Zhang W(1), Li B(2), Qian

Z(3), Wang X(4), Xu G(5), Wang H(6), Xu T(7).

**Fangzheng Guo, Sihang Dong, Yamin Song, Yuanyuan Qian, Hairui Jiang, Wutong Zhang, Baiqing Li, Zhongqing Qian, Xiaojing Wang, Guangxian Xu\*, Hongtao Wang\*, Tao Xu\***

**\*Correspondence: Guangxian Xu: xuguangxian@gdmu.edu.cn ；Hongtao Wang: hongtaowang@bbmu.edu.cn ；Tao Xu: taoxu@bbmu.edu.cn**

Author information:

(1)Anhui Province Key Laboratory of Immunology in Chronic Diseases, Laboratory

Medicine Experimental Center, Laboratory Medicine College, Bengbu Medical

University, Bengbu 233030, China.

(2)Anhui Province Key Laboratory of Immunology in Chronic Diseases, Laboratory

Medicine Experimental Center, Laboratory Medicine College, Bengbu Medical

University, Bengbu 233030, China. Electronic address: baiqingli@bbmc.edu.cn.

(3)Anhui Province Key Laboratory of Immunology in Chronic Diseases, Laboratory

Medicine Experimental Center, Laboratory Medicine College, Bengbu Medical

University, Bengbu 233030, China. Electronic address: qzq7778@bbmc.edu.cn.

(4)Anhui Province Key Laboratory of Respiratory Tumor and Infectious Disease,

Molecular Diagnosis Center, First Affiliated Hospital of Bengbu Medical

University, Bengbu 233004, China.

(5)Guangdong Provincial Key Laboratory of Medical Immunology and Molecular

Diagnostics, Dongguan Key Laboratory of Molecular Immunology and Cell Therapy,

The First Dongguan Affiliated Hospital, School of Medical Technology, Guangdong

Medical University, Dongguan 523000, China. Electronic address:

xuguangxian@gdmu.edu.cn.

(6)Anhui Province Key Laboratory of Immunology in Chronic Diseases, Laboratory

Medicine Experimental Center, Laboratory Medicine College, Bengbu Medical

University, Bengbu 233030, China. Electronic address: hongtaowang@bbmu.edu.cn.

(7)Anhui Province Key Laboratory of Immunology in Chronic Diseases, Laboratory

Medicine Experimental Center, Laboratory Medicine College, Bengbu Medical

University, Bengbu 233030, China. Electronic address: taoxu@bbmu.edu.cn.

Tuberculosis (TB) is a chronic and persistent infectious disease caused by

Mycobacterium tuberculosis (Mtb), posing a serious threat to global public

health. The only widely available vaccine for TB is Bacillus Calmette-Guérin

(BCG), and its limitations have become increasingly apparent in recent years,

underscoring the urgent need for new TB vaccines. Moreover, subunit vaccines

undergoing clinical trials face challenges such as complex production processes

and weak immunogenicity. Efforts must be made to develop a safe, effective,

easily mass-produced TB vaccine. Here, early secreted antigenic target of 6 kDa

(ESAT6), culture filtrate protein of 10 kDa (CFP10) and ESAT6-CFP10 (EC) fusion

epitopes from the Mtb region of difference (RD) were selected to construct

traditional subunit antigens and self-assembling ferritin-based nanovaccines,

EF, CF, and ECF. The transmission electron microscopy and dynamic light

scattering showed that the three antigens coupled with ferritin self-assembled

into uniform nanoparticles with even sizes. H&E staining demonstrated that the

nanovaccines were safe. EF, CF, and ECF induced higher levels of cell

proliferation than BCG and conventional subunit vaccines in immunized mice

exposed to antigenic stimulation. TB nanovaccines enhanced the IFN-γ recall

response and strongly stimulated the secretion of various TB-related cytokines,

particularly Th1-type cytokines. Multi-color flow cytometry revealed that the

nanovaccines, especially ECF, induced immune memory involving IFN-γ+TCM/TEM,

CD4+IL-2+TEM and CD8+IL-2+TCM cells. Ferritin-NPs hold potential as a TB vaccine

carrier and compared to BCG and traditional subunit vaccines, Ferritin-based TB

nanoparticles produced by prokaryotic expression display superior

immunogenicity.

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**2. Infect Genet Evol. 2025 Jul 17:105799. doi: 10.1016/j.meegid.2025.105799. Online ahead of print.**

The relationships of gene mutations between ESX and drug resistance in the

patients with extra-pulmonary tuberculosis in local regions of Southwest China.

Fan J(1), Feng H(1), Yang D(2), Zhao H(3), Shi T(4), Li T(5).

**Jiwen Fan, Haoming Feng, Dazhi Yang, Haiyang Zhao\*, Tao Shi\*, Tongxin Li\***

**\*Corresponding authors: Haiyang Zhao: E-mail: 909943508@qq.com ；Tao Shi: E-mail: shitaostone@163.com ；Tongxin Li: E-mail: cqltxin@163.com**

Author information:

(1)Department of Orthopedics, Shenzhen Qianhai Taikang Hospital, No. 3099,

Menghai Avenue, Nanshan District, Shenzhen 518000, Guangdong Province, China.

(2)Department of Orthopedics, Shenzhen Qianhai Taikang Hospital, No. 3099,

Menghai Avenue, Nanshan District, Shenzhen 518000, Guangdong Province, China.

Electronic address: dazhiyang@email.szu.edu.cn.

(3)Department of Orthopedics, Shenzhen Qianhai Taikang Hospital, No. 3099,

Menghai Avenue, Nanshan District, Shenzhen 518000, Guangdong Province, China.

Electronic address: 909943508@qq.com.

(4)Department of Orthopedics, Shenzhen Qianhai Taikang Hospital, No. 3099,

Menghai Avenue, Nanshan District, Shenzhen 518000, Guangdong Province, China.

Electronic address: shitaostone@163.com.

(5)Department of Clinical Laboratory, Chongqing Public Health Medical Center,

Southwest University Public Health Hospital, Chongqing 400036, China. Electronic

address: cqltxin@163.com.

**BACKGROUND:** Drug resistant extrapulmonary tuberculosis (DR-EPTB) is a major

threat to human health. The mycobacterial ESAT-6 secretion (ESX) system is main

virulence protein export system of Mycobacterium tuberculosis (MTB). This study

aimed to determine the relationships between ESX and drug resistance (DR) in

patients with DR-EPTB in local regions of Southwest China.

**METHODS AND DESIGN:** Patients were retrospectively studied from January 2020 to

December 2021. All the isolates were cultured, drug susceptibility was detected,

and gene mutations were detected using whole-genome sequencing (WGS). The

correlations between the mutant genes of the ESX system and DR pattern, patient

demographics, and DR mutant gene sites were analyzed.

**RESULTS:** A total of 111 patients with DR-EPTB were enrolled including 40 females

and 71 males. In the five ESX systems there were 1664 gene mutation sites and

ESX-3 accounted for 32.6 %. The most common mutant gene site in all the ESX

systems was eccC2. There was a significant difference in the number of mutant

gene sites between ESX-1 and DR (P < 0.01). There were significant correlations

between the numbers of mutant gene sites in the different ESX systems and gender

(P < 0.05), age group (P < 0.05), residence (P < 0.01), type of treatment

(P < 0.01), lineage (P < 0.01) and cluster (P < 0.01).

**CONCLUSION:** In patients with DR-EPTB, ESX-3 was the system that included the

most mutant gene sites and the eccC2 gene had the highest frequency. The gender,

age group, residence, type of treatment, lineage and cluster were risk factors

for gene mutations in the ESX system. The mutant gene sites of ESX-1 were

correlated with those of DR and the mutations in espA and espK may be the main

factors.

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**3. Microb Pathog. 2025 Jul 16:107914. doi: 10.1016/j.micpath.2025.107914. Online**

**ahead of print.**

Immune Defense and Immune Evasion in Mycobacterium Tuberculosis Infection:

Inspirations and Challenges for Host Directed Therapy.

Li J(1), Liu Y(1), Ruan Y(2), Kong X(1), Jin X(1), Wang J(1), Liao K(3), Shen

L(4), Pi J(5).

**Jiaxiang Li, Yilin Liu, Yongdui Ruan, Xinen Kong, Xiaoying Jin, Jiajun Wang, Kangsheng Liao\*, Ling Shen\*, Jiang Pi\***

**\* Corresponding authors: Jiang Pi: jiangpi@gdmu.edu.cn ； Ling Shen: lshen@uic.edu ; Kangsheng Liao: liaoks@yeah.net**

Author information:

(1)Guangdong Provincial Key Laboratory of Medical Molecular Diagnostics, The

First Dongguan Affiliated Hospital, School of Medical Technology, Guangdong

Medical University, Dongguan 523808, China; Research Center of Nano Technology

and Application Engineering, Dongguan Innovation Institute, School of Medical

Technology, Guangdong Medical University, Dongguan 523808, China.

(2)Guangdong Provincial Key Laboratory of Medical Molecular Diagnostics, The

First Dongguan Affiliated Hospital, School of Medical Technology, Guangdong

Medical University, Dongguan 523808, China.

(3)Guangdong Provincial Key Laboratory of Medical Molecular Diagnostics, The

First Dongguan Affiliated Hospital, School of Medical Technology, Guangdong

Medical University, Dongguan 523808, China; Research Center of Nano Technology

and Application Engineering, Dongguan Innovation Institute, School of Medical

Technology, Guangdong Medical University, Dongguan 523808, China. Electronic

address: liaoks@yeah.net.

(4)Department of Microbiology and Immunology, University of Illinois at Chicago,

Chicago, IL 60607, USA. Electronic address: lshen@uic.edu.

(5)Guangdong Provincial Key Laboratory of Medical Molecular Diagnostics, The

First Dongguan Affiliated Hospital, School of Medical Technology, Guangdong

Medical University, Dongguan 523808, China; Research Center of Nano Technology

and Application Engineering, Dongguan Innovation Institute, School of Medical

Technology, Guangdong Medical University, Dongguan 523808, China. Electronic

address: jiangpi@gdmu.edu.cn.

Tuberculosis (TB), caused by Mycobacterium tuberculosis (Mtb), remains a major

global public health issue, despite improvements in socioeconomic conditions and

widespread use of antibiotics. Host immune defense against Mtb infection involve

various cells like macrophages, dendritic cells, natural killer cells and T cell

subsets, which play distinct roles. By inhibiting phagosome maturation,

modulating reactive oxygen and nitrogen species production, regulating host cell

death pathway, as well as suppressing antigen presentation and T cell immune

responses, the immune escape help Mtb to survive and replicate in macrophages,

which ultimately contributes to the development of latent or active TB. While

traditional TB treatment strategy suffers challenges like low efficacy, long

treatment durations and side effects, the emergence of drug-resistant TB (DR-TB)

and multidrug-resistant TB (MDR-TB), which further highlight the therapeutic

challenges due to the low cure rate. Host Directed Therapy (HDT) is an emerging

supplementary approach to TB treatment, which leverages insights into how host

immune cells defend Mtb infection, as well as how pathogens manipulate host

immune defense mechanisms. HDT is an approach for treating TB that appropriately

modulates host immune responses, which aims to enhance the antimicrobial

activity of the host. In this review, we summarized the host immune defense

mechanisms, as well as analyzed how Mtb evades host immunological killings, thus

potentially providing new insights into the host-pathogen interactions during

Mtb infection and TB development. Furthermore, we reviewed recent advances in

exploring HDT strategies for effective anti-TB interventions, which may

highlight more effective therapeutics to fight against TB.

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**4. Travel Med Infect Dis. 2025 Jul 16:102875. doi: 10.1016/j.tmaid.2025.102875.**

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Epidemiology and Transmission Dynamics of tuberculosis among internal migrants

in Hangzhou: A Retrospective Analysis from 2013 - 2022.

Li Q(1), Cheng Z(2), Cheng Q(1), Dai R(1), Wu Y(1), Ai L(1), Huang Y(1), Jia

Q(1), Jiang N(1), Bai X(1), Fang Z(1), Song X(1), Lv X(3).

**Qingchun Li, Zike Cheng, Qinglin Cheng, Ruoqi Dai, Yifei Wu, Liyun Ai, Yinyan Huang, Qingjun Jia, Nan Jiang, Xuexin Bai, Zijian Fang, Xu Song, Xin Lv\***

**\* Corresponding author. E-mail address: Lvxinb009@gmail.com (X. Lv).**

Author information:

(1)Department for tuberculosis control and prevention, Hangzhou Center for

Disease Control and Prevention(Hangzhou Health Supervision Institution), No.568,

Mingshi Road, Shangcheng District, Hangzhou, Zhejiang Province, 310021, China.

(2)Office, Binzhou Center for Disease Control and Prevention, No.413, Huanghe'2

Road, Bincheng District, Binzhou, Shandong Province, 256600, China.

(3)Hangzhou Gongshu Center for Disease Control and Prevention(Hangzhou Gongshu

Health Supervision Institution), No.51, Yuanhe Road, Gongshu District, Hangzhou,

Zhejiang Province, 310021, China. Electronic address: Lvxinb009@gmail.com.

**BACKGROUND:** Tuberculosis (TB) remains a critical public health challenge in

China, particularly amid rapid urbanization and internal migration. This

retrospective study analyzed the epidemiology and transmission dynamics of TB

among internal migrants (IMTB) versus local residents (LRTB) in Hangzhou, China,

from 2013 to 2022.

**METHODS:** Data from 47,659 pulmonary TB cases were extracted from the national

Tuberculosis Information Management System.

**RESULTS:** IMTB accounted for 21.88% of cases, with patients significantly younger

(mean age 33.45 vs. 51.50 years, P <0.0001) and fewer bacteriologically

confirmed diagnoses (34.9% vs. 41.8%, P <0.0001) compared to LRTB. Treatment

success rates were higher among IMTB (95.0% vs. 89.7%, P <0.0001). Spatial

clustering of IMTB occurred in industrial districts, primarily originating from

Anhui, Guizhou, and Jiangxi provinces.

**CONCLUSION:** Migration-driven TB transmission highlights the need for adaptive

control strategies in urbanizing settings.

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**5. Nat Microbiol. 2025 Jul 14. doi: 10.1038/s41564-025-02050-3. Online ahead of**

**print.**

A single-cell transcriptomic atlas reveals senescence and inflammation in the

post-tuberculosis human lung.

Sun G(#)(1)(2), Li K(#)(3), Ping J(#)(4)(5), Zhao L(#)(6), Cui C(#)(7), Wu

J(#)(8), Xie L(#)(9), Yao X(#)(10), Xu G(#)(11)(12), Ma S(1)(2)(13), Fan Y(4),

Wang Q(4)(5), Yang D(14), Luo B(6), Liu H(9), Yang J(11)(12), Zhang W(4)(5)(13),

Song W(14), Zhao G(15), Fu X(16), Bian XW(17)(18), Qu J(19)(20)(21)(22)(23),

Wang S(24)(25), Chen H(26)(27), Liu GH(28)(29)(30)(31)(32).

**Guoqiang Sun, Kuan Li, Jiale Ping, Liyun Zhao, Chao Cui, Junping Wu, Lixin Xie, Xiaojun Yao, Gang Xu, Shuai Ma, Yanling Fan, Qiaoran Wang, Danlu Yang, Bilan Luo, Huiying Liu, Jiayin Yang, Weiqi Zhang, Weihong Song, Guoguang Zhao, Xiaobing Fu,**

**Xiu-Wu Bian, Jing Qu\*, Si Wang\*, Huaiyong Chen\* & Guang-Hui Liu\***

**\*  Jing Qu, e-mail: qujing@ioz.ac.cn; Si Wang,** **wangsi@xwh.ccmu.edu.cn****; Huaiyong Chen, huaiyong.chen@foxmail.com; Guang-Hui Liu, ghliu@ioz.ac.cn**

Author information:

(1)State Key Laboratory of Organ Regeneration and Reconstruction, Institute of

Zoology, Chinese Academy of Sciences, Beijing, China.

(2)Beijing Institute for Stem Cell and Regenerative Medicine, Beijing, China.

(3)Tianjin Key Laboratory of Lung Regenerative Medicine, Haihe Hospital, Tianjin

University, Tianjin, China.

(4)China National Center for Bioinformation, Beijing Institute of Genomics,

Chinese Academy of Sciences, Beijing, China.

(5)University of Chinese Academy of Sciences, Beijing, China.

(6)Advanced Innovation Center for Human Brain Protection, National Clinical

Research Center for Geriatric Disorders, Aging Translational Medicine Center,

Beijing Municipal Geriatric Medical Research Center, Beijing Key Laboratory of

Environment and Aging, Xuanwu Hospital, Capital Medical University, Beijing,

China.

(7)Department of Thoracic Surgery, Haihe Hospital, Tianjin University, Tianjin,

China.

(8)Department of Tuberculosis, Haihe Hospital, Tianjin University, Tianjin,

China.

(9)College of Pulmonary and Critical Care Medicine, 8th Medical Center of

Chinese PLA General Hospital, Beijing, China.

(10)Department of Thoracic Surgery, Public Health Clinical Center of Chengdu,

Chengdu, China.

(11)Liver Transplant Center, Organ Transplant Center, West China Hospital of

Sichuan University, Chengdu, China.

(12)Laboratory of Liver Transplantation, Key Laboratory of Transplant

Engineering and Immunology, NHC, West China Hospital of Sichuan University,

Chengdu, China.

(13)Aging Biomarker Consortium, Beijing, China.

(14)Oujiang Laboratory, Center for Geriatric Medicine and Institute of Aging,

Key Laboratory of Alzheimer's Disease of Zhejiang Province, Zhejiang Provincial

Clinical Research for Mental Disorders, The First-affiliated Hospital, Wenzhou

Medical University, Wenzhou, China.

(15)Department of Neurosurgery, Beijing Municipal Geriatric Medical Research

Center, National Medical Center for Neurological Diseases, Xuanwu Hospital

Capital Medical University, Beijing, China.

(16)Tissue Repair and Regeneration Research Center, Medical Innovation

Department, PLA General Hospital and Medical College, Beijing, China.

(17)Institute of Pathology and Southwest Cancer Center, Southwest Hospital,

Third Military Medical University (Army Medical University), and Key Laboratory

of Tumor Immunopathology, Ministry of Education of China, Chongqing, China.

(18)Chongqing Institute of Advanced Pathology, Jinfeng Laboratory, Chongqing,

China.

(19)State Key Laboratory of Organ Regeneration and Reconstruction, Institute of

Zoology, Chinese Academy of Sciences, Beijing, China. qujing@ioz.ac.cn.

(20)Beijing Institute for Stem Cell and Regenerative Medicine, Beijing, China.

qujing@ioz.ac.cn.

(21)University of Chinese Academy of Sciences, Beijing, China. qujing@ioz.ac.cn.

(22)Aging Biomarker Consortium, Beijing, China. qujing@ioz.ac.cn.

(23)Beijing Institute of Heart Lung and Blood Vessel Diseases, Beijing Anzhen

Hospital, Capital Medical University, Beijing, China. qujing@ioz.ac.cn.

(24)Advanced Innovation Center for Human Brain Protection, National Clinical

Research Center for Geriatric Disorders, Aging Translational Medicine Center,

Beijing Municipal Geriatric Medical Research Center, Beijing Key Laboratory of

Environment and Aging, Xuanwu Hospital, Capital Medical University, Beijing,

China. wangsi@xwh.ccmu.edu.cn.

(25)Aging Biomarker Consortium, Beijing, China. wangsi@xwh.ccmu.edu.cn.

(26)Tianjin Key Laboratory of Lung Regenerative Medicine, Haihe Hospital,

Tianjin University, Tianjin, China. huaiyong.chen@foxmail.com.

(27)Key Research Laboratory for Infectious Disease Prevention for State

Administration of Traditional Chinese Medicine, Tianjin Institute of Respiratory

Diseases, Tianjin, China. huaiyong.chen@foxmail.com.

(28)State Key Laboratory of Organ Regeneration and Reconstruction, Institute of

Zoology, Chinese Academy of Sciences, Beijing, China. ghliu@ioz.ac.cn.

(29)Beijing Institute for Stem Cell and Regenerative Medicine, Beijing, China.

ghliu@ioz.ac.cn.

(30)University of Chinese Academy of Sciences, Beijing, China. ghliu@ioz.ac.cn.

(31)Advanced Innovation Center for Human Brain Protection, National Clinical

Research Center for Geriatric Disorders, Aging Translational Medicine Center,

Beijing Municipal Geriatric Medical Research Center, Beijing Key Laboratory of

Environment and Aging, Xuanwu Hospital, Capital Medical University, Beijing,

China. ghliu@ioz.ac.cn.

(32)Aging Biomarker Consortium, Beijing, China. ghliu@ioz.ac.cn.

(#)Contributed equally

Patients with a history of Mycobacterium tuberculosis infection often suffer

from irreversible and progressive pulmonary damage, yet the underlying

mechanisms are not fully understood. Here we conducted single-cell

transcriptomic analysis of human lung tissues including 19 post-tuberculosis

lung tissues and 13 matched normal lung samples as controls, focusing on areas

within and surrounding tuberculosis lesions. We identified

tuberculosis-associated molecular signatures across various cell types,

including gene expression patterns associated with senescence, inflammation,

fibrosis and apoptosis. We observed increased vascular inflammation as a key

feature of lung tissues following tuberculosis. Signatures of decreased FOXO3

signalling and increased NF-κB-dependent thromboinflammation were validated by

showing that small interfering RNA silencing of FOXO3 and thrombin treatment

exacerbated senescence and inflammation in pulmonary endothelial cells. These

findings provide insight into the mechanisms contributing to post-tuberculosis

pulmonary damage and suggest potential therapeutic targets for alleviating lung

impairment in these patients.

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**6. Diagn Microbiol Infect Dis. 2025 Jul 7;113(3):116989. doi:**

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The association between erythrocyte count and latent tuberculosis infection in

US participants: a cross-sectional study from NHANES.

Liu Y(1), Jia J(2), Chen Y(3), Yang W(4).

**Yuanyuan Liu, Jingbo Jia\*, Yating Chen, Wanjie Yang\***

**\* Corresponding author at: E-mail addresses: 380967866@qq.com (J. Jia), yangwanjie0709@126.com (W. Yang).**

Author information:

(1)Nursing Department of Tianjin Haihe Hospital, Tianjin, China.

(2)Tuberculosis Department of Tianjin Haihe Hospital, Tianjin, China; TCM Key

Research Laboratory for Infectious Disease Prevention for State Administration

of Traditional Chinese Medicine, Tianjin, China. Electronic address:

380967866@qq.com.

(3)Tuberculosis Department of Tianjin Haihe Hospital, Tianjin, China; TCM Key

Research Laboratory for Infectious Disease Prevention for State Administration

of Traditional Chinese Medicine, Tianjin, China.

(4)The President's Office of Tianjin Haihe Hospital, Tianjin, China. Electronic

address: yangwanjie0709@126.com.

**BACKGROUND:** Latent tuberculosis infection (LTBI) poses significant challenges to

public health, with an estimated one-quarter of the global population infected

and a potential risk of progression to active tuberculosis (TB). Currently,

there is insufficient evidence available regarding the association between

erythrocyte count and tuberculosis infection.

**OBJECTIVE:** This study aimed to explore the relationship between erythrocyte

count and LTBI using a cross-sectional design, incorporating univariate and

multivariate logistic regression analyses.

**METHODS:** We enrolled 3923 participants in this study, and compared the baseline

characteristics of participants involved. Multivariate logistic regression

analysis, restricted cubic splines (RCS) analysis, along with subgroup analysis

and interaction tests were utilized to explore the association between

erythrocyte count and LTBI risk.

**RESULTS:** Among 3923 participants,430(10.96 %) were considered as having latent

TB infection.A significant positive association between erythrocyte count and

LTBI was revealed, with multivariate analysis odds ratio (OR) of 1.37 (95 % CI:

1.12, 1.67).And maintaining an OR of 1.51 (95 % CI: 1.08-2.12) after adjusting

for potential confounders.They were statistically significant.Subgroup analysis

in gender, race, marriage, education, drinking, smoking, and diabetes found no

interaction, demonstrating robust results.

**CONCLUSIONS:** These results suggest that erythrocyte count may serve as an

important risk factor for LTBI, providing new insights for early screening and

intervention strategies. However,further studies are needed to explore the

underlying mechanisms.

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**7. Epidemiol Infect. 2025 Jul 15:1-23. doi: 10.1017/S0950268825100095. Online ahead of print.**

Trend and forecast analysis of the changing disease burden of Tuberculosis in

China, 1990-2021.

Zhang SX(1,2), Zheng JX(2,3), Wang Y(1), Lv WW(4), Yang J(5), Wang JC(5), Lu ZH(1).

**Shun-Xian Zhang, Jin-Xin Zheng, Yu Wang, Wen-Wen Lv, Jian Yang, Ji-Chun Wang\* and Zhen-Hui Lu\***

**\*Corresponding authors: Ji-Chun Wang and Zhen-Hui Lu, wangjc@chinacdc.cn; Dr\_luzh@shutcm.edu.cn**

Author information:

(1) Longhua Hospital, Shanghai University of Traditional Chinese Medicine, Shanghai 200032, China.

(2) National Institute of Parasitic Diseases at Chinese Center for Disease Control and Prevention (Chinese Center for Tropical Diseases Research); NHC Key Laboratory of Parasite and Vector Biology; WHO Collaborating Centre for Tropical Diseases; National Center for International Research on Tropical Diseases; National Key Laboratory of Intelligent Tracking and Forecasting for Infectious Diseases, Shanghai 200025, China.

(3) School of Global Health, Chinese Center for Tropical Diseases Research-Shanghai Jiao Tong University School of Medicine, Shanghai 200025, China.

(4) Clinical Research Institute, Shanghai Jiao Tong University School of Medicine, Shanghai 200025, China.

(5) Department of Science and Technology, Chinese Center for Disease Control and Prevention, Beijing 102206, China.

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**8. BMC Infect Dis. 2025 Jul 24;25(1):942. doi: 10.1186/s12879-025-11336-0.**

Negligible clinical impact of subsequent non-tuberculous mycobacteria isolation

during MDR/RR-TB treatment: a 9-year retrospective cohort study from Wenzhou,

China.

Zheng Q(#)(1), Chen Q(#)(2), Zhou W(#)(3), Huang O(3), He G(4).

**Qingyong Zheng, Quelu Chen, Wenzhen Zhou, Ouyang Huang, Guiqing He\***

**\*Correspondence: Guiqing He, heguiqing@wmu.edu.cn**

Author information:

(1)Laboratory of Infectious Diseases, Wenzhou Central Hospital, The Dingli

Clinical College of Wenzhou Medical University, Wenzhou, 325000, China.

(2)Department of Radiology, Wenzhou Central Hospital, The Dingli Clinical

College of Wenzhou Medical University, Wenzhou, 325000, China.

(3)Department of Infectious Diseases, Wenzhou Central Hospital, The Dingli

Clinical College of Wenzhou Medical University, Wenzhou, 325000, China.

(4)Laboratory of Infectious Diseases, Wenzhou Central Hospital, The Dingli

Clinical College of Wenzhou Medical University, Wenzhou, 325000, China.

heguiqing@wmu.edu.cn.

(#)Contributed equally

**BACKGROUND:** The frequency of clinical isolation of non-tuberculous mycobacteria

(NTM) in patients with multidrug-resistant or rifampin-resistant tuberculosis

(MDR/RR-TB) is increasing, but its relevance remains unclear. This study aimed

to assess the frequency of NTM isolation and its clinical relevance in

respiratory specimens from MDR/RR-TB patients in Wenzhou, China.

**METHODS:** Medical records of MDR/RR-TB patients with NTM isolated from 2014 to

2022 were reviewed retrospectively. To establish the clinical relevance, the

diagnostic criteria for nontuberculous mycobacterial pulmonary disease (NTM-PD)

published by the American Thoracic Society (ATS) and Infectious Diseases Society

of America (IDSA) were applied.

**RESULTS:** Between 2014 and 2022, a total of 922 patients were enrolled, among

whom 45 (4.9%) cases yielded NTM isolates, resulting in the isolation of 68

distinct NTM strains. The most prevalent NTM species was M. abscessus,

accounting for 36.8% (25/68) of the isolates, followed by M. intracellulare at

22.1% (15/68) and M. avium at 8.8% (6/68). Notably, only five cases (0.54%) met

the microbiologic criteria specified in the ATS/IDSA guidelines. Four of these

cases received no specific NTM treatment and achieved a favorable prognosis with

anti-TB therapy. Remarkably, a single case out of 922 (0.11%) was identified as

having concomitant MDR/RR-TB and NTM-PD.

**CONCLUSIONS:** The clinical relevance of respiratory NTM isolates in patients with

MDR/RR-TB is generally low, with the overwhelming majority of these NTM isolates

being either colonizers or contaminants. Consequently, in most cases, those with

concomitant NTM isolates do not require specific therapy.

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**9. BMC Infect Dis. 2025 Jul 23;25(1):935. doi: 10.1186/s12879-025-11278-7.**

Rare early hematogenous disseminated tuberculosis inducing hemophagocytic

syndrome in conflict treatment.

Jin XH(#)(1), Shang XW(#)(1), Zhang HQ(2).

**Xiao-Hui Jin, Xin-Wei Shang, Hui-Qiang Zhang\***

**\*Correspondence: Hui-Qiang Zhang, zhanghuiqiangzhq@126.com**

Author information:

(1)The First Affiliated Hospital of Xinxiang Medical University, Xinxiang,

China.

(2)The First Affiliated Hospital of Xinxiang Medical University, Xinxiang,

China. zhanghuiqiangzhq@126.com.

(#)Contributed equally

This article presents a case of an acute onset in a middle-aged male who

exhibited persistent high fever (temperature > 40 °C), delirium, and respiratory distress. Initial chest CT only suggested "bilateral pneumonia," and empirical anti-infection treatment proved ineffective. The patient subsequently developed pancytopenia, splenomegaly, and markedly elevated ferritin levels (848.90 μg/L). Bone marrow aspiration demonstrated hemophagocytic activity and granulomatous lesions. A positive TB-PCR, confirmed the diagnosis of early hematogenous disseminated tuberculosis complicated by the hemophagocytic syndrome (HLH). The patient's condition gradually improved Following, individualized

anti-tuberculosis therapy and immunosuppressive treatment. The uniqueness of

this case lies in two main aspects: (1) early imaging did not show typical

miliary nodules, which could have led to misdiagnosis as common pneumonia; (2)

the dissemination of tuberculosis and onset of HLH occurred almost

simultaneously, creating a therapeutic dilemma. Although tuberculosis

complicated by HLH is rare, it poses significant danger. The cornerstone of

treatment is effective control of the tuberculosis infection while

simultaneously suppressing the excessive immune response. This case highlights

the importance of considering tuberculosis complicated by HLH in patients with

recurrent fever and pulmonary infiltrates. Early diagnosis and prompt treatment

are crucial for improving prognosis. The article also discusses the underlying

pathogenesis, offering valuable insights for clinical practice.

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**10. Sci Rep. 2025 Jul 23;15(1):26785. doi: 10.1038/s41598-025-12232-y.**

LPS promotes the production of ROS in neutrophils to regulate their killing

activity against Mycobacterium tuberculosis.

Jiang L(1), Su Z(2), Zhang Y(2), Liu H(3), Wang H(4).

**Lina Jiang\*, Zhenxing Su, Yangxiao Zhang, Hongsheng Liu, Hongtao Wang**

**\*email: jln\_baby@163.com**

Author information:

(1)School of Stomatology, Bengbu Medical University, No. 2600 Donghai Road,

Bengbu, 233030, China. jln\_baby@163.com.

(2)School of Basic Medicine, Bengbu Medical University, Bengbu, China.

(3)School of Stomatology, Bengbu Medical University, No. 2600 Donghai Road,

Bengbu, 233030, China.

(4)School of Laboratory Medicine, Bengbu Medical University, Bengbu, China.

Tuberculosis (TB) is now the leading cause of death globally from a single

infectious disease. So far, the exact mechanism of anti-tuberculosis immunity

has not been fully elucidated, and the immune role of neutrophils in

anti-tuberculosis infection is controversial. We investigated the killing

function of neutrophils against Mycobacterium tuberculosis (M.tb) and the effect

of neutrophils activated by lipopolysaccharide (LPS) on the production of

reactive oxygen species (ROS), to evaluate the mechanism by which neutrophils

eradicate M.tb mediated infection and find theoretical basis for clinical

treatment of tuberculosis. The killing rate of neutrophils to FDA (Fluorescein

diacetate)-labeled M.tb was detected by flow cytometry, and the killing rate of

neutrophils to M.tb was observed by fluorescence microscopy. The activation rate

and ROS production of neutrophils were observed at different time points after

M.tb infection. Flow cytometry was utilized to detect the effect of LPS on the

ROS production during neutrophil mediated killing of M.tb. Toll-like receptor 4

(TLR4) monoclonal antibody or NADPH oxidase inhibitor was utilized to detect the

LPS activated neutrophil mediated production of ROS during M.tb killing. The

killing function of neutrophils against M.tb increased with time. The activation

rate and ROS production of neutrophils increased with time after M.tb infection.

The activation rate and ROS production of neutrophils increased with the

increase of LPS concentration. The activation rate and ROS production of PMN

were reduced by TLR4 monoclonal antibody or NADPH oxidase inhibitor.LPS-TLR4

pathway is involved in neutrophils induced ROS mediated killing of M.tb. LPS

promotes neutrophils mediated killing of M.tb, through ROS mediated production

of NADPH oxidase which provides a theoretical basis for testing the role of

neutrophils in clearance of M.tb in humans, and reducing the M.tb pathogenesis.

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**11. Sci Rep. 2025 Jul 22;15(1):26620. doi: 10.1038/s41598-025-10639-1.**

Exploration of plasma exosomal miR-122-5p and its related targets KNG1 and C3 in

the diagnosis of drug-resistant tuberculosis.

Yao X(1), Zhang L(2).

**Xinyi Yao, Lahong Zhang\***

**\*email: zjhzzlh2007@163.com**

Author information:

(1)Department of Clinical Medicine, Hangzhou Normal University, Hangzhou, China.

(2)Department of Clinical laboratory, The Affiliated Hospital of Hangzhou Normal

University, Hangzhou, China. zjhzzlh2007@163.com.

Drug-resistant tuberculosis (DR-TB) poses significant challenges not only to

public health but also imposes substantial psychological and economic burdens on

individuals and their families. As a severe infectious disease that jeopardizes

both physical and mental well-being, DR-TB frequently spreads in underdeveloped

regions due to inadequate diagnostic technologies.In this study, we validated

the binding interaction between miR-122-5p and the proteins kininogen-1

(KNG1)/complement C3 using a dual-luciferase reporter assay. Furthermore, we

employed liquid biopsy techniques to quantify miR-122-5p expression in plasma

exosomes from DR-TB patients, alongside measuring plasma levels of KNG1,

complement C3, and other coagulation and immune function parameters. This

approach aims to identify efficient, non-invasive laboratory biomarkers for the

early diagnosis of DR-TB. 50 patients with drug-susceptible tuberculosis (DS-TB)

and 50 patients with DR-TB who were diagnosed in the nearby hospital between

April 2024 and January 2025 were chosen. 51 healthy people who had physical

exams over the same time frame were also selected as the control group. In the

early morning, 5 ml of fasting venous blood was drawn from each of all subjects

and centrifuged for standby. Informed consent was obtained from all

Participants, who then signed the informed consent forms. We used Western

blotting (WB), transmission electron microscopy (TEM), and nanoparticle tracking

analysis (NTA) to find the biomarkers in the exosomes that were taken from each

of the three groups' plasma. The dual-luciferase experiment was used to verify

the targeting relationship between miR-122-5p and protein KNG1 and complement

C3. The RNA level of the miR-122-5p gene in plasma exosomes was detected by

real-time fluorescence quantitative PCR (qRT-PCR). The KNG1 level in the plasma

of the subjects was measured by ELISA, and the clinical indicators of the

patients were also collected. To assess the diagnostic effectiveness of the

genes found in the plasma exosomes, we used the receiver operating

characteristic (ROC) curve. We found that there is a targeting relationship

between miR-122-5p and protein KNG1 as well as complement C3. Meanwhile, the

level of miR-122-5p in the DR-TB group was significantly higher than that in the

DS-TB group and the HCs group, indicating a relatively high diagnostic efficacy.

A useful biomarker to enhance the diagnosis of DR-TB is the level of miR-122-5p

in plasma exosomes.

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**12. ERJ Open Res. 2025 Jul 21;11(4):01231-2024. doi: 10.1183/23120541.01231-2024.**

**eCollection 2025 Jul.**

Association of inactive pulmonary tuberculosis lesions with the risk of active

disease development in the elderly: a population-based retrospective study.

Shen L(1)(2)(3), Zhang Y(4)(3), Xin H(1)(2)(3), Cao X(1)(2), Du J(1)(2), Di

Y(1)(2), Huang J(1)(2), He Y(1)(2), Feng B(1)(2), Li Z(1)(2), Liang J(1)(2),

Wang W(5), Peng Y(4), Hao X(5), Fang C(5), Xu B(4), Wang X(4), Chen B(4), Wang

Z(4), Wang F(4)(6), Zhu P(5)(6), Gao L(1)(2)(6).

**Lingyu Shen, Yu Zhang, Henan Xin, Xuefang Cao, Jiang Du, Yuanzhi Di, Juanjuan Huang, Yijun He, Boxuan Feng, Zihan Li, Jianguo Liang, Wei Wang, Ying Peng, Xiaogang Hao, Chunfu Fang, Bingjun Xu, Xiaomeng Wang, Bin Chen, Zhen Wang, Fei Wang, Ping Zhu, Lei Gao\***

**\*Correspondingauthor: LeiGao (gaolei@ipbcams.ac.cn)**

Author information:

(1)NHC Key Laboratory of Systems Biology of Pathogens, National Institute of

Pathogen Biology, and Center for Tuberculosis Research, Chinese Academy of

Medical Sciences and Peking Union Medical College, Beijing, PR China.

(2)Key Laboratory of Pathogen Infection Prevention and Control (Ministry of

Education), National Institute of Pathogen Biology, Chinese Academy of Medical

Sciences and Peking Union Medical College, Beijing, PR China.

(3)L. Shen, Y. Zhang and H. Xin contributed equally to this article.

(4)Center for Diseases Control and Prevention of Quzhou City, Quzhou, PR China.

(5)Zhejiang Provincial Center for Diseases Control and Prevention, Hangzhou, PR

China.

(6)F. Wang, P. Zhu and L. Gao contributed equally to this article as lead

authors and supervised the work.

**BACKGROUND:** Individuals with inactive pulmonary tuberculosis (PTB) lesions were

found to be high-risk populations for active PTB development. This retrospective

study evaluated the association between different types of inactive PTB lesions

and the development of active PTB aiming to provide epidemiological evidence for

developing precise intervention strategies.

**METHODS:** Based on a population-based PTB active-case-finding project conducted

on the elderly, 154 028 subjects who had participated in the 2020 baseline

survey were included in the current analysis.

**RESULTS:** During the 2-year follow-up, 462 cases developed microbiologically

confirmed active PTB with an overall incidence rate of 0.19 per 100

person-years. Among the study population, 15 037 (9.76%) showed chest

radiography (CXR) abnormalities suggestive of inactive PTB, which was found to

be independently associated with an increased risk of active PTB with an

adjusted hazard ratio (aHR) of 6.00 (95% confidence interval (CI) 4.85-7.43)

compared with normal CXR. Such a relationship was consistently observed for

inactive lesions, including fibrosis, calcification, pleural thickening and

nodule lesions with aHRs ranging from 2.94 to 6.55. Inactive PTB lesions alone

or a history of anti-tuberculosis (TB) treatment alone were independently

associated with the risk of active PTB with aHRs of 6.96 (95% CI 5.59-8.67) and

7.67 (95% CI 4.26-13.78), respectively. A combined effect between inactive PTB

lesions and with history of anti-TB treatment was found with an aHR of 10.50

(95% CI 5.93-18.52).

**CONCLUSION:** Overall, individuals with inactive PTB lesions, regardless of lesion

type and history of anti-TB treatment, are at increased risk of developing

active PTB and deserve interventions for TB control.

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**13. J Orthop Surg Res. 2025 Jul 21;20(1):692. doi: 10.1186/s13018-025-06112-4.**

Risk stratification and clinical classification for postoperative neurological

complications in post-tuberculosis kyphosis: a retrospective cohort study.

Wang J(1)(2), Hai Y(3)(4)(5), Geng H(1)(2), Li Z(1)(2), Liu Y(1)(2), Zhang

Y(6)(7), Zhou L(8)(9).

**Jianqiang Wang, Yong Hai\*, Haoshuang Geng, Zhangfu Li, Yuzeng Liu, Yangpu Zhang\*, Lijin Zhou\***

**\*Correspondence: Yong Hai, yong.hai@ccmu.edu.cn ; Yangpu Zhang, zhangyp223@163.com ; Lijin Zhou, doctorzhoulijin@163.com**

Author information:

(1)Department of Orthopedic Surgery, Beijing Chaoyang Hospital, Capital Medical

University of China, 8 Gong Ti Nan Road, Chaoyang District, Beijing, 100020,

China.

(2)Clinical Center for Spinal Deformity, Capital Medical University of China, 8

Gong Ti Nan Road, Chaoyang District, Beijing, 100020, China.

(3)Department of Orthopedic Surgery, Beijing Chaoyang Hospital, Capital Medical

University of China, 8 Gong Ti Nan Road, Chaoyang District, Beijing, 100020,

China. yong.hai@ccmu.edu.cn.

(4)Joint Laboratory for Research & Treatment of Spinal Cord Injury in Spinal

Deformity, Laboratory for Clinical Medicine, Capital Medical University of

China, 8 Gong Ti Nan Road, Chaoyang District, Beijing, 100020, China.

yong.hai@ccmu.edu.cn.

(5)Clinical Center for Spinal Deformity, Capital Medical University of China, 8

Gong Ti Nan Road, Chaoyang District, Beijing, 100020, China.

yong.hai@ccmu.edu.cn.

(6)Department of Orthopedic Surgery, Beijing Chaoyang Hospital, Capital Medical

University of China, 8 Gong Ti Nan Road, Chaoyang District, Beijing, 100020,

China. zhangyp223@163.com.

(7)Clinical Center for Spinal Deformity, Capital Medical University of China, 8

Gong Ti Nan Road, Chaoyang District, Beijing, 100020, China. zhangyp223@163.com.

(8)Department of Orthopedic Surgery, Beijing Chaoyang Hospital, Capital Medical

University of China, 8 Gong Ti Nan Road, Chaoyang District, Beijing, 100020,

China. doctorzhoulijin@163.com.

(9)Clinical Center for Spinal Deformity, Capital Medical University of China, 8

Gong Ti Nan Road, Chaoyang District, Beijing, 100020, China.

doctorzhoulijin@163.com.

**PURPOSE:** This study aimed to identify risk factors for postoperative

neurological complications in patients with post-tuberculosis kyphosis

undergoing posterior corrective surgery and to develop a classification system

for preoperative risk stratification.

**METHODS:** We retrospectively analyzed 51 patients with post-tuberculosis kyphosis

who underwent single-stage posterior osteotomy and correction at our

institution. Radiographic parameters, including the kyphotic angle,

cross-sectional area ratio of the spinal cord (CSAR), and spinal cord angle

(SCA), alongside surgical factors such as intraoperative blood loss and

osteotomy grade, were evaluated. Postoperative neurological complications were

recorded. Univariate and multivariate logistic regression analyses were employed

to identify potential influencing factors. Based on the interaction between

these factors, a clinical classification system for post-tuberculosis kyphosis

was established to stratify the risk of postoperative neurological

complications.

**RESULTS:** A minimum 2-year follow-up was conducted for the 51 patients with

post-tuberculosis kyphosis. Multivariate logistic regression analysis revealed

that the Baltalimani sign, spinal cord MRI type, Rajasekaran classification,

three-column osteotomy, C-reactive protein (CRP), and SCA were significant risk

factors for postoperative neurological complications. Two risk prediction models

were developed accordingly. Synergistic interactions were identified between

spinal cord MRI type and Rajasekaran classification, as well as between CRP and

SCA. These findings informed the development of two clinical classification

systems: the Mechanical Classification (AUC = 0.751) and the Imaging-Biomarker

Classification (AUC = 0.883). The area under the curve (AUC) for both

classifications demonstrated good predictive performance, with the DeLong test

indicating superior efficacy for the Imaging-Biomarker Classification

(P = 0.039).

**CONCLUSION:** Spinal structural instability, spinal cord compression, osteotomy

grade, and elevated CRP levels may all contribute to an increased risk of

postoperative neurological complications in patients with post-tuberculosis

kyphosis. The clinical classification systems established herein facilitate

precise risk stratification, enabling targeted preoperative interventions to

mitigate surgical risks and enhance surgical outcomes.

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**14. BMC Infect Dis. 2025 Jul 22;25(1):933. doi: 10.1186/s12879-025-11288-5.**

Association of polymorphisms and abnormal methylation of several autophagy genes

with pulmonary tuberculosis susceptibility, clinical manifestations in a Chinese

population.

Niu H(#)(1), Wang DP(#)(2), Cai XQ(#)(1), Fang HH(3), Li Y(4).

**Hua Niu, Dong-Ping Wang, Xue-Qian Cai, Hao-Hui Fang\*, Ye Li**

**\*Correspondence: Hao-Hui Fang, fanghh88@163.com**

Author information:

(1)Department of Respiratory and Critical Care Medicine, Anhui Chest Hospital,

Hefei, China.

(2)Department of Laboratory, Anhui Chest Hospital, Hefei, China.

(3)Department of Respiratory and Critical Care Medicine, Anhui Chest Hospital,

Hefei, China. fanghh88@163.com.

(4)Department of Tuberculosis, Anhui Chest Hospital, Hefei, 230022, Anhui, PR

China.

(#)Contributed equally

**BACKGROUND:** Studies have shown that autophagy was closely involved in host

defense against mycobacteria, and genetic variations in autophagy genes were

related to susceptibility to multiple diseases. We conducted this observational

study to analyze the role of autophagy related genes polymorphisms and promoter

methylation in the pathogenesis of pulmonary tuberculosis (PTB).

**METHODS:** Ten single nucleotide polymorphisms (SNPs) in four autophagy related

genes (ATG16L1, ATG5, IRGM, ULK1) were genotyped in 496 PTB patients and 498

controls using SNPscan technique, and the methylation levels of these genes were

detected by MethylTarget technique in 98 PTB patients and 97 controls.

**RESULTS:** We found that ATG16L1 gene rs2241880 GG genotype frequency was

significantly increased in PTB patients than that in controls. While, no

significant association was found between PTB risk and ATG16L1 rs6754677, ATG5

rs2245214, rs510432, IRGM rs1000113, rs10065172, rs12658239, ULK1 rs7138581,

rs9481, rs12297124. Haplotype analysis showed that ATG16L1 GA haplotype was

associated with the increased risk to PTB, and ATG5 CC haplotype was related to

the decreased risk to PTB. Stratification analysis demonstrated that ATG16L1

rs6754677, IRGM rs1000113, rs10065172 polymorphism were associated with

pulmonary infection, and ULK1 rs7138581 polymorphism was related to fever,

drug-induced liver injury in PTB patients. Compared with controls, ATG16L1

methylation level was significantly decreased in PTB, while ATG5, IRGM

methylation levels were not significantly changed. Rs1000113, rs10065172,

rs12658239 variants in IRGM had a major impact on IRGM methylation level in PTB

patients.

**CONCLUSION:** ATG16L1, ATG5 genes variation and ATG16L1 gene methylation level

were associated with the genetic background of PTB, while IRGM, ULK1 genes

variations showed no significant association with PTB.

© 2025. The Author(s).

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**15. Front Cell Infect Microbiol. 2025 Jul 9;15:1539240. doi:**

**10.3389/fcimb.2025.1539240. eCollection 2025.**

A comparative study using Xpert MTB/RIF and culture methods evaluates MassARRAY

technology for rapid detection of Mycobacterium tuberculosis and drug

resistance.

Wu S(1)(2), Ge L(1)(2), Zheng S(1)(2), Ma X(3), Liang R(1)(2), Zhang B(4).

**Sufang Wu, Lulu Ge, Shulan Zheng, Xiaocui Ma, Ruixia Liang\*, Baolong Zhang\***

**\*CORRESPONDENCE Ruixia Liang, 13937136537@163.com ; Baolong Zhang, zhangbl@jhun.edu.cn**

Author information:

(1)Department of Tuberculosis, Henan Provincial Chest Hospital, Zhengzhou

University, Zhengzhou, Henan, China.

(2)Tuberculosis Clinical Research Center of Henan Province, Zhengzhou,

Henan, China.

(3)Children`s Hospital Affiliated to Zhengzhou University, Henan Key Laboratory

of Pediatric Genetics and Metabolic Diseases, Zhengzhou, Henan, China.

(4)Institute for Systems Biology, School of Life Sciences, Jianghan University,

Wuhan, Hubei, China.

Tuberculosis (TB) remains a major global health threat, with the urgent need for

rapid and accurate diagnostic methods to improve control and treatment outcomes.

This study evaluates the performance of MassARRAY technology for detecting

Mycobacterium tuberculosis (MTB) and identifying drug resistance, compared to

traditional culture methods and Xpert MTB/RIF. From July 2021 to February 2024,

bronchoalveolar lavage fluid (BALF) samples from 289 suspected pulmonary

tuberculosis patients at Henan Provincial Chest Hospital, China, were tested

using MassARRAY, Xpert MTB/RIF, and conventional culturing techniques. The

performance of each method was assessed for MTB detection, and the ability of

MassARRAY to identify drug resistance was compared with standard drug

susceptibility testing (DST). MassARRAY demonstrated a sensitivity of 96.5% and

a specificity of 34.6% for MTB detection, outperforming the Xpert MTB/RIF assay

in sensitivity (94.7%) but showing lower specificity. In detecting rifampicin

resistance, MassARRAY achieved concordance rates of 83.93% with Xpert MTB/RIF

and 72.73% with DST. Furthermore, MassARRAY successfully identified key genetic

mutations associated with drug resistance, such as rpoB 531 for rifampicin and

katG 315 for isoniazid. MassARRAY demonstrated high concordance with DST for

several drugs, including isoniazid, kanamycin, and streptomycin, but exhibited

limitations in detecting resistance to pyrazinamide, clofazimine, cycloserine,

and linezolid. Overall, MassARRAY provides a rapid, cost-effective, and

high-throughput diagnostic platform for MTB and drug resistance, particularly

for first-line anti-tuberculosis drugs. While limitations in specificity and

resistance detection for certain second-line drugs exist, its ability to rapidly

provide comprehensive resistance profiles makes it a valuable tool for TB

management.

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**16. Int J Nanomedicine. 2025 Jul 19;20:9195-9218. doi: 10.2147/IJN.S531255.**

**eCollection 2025.**

Nitric Oxide Therapeutics: New Hopes for More Effective Tuberculosis Treatment

Combine with Targeted and Controlled Nanotechnology.

Jin X(#)(1)(2), Wang J(#)(1)(2), Ruan Y(#)(1), Li J(1)(2), Kong X(1)(2), Xia

J(3), Yang J(1)(2), Zhang Q(3), Liu J(1)(2), Pi J(1)(2).

**Xiaoying Jin, Jiajun Wang, Yongdui Ruan, Jiaxiang Li, Xinen Kong, Jiaojiao Xia, Jiayi Yang, Qiao Zhang\*, Juan Liu, Jiang Pi\***

**\*Correspondence: Jiang Pi; Qiao Zhang, Email jiangpi@gdmu.edu.cn; zhangqiao200824@126.com**

Author information:

(1)Research Center of Nanotechnology and Application Engineering, School of

Medical Technology, The First Dongguan Affiliated Hospital, Guangdong Medical

University, Dongguan, People's Republic of China.

(2)Dongguan Key Laboratory for Pathogenesis and Experimental Diagnosis of

Infectious Diseases, The First Dongguan Affiliated Hospital, School of Medical

Technology, Guangdong Medical University, Dongguan, People's Republic of China.

(3)Department of Biochemistry and Molecular Biology, School of Basic Medical

Sciences, Kunming Medical University, Kunming, Yunnan, 650500, People's Republic

of China.

(#)Contributed equally

Tuberculosis (TB) caused by Mycobacterium tuberculosis (Mtb) is one of the most

prevalent infectious diseases worldwide. Nitric oxide (NO) is produced by the

reaction of arginine and oxygen catalyzed by nitric oxide synthase (NOS) in

mammals. Several studies have highlighted the potential therapeutic use of NO

for the treatment of various diseases, including infectious diseases. NO plays a

direct bactericidal role by damaging the bacterial DNA, proteins, and enzymes.

Additionally, it plays a role in modulating immune cell function, contributing

to their anti-tuberculosis (anti-TB) effects by regulating macrophage activity.

NO has also been shown to eliminate bacterial biofilms, thereby increasing drug

sensitivity of drug-resistant bacteria. Therefore, combining NO with antibiotics

may be a strategy for treating drug-resistant tuberculosis (DR-TB). However,

owing to the limitations of NO, including their short half-life, instability,

and cytotoxicity, exogenous supplementation with NO donors has emerged as a

promising alternative therapy. Rapid advancements in nanotechnology have led to

the development of nanoparticles (NPs) as drug delivery platforms, at the same

time, using strategies such as introducing selective organ targeting (SORT)

molecules into nanocarrier systems or preparing nanodrugs in inhalable or dry

powder inhalation forms can increase the accumulation of nanodrugs in the lungs.

Combined with host-directed therapy strategies, this can improve the therapeutic

effect on tuberculosis and shorten the treatment time. This review summarizes

the biological activities of NO and introduces their applications in the

treatment of several major infectious diseases, followed by a systemic analysis

of the role and mechanism of action of NO in TB treatment. Moreover,

nanotechnology-assisted NO therapeutics are also summarized to explore the

potential for more effective Mtb killing based on the advantages of targeted NO

release at the infected site and host cells, thus benefiting the development of

more effective therapeutics against TB and drug-resistant TB.

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**17. World J Orthop. 2025 Jul 18;16(7):106041. doi: 10.5312/wjo.v16.i7.106041.**

**eCollection 2025 Jul 18.**

Treatment of lumbar tuberculosis with minimally invasive anterior lesion

clearance combined with posterior fixation.

Pu FF(1)(2), Peng XL(1)(2), Zhou FZ(1)(2), Zhao XL(1)(2), Yang L(1)(2), Cao

JQ(1)(2), Wei L(1)(2), Feng J(1)(2), Xia P(3).

**Fei-Fei Pu, Xiang-Lin Peng, Fang-Zheng Zhou, Xiao-Long Zhao, Ling Yang, Jun-Qing Cao, Liu Wei, Jing Feng\*, Ping Xia\***

**\*Co-corresponding authors: Jing Feng and Ping Xia.**

**\*Corresponding author: Ping Xia, xiapingfm@163.com**

Author information:

(1)Department of Orthopedics, Wuhan Hospital of Traditional Chinese and Western

Medicine, Tongji Medical College, Huazhong University of Science and Technology,

Wuhan 430022, Hubei Province, China.

(2)Department of Orthopedics, Wuhan No. 1 Hospital, Wuhan 430022, Hubei

Province, China.

(3)Department of Orthopedics, Wuhan Fourth Hospital (Puai Hospital), Wuhan

430022, Hubei Province, China. xiapingfm@163.com.

**BACKGROUND:** Spinal tuberculosis, a destructive extrapulmonary form, often causes

severe deformity and neurological deficits. Surgical intervention aims to

debride lesions, reconstruct stability, and correct deformities. This study

evaluates a combined posterior fixation and minimally invasive anterior approach

for lumbar tuberculosis.

**AIM:** To evaluate the clinical outcomes and radiological parameters of posterior

internal fixation combined with minimally invasive anterior lesion clearance and

bone graft fusion for the treatment of lumbar tuberculosis.

**METHODS:** Clinical data from 24 patients with lumbar tuberculosis who underwent

posterior pedicle screw fixation combined with minimally invasive anterior

lesion clearance were analyzed. The Cobb angle, visual analog scale (VAS) score,

and Frankel classification were statistically assessed preoperatively and

postoperatively. Complications and bone graft fusion were also recorded.

**RESULTS:** Wounds healed in the first stage in 22 patients; one patient developed

a posterior incisional sinus tract, and one experienced postoperative

tuberculosis recurrence. At the final follow-up, according to the Frankel

classification, there were 1, 2, and 21 cases classified as grade C, grade D,

and grade E, respectively. By the last follow-up, the Cobb angle, VAS score, and

erythrocyte sedimentation rate had all decreased. Both X-ray and computed

tomography images confirmed bone healing. The fusion time ranged from 3 to 9

months, with an average of 5.2 months.

**CONCLUSION:** Posterior pedicle screw fixation combined with minimally invasive

anterior lesion clearance is an effective and safe treatment for lumbar

tuberculosis.

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**18. Medicine (Baltimore). 2025 Jul 18;104(29):e43262. doi:**

**10.1097/MD.0000000000043262.**

Analysis of risk factors of unfavorable treatment outcomes in patients with

rifampicin-sensitive pulmonary tuberculosis.

Lv L(1), Ye L(1), Lan J(2), Wang T(2), Wu Z(2), Wu S(2), Lu W(2), Peng C(2), Lu

T(2).

**Luyi Lv, Ling Ye, Jianhua Lan, Tao Wang, Zhiyu Wu, Shugen Wu, Weili Lu, Chunxian Peng, Tao Lu\***

**\* Correspondence: Tao Lu, (e-mail: zjqzlutao@163.com)**

Author information:

(1)The 2nd Clinical Medical College of Zhejiang Chinese Medical University,

Hangzhou, Zhejiang Province, China.

(2)Department of Infectious Diseases, The Quzhou Affiliated Hospital of Wenzhou

Medical University (Quzhou People's Hospital), Quzhou, Zhejiang Province, China.

This study analyzes the risk factors of unfavorable treatment outcomes in

rifampicin-sensitive pulmonary tuberculosis (PTB) patients. Clinical data of 694

patients with rifampicin-sensitive PTB admitted to Quzhou Hospital Affiliated to

Wenzhou Medical University from January 2020 to December 2021 were

retrospectively analyzed. Univariate and multivariate logistic regression were

used to analyze the related risk factors, and the predictive value was assessed

using the receiver operating characteristic curve. Among 66 patients with

unfavorable treatment outcomes, 42 died from non-tuberculosis causes, 16 died

from tuberculosis, and 8 had failed treatment. Multivariate Logistic regression

analysis showed that retreatment of PTB (odds ratio [OR] = 2.750, 95% confidence

interval [CI] 1.253-6.033), chronic obstructive pulmonary disease (OR = 3.229,

95% CI 1.678-6.212), respiratory failure (OR = 7.388, 95% CI 2.420-22.560),

elevated C-reactive protein (CRP) (OR = 1.006, 95% CI 1.000-1.011),

hypoproteinemia (OR = 0.902, 95% CI 0.839-0.969), and low body mass index (BMI)

(OR = 0.976, 95% CI 0.959-0.992) were independent risk factors for unfavorable

treatment outcomes in rifampicin-sensitive PTB patients (P < .05); retreated of

PTB (OR = 5.347, 95% CI 1.355-21.099), respiratory failure (OR = 17.046, 95% CI

3.080-94.354), hypoalbuminemia (OR = 0.795, 95% CI 0.702-0.902), and low BMI

(OR = 0.748, 95% CI 0.584-0.959) were independent risk factors for poor

prognosis in rifampicin-sensitive PTB patients (P < .05). The area under the

curve of CRP, serum albumin, and BMI combined to predict unfavorable treatment

outcomes in PTB patients was 0.798 (95% CI 0.749-0.847), with a sensitivity of

92.4% and specificity of 51.4%. The area under the curve of serum albumin and

BMI combined to predict the prognosis of PTB patients was 0.923 (95% CI

0.862-0.984), with a sensitivity of 93.8% and a specificity of 89.3%. The low

BMI, hypoproteinemia, elevated CRP level, comorbidities, and retreatment are

risk factors for unfavorable treatment outcomes and poor prognosis in patients

with rifampicin-sensitive PTB. Serum albumin and BMI were good indicators for

evaluating unfavorable treatment responses in rifampicin-sensitive PTB patients,

and their combination could improve the accuracy of prognostic assessment.

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Pulmonary rehabilitation of a 72-year-old male with tracheostomy combined with

unilateral tuberculous pleural effusion after cerebral infarction: A case report

and literature review.

Wei H(1), Huang Y(2), Yang J(1), Guo T(3), Yang L(1)(4)(5).

**Haitang Wei, Ying Huang, Jun Yang, Tiecheng Guo, Lu Yang\***

**\* Correspondence: Lu Yang, (e-mail: luluyang\_tj@foxmail.com).**

Author information:

(1)Department of Rehabilitation, Wuhan Hankou Hospital Affiliated to Wuhan

University of Science and Technology, Wuhan, Hubei, China.

(2)Department of Science and Education, Wuhan Hankou Hospital Affiliated to

Wuhan University of Science and Technology, Wuhan, Hubei, China.

(3)Department of Rehabilitation, Tongji Hospital Affiliated to Tongji Medical

College, Huazhong University of Science and Technology, Wuhan, Hubei, China.

(4)Hubei Province Key Laboratory of Occupational Hazard Identification and

Control, Wuhan University of Science and Technology, Wuhan, Hubei, China.

(5)Department of Rehabilitation, The Fifth Affiliated Hospital of Zhengzhou

University, Zhengzhou, Henan, China.

**INTRODUCTION:** While poststroke rehabilitation primarily addresses motor,

linguistic, cognitive, and swallowing impairments, pulmonary dysfunction (PD) is

frequently neglected. PD following stroke, attributed to cortical-diaphragm

pathway damage, can lead to increased mortality and prolonged hospitalization.

Tracheostomy in such patients can exacerbate PD by increasing airway resistance

and the risk of respiratory infections. This case study aims to report the

successful integration of early pulmonary rehabilitation (PR) in a high-risk

patient with poststroke tracheostomy complicated by unilateral tuberculous

pleural effusion, underscoring its critical role in mitigating PD and improving

outcomes.

**PATIENT CONCERNS:** A 72-year-old male with left-sided hemiplegia and dysphagia

for over 3 months was admitted for rehabilitation following recurrent pulmonary

infections post-cerebral infarction, which necessitated tracheostomy and

indwelling tracheal cannula placement in the intensive care unit 3 months prior.

DIAGNOSES: Cranial and thoracic computed tomography scans of the patient

demonstrated infarctive lesions within the brainstem and the right semioval

center, as well as evidence of infection in the lower lobe of the right lung.

Additionally, atelectasis of the left lung and a significant amount of

left-sided pleural effusion were observed. The patient's T-cell spot test

confirmed a positive result for tuberculosis infection. Due to the presence of

dysphagia and bile reflux, a nasojejunal tube was inserted to facilitate enteral

feeding. Furthermore, a tracheostomy was performed with the placement of an

indwelling tracheostomy tube to manage respiratory difficulties. The patient was

subsequently diagnosed with poststroke tracheostomy complicated by left-sided

pleural effusion.

**INTERVENTIONS:** For this elderly patient who underwent tracheostomy following a

cerebral infarction and subsequently developed pleural effusion, our team

performed an integrated rehabilitation evaluation and treatment protocol,

prioritizing PR strategies.

**OUTCOMES:** The patient's thoracic drainage tube and tracheostomy tube were

successfully removed, with subsequent improvements in pulmonary function and

overall motor function, leading to a reduction in the level of dependence on

daily living activities.

**LESSONS:** For patients with pulmonary dysfunction following a stroke, PR should

be considered an integral component of the rehabilitation plan. This approach is

crucial for enhancing respiratory function, improving overall physical capacity,

and thereby accelerating the recovery process.

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Factors associated with post-treatment resorption of lung cavities in

individuals with first episodes of drug-sensitive cavitary pulmonary

tuberculosis in China.

Li X(#)(1), Ye J(#)(1), Wang S(#)(2), Wan Z(#)(3), Xie L(#)(1), He Z(#)(4), Shao

H(#)(1), Zhang S(5), Hou Z(1), Xie Y(3), Xing Z(6), Wu J(7), Yang W(8), Chen

H(9)(10).

**Xue Li, Jing Ye, Sisi Wang, Zhen Wan, Lijia Xie, Zuokuan He, Hongxia Shao, Shuo Zhang, Zhili Hou, Yi Xie, Zhiheng Xing\*, Junping Wu\*, Wanjie Yang\*, Huaiyong Chen\***

**\*Correspondence: Zhiheng Xing, 18920696025@189.cn ; Junping Wu, wujp0618@126.com ; Wanjie Yang, yangwanjie0709@126.com ; Huaiyong Chen, huaiyong.chen@foxmail.com**

Author information:

(1)Department of Tuberculosis, Haihe Hospital, Tianjin University, Tianjin,

300350, China.

(2)Department of Respiratory, Tianjin Union Medical Center, The First Affiliated

Hospital of Nankai University, Tianjin, 300121, China.

(3)Key Research Laboratory for Infectious Disease Prevention for State

Administration of Traditional Chinese Medicine, Tianjin Institute of Respiratory

Diseases, Tianjin, 300350, China.

(4)Department of Basic Medicine, Haihe Clinical School, Tianjin Medical

University, Tianjin, 300350, China.

(5)Department of Radiology, Haihe Hospital, Tianjin University, Tianjin, 300350,

China.

(6)Department of Radiology, Haihe Hospital, Tianjin University, Tianjin, 300350,

China. 18920696025@189.cn.

(7)Department of Tuberculosis, Haihe Hospital, Tianjin University, Tianjin,

300350, China. wujp0618@126.com.

(8)Key Research Laboratory for Infectious Disease Prevention for State

Administration of Traditional Chinese Medicine, Tianjin Institute of Respiratory

Diseases, Tianjin, 300350, China. yangwanjie0709@126.com.

(9)Department of Tuberculosis, Haihe Hospital, Tianjin University, Tianjin,

300350, China. huaiyong.chen@foxmail.com.

(10)Tianjin Key Laboratory of Lung Regenerative Medicine, Tianjin, 300350,

China. huaiyong.chen@foxmail.com.

(#)Contributed equally

**BACKGROUND:** In patients with pulmonary tuberculosis (TB), the persistence of the

lung cavities leads to opportunistic infections and increases the risk of

person-to-person Mycobacterium tuberculosis (Mtb) transmission. However, factors

that associated with cavity resorption remain unknown.

**METHODS:** In this retrospective study, 588 patients with drug-sensitive pulmonary

tuberculosis and cavitary lesions on chest imaging were enrolled. All patients

completed a standard 6-month anti-tuberculosis drug treatment regimen. They were

randomly divided into a training set (n = 412) and a validation set (n = 176) in

a 7:3 ratio. Clinical variables including demographic data, radiological

findings, laboratory test results, and anti-tuberculosis drug usage were

collected. Univariate and multivariate logistic regression analyses were

performed to identify factors associated with cavity absorption.

**RESULTS:** Multivariate logistic regression identified several factors

independently associated with poor cavity resorption: older age (odds ratio [OR]

1.029, 95% confidence interval [CI]: 1.012-1.047), male sex (OR 2.599, CI:

1.349-5.009), serum total protein (OR 0.963, CI: 0.931-0.997), presence of

multiple cavities (OR 1.791, CI: 1.115-2.876) and absence of fever (OR 1.729,

CI: 1.032-2.893). The predictive model constructed using these six variables

showed good discrimination, with an area under the curve (AUC) of 0.749 (95% CI:

0.699-0.798) in the training set and 0.746 (95% CI: 0.670-0.822) in the

validation set (n = 176).

**CONCLUSIONS:** Our findings indicate that older age, male sex, lower serum total

protein, presence of multiple cavities, and absence of fever are independently

associated with poor cavity resorption in patients with pulmonary tuberculosis.

These variables may help identify high-risk patients and guide personalized

management. Therefore, for better control of Mtb infection and improved

outcomes, greater clinical attention should be paid to these associated factors.

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**eCollection 2025.**

Clinical Characteristics and Mortality Risk Factors in Patients with

Tuberculosis and Coincident Pneumocystis jirovecii Pneumonia: A Retrospective

Single-Center Study.

Pan X(1), Zheng J(2), Xu J(1), Pan L(1), Wang C(1), Huang X(1), Qiu J(1), Yan

C(1), Mao M(1).

**Xiaohong Pan, Jun Zheng, Jiekun Xu, Lei Pan, Caihong Wang, Xiaoqing Huang, Junke Qiu, Chenxi Yan, Minjie Mao\***

**\*Correspondence: Minjie Mao, Email pansaide@foxmail.com**

Author information:

(1)Department of Intensive Care Unit for Tuberculosis, Zhejiang Tuberculosis

Diagnosis and Treatment Center, Zhejiang Hospital of Integrated Traditional

Chinese and Western Medicine, Hangzhou, Zhejiang, 310013, People's Republic of

China.

(2)Department of Rehabilitation, Health Service Center of Nanxing Subdistrict,

Hangzhou, Zhejiang, 310000, People's Republic of China.

**INTRODUCTION:** HIV infection and immunosuppressive therapy are major risk factors

for tuberculosis (TB) or Pneumocystis jirovecii pneumonia (PJP). The joint

presence of these diseases is not rare, posing substantial challenges in

diagnosis and treatment. This study examined the clinical characteristics of

patients with coincident TB and PJP and identified the associated mortality risk

factors.

**METHODS:** Patients diagnosed with TB and PJP at our center between January 2018

and December 2023 were retrospectively investigated. Data on demographics,

diagnostic methods, clinical symptoms, imaging findings, laboratory

examinations, treatment regimens, and clinical outcomes were collected from

electronic medical records and summarized. The risk factors for mortality were

then explored by logistic regression analysis, and the corresponding odds ratios

(ORs) and 95% confidence intervals (CIs) were calculated.

**RESULTS:** In total, 26 patients were included (mean age, 61.6 ± 16.6 years;

illness duration, 39.8 ± 53.1 days). All cases of PJP were diagnosed by

next-generation sequencing. The most common symptoms were cough (88.5%), fever

(84.6%), and shortness of breath (69.2%). Chest imaging predominantly revealed

ground-glass opacities (57.7%). Six patients (23.1%) died during

hospitalization. Multivariate analysis identified the oxygenation index (OR =

0.979, 95% CI = 0.976-0.982) and lymphocyte count (OR = 0.006, 95% CI =

0.002-0.017) as independent risk factors for mortality.

**CONCLUSION:** Favorable clinical outcomes can be expected in most cases of

coincident TB and PJP. However, decreases in the oxygenation index and

lymphocyte count increase the risk of mortality.

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Current Landscape and Multidimensional Determinants of Spiritual Coping

Mechanisms Among Tuberculosis Patients in Zhejiang, China: A Population-Based

Cross-Sectional Investigation.

Lu L(1), Zheng L(2), Zhu Q(3), Qiu Q(4), Zhou T(1), Fu J(1), Pan X(1), Zheng

G(1), Xu Y(1).

**Lifen Lu, Luman Zheng, Qiongyi Zhu, Qi Qiu, Tianping Zhou, Jing Fu, Xiao Pan, Gui Zheng\*, Yan Xu\***

**\*Correspondence: Yan Xu, Email 1195047@zju.edu.cn; Gui Zheng, Email zhenggui1119@zju.edu.cn**

Author information:

(1)Department of Nursing, The First Affiliated Hospital, Zhejiang University

School of Medicine, Hangzhou, Zhejiang, People's Republic of China.

(2)Department of Laboratory Medicine, Hunan Changsha Medical University,

Changsha, Hunan, People's Republic of China.

(3)Department of Nursing, The Affiliated Yueqing Hospital of Wenzhou Medical

University, Wenzhou, Zhejiang, People's Republic of China.

(4)Department of Health, The Health Center of Jincheng Sub-district, Lin'an

District, Hangzhou, Zhejiang, People's Republic of China.

**AIM:** Investigate the different spiritual coping strategies employed by

tuberculosis patients during their illness and determine the multidimensional

determinants influencing these adaptive strategies.

**DESIGN**: Online cross-sectional design.

**METHODS:** Between January and September 2024, 448 tuberculosis (TB) patients in

Zhejiang Province, China, were recruited via WeChat-based outreach. Data

collection was implemented through a digitally administered, self-report survey

platform. Comprehensive statistical analyses were performed, including

independent samples t-tests, one-way ANOVA for group comparisons, Pearson

correlation coefficients for bivariate associations, and hierarchical multiple

linear regression modeling to identify predictor clusters. This cross-sectional

investigation rigorously adhered to the STROBE guidelines throughout its design,

execution, and reporting phases.

**RESULTS:** Among the 448 patients, 255 were male and 193 were female, with an

average age of 47.45 (SD = 18.23) years. The factors influencing the level of

Positive Spiritual Coping (PSC) were sex (t = -2.593, p = 0.010), residence (t =

2.317, p = 0.021), marital status (t = -2.485, p = 0.013), and economic

indicators (F = 2.951, p = 0.032). The factors influencing the level of Negative

Spiritual Coping (NSC) were age (F = 3.226, p = 0.041), marital status (t =

2.635, p = 0.009), alcohol consumption (t = 2.840, p = 0.005), number of

children (t = 2.022, p = 0.044), and TB diagnosis type (t = -2.323, p = 0.021).

The PSC level was negatively correlated with depression (p < 0.01) and

positively correlated with the Brief Resilience Scale (BRS), Family APGAR Index

(APGAR), and Personal Mastery Scale (PMS) (p < 0.01). The NSC level was

positively correlated with depression, anxiety, and stress (p < 0.01) and

negatively correlated with BRS, APGAR, and PMS (p < 0.01). Multivariate linear

regression analysis indicated that PMS (2.852, P=0.005), APGAR (3.740,

P<0.0001), BRS (3.457, P=0.001), and gender (3.343, P=0.001) significantly

affected the PSC level in TB patients. Depression (10.112, P < 0.0001), APGAR

(-4.571, P < 0.0001), BRS (-3.084, P = 0.002), number of children (-2.315, P =

0.021), and type of TB diagnosis (2.217, P = 0.027) were factors that

independently affected the NSC level of TB patients.

**CONCLUSION:** TB patients exhibit better PSC levels in female patients, and higher

PMS, BRS, and APGAR levels correlate with higher PSC levels. NSC levels are

higher in patients without children and pulmonary TB, while higher BRS and APGAR

levels are associated with lower NSC levels. These findings can help healthcare

providers tailor person-centered spiritual care strategies for TB patients based

on factors influencing spiritual coping, thereby improving their mental health

during illness, reducing psychological distress, and facilitating earlier

recovery.

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Identification of Mycobacterium Species by DNA Microarray Chip Method.

Zixuan C(1), Jianming Z(2), Yancheng J(1), Zhenglong L(1), Xiaoting C(1).

**Chen Zixuan, Zhang Jianming\*, Jiang Yancheng, Lin Zhenglong, Chen Xiaoting**

**\*0591350004@163.com.**

Author information:

(1)Quanzhou First Hospital Affiliated to Fujian Medical University.

(2)Quanzhou First Hospital Affiliated to Fujian Medical University;

0591350004@163.com.

This study presents a DNA microarray chip method designed for the accurate

identification of Mycobacterium species. By leveraging asymmetric PCR

amplification and hybridization principles, this method targets 17 common

mycobacteria, including those in the Mycobacterium tuberculosis complex and

various non-tuberculous mycobacteria. It is applicable to a wide range of

clinical specimens like sputum, pus, bronchoalveolar lavage fluid, cerebrospinal

fluid, and puncture fluid from patients suspected of mycobacterial diseases. The

assay involves amplifying target sequences in the Mycobacterium genome through

asymmetric PCR, followed by hybridization with the probes on the microarray

chip. The unique probe arrangement (repeated 5x in a 12 row x 10 column

microarray) and the use of control probes enhance its reliability. Clinical

trials with 1,724 samples demonstrated high performance. The method achieved

100% clinical specificity, sensitivity, and overall concordance compared to

sequencing results, except for two rare non-tuberculous mycobacterial samples

beyond its detection scope. This DNA microarray chip method offers a significant

improvement over traditional diagnostic techniques, shortening the diagnosis

time and providing a more comprehensive detection, thus having great potential

in the diagnosis and management of mycobacterial diseases.

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