



# Profiling Chimeric RNA in Prostate Cancer in Chinese Cohorts Reveals Similarities and Differences Compared to Western Populations

Qiong Wang<sup>1,2,3#</sup>, Shunli Yu<sup>3,4#</sup>, Jirong Jie<sup>1#</sup>, Justin Elfman<sup>2</sup>, Zhi Xiong<sup>3,4</sup>, Sandeep Singh<sup>2</sup>, Samir Lalani<sup>2</sup>, Yiwei Wang<sup>2</sup>, Kaiwen Li<sup>3,4</sup>, Bisheng Cheng<sup>1</sup>, Ze Gao<sup>3,4</sup>, Xu Gao<sup>5\*</sup>, Hui Li<sup>2\*</sup>, Hai Huang<sup>3,4,6\*</sup>

<sup>1</sup>Department of Urology, Nanfang Hospital, Southern Medical University, Guangzhou 510515, China

<sup>2</sup>Department of Pathology, School of Medicine, University of Virginia, Charlottesville VA 22908, USA

<sup>3</sup>Department of Urology, Sun Yat-sen Memorial Hospital, Sun Yat-sen University, Guangzhou 510120, China

<sup>4</sup>Guangdong Provincial Key Laboratory of Malignant Tumor Epigenetics and Gene Regulation, Sun Yat-Sen Memorial Hospital, Sun Yat-Sen University, Guangzhou 510120, China

<sup>5</sup>Department of Urology, Changhai Hospital, Naval Medical University, Shanghai 200433, China

<sup>6</sup>Department of Urology, The Sixth Affiliated Hospital of Guangzhou Medical University, Qingyuan People's Hospital, Qingyuan 511518, China



Qiong Wang, Shunli Yu, Jirong Jie, Justin Elfman, Zhi Xiong, Sandeep Singh, Samir Lalani, Yiwei Wang, Kaiwen Li, Bisheng Cheng, Ze Gao, Xu Gao, Hui Li, Hai Huang. 2025. Profiling chimeric RNA in prostate cancer in Chinese cohorts reveals similarities and differences compared to western populations. *iMeta* 4:70014. <https://doi.org/10.1002/imt2.70014>



# Introduction

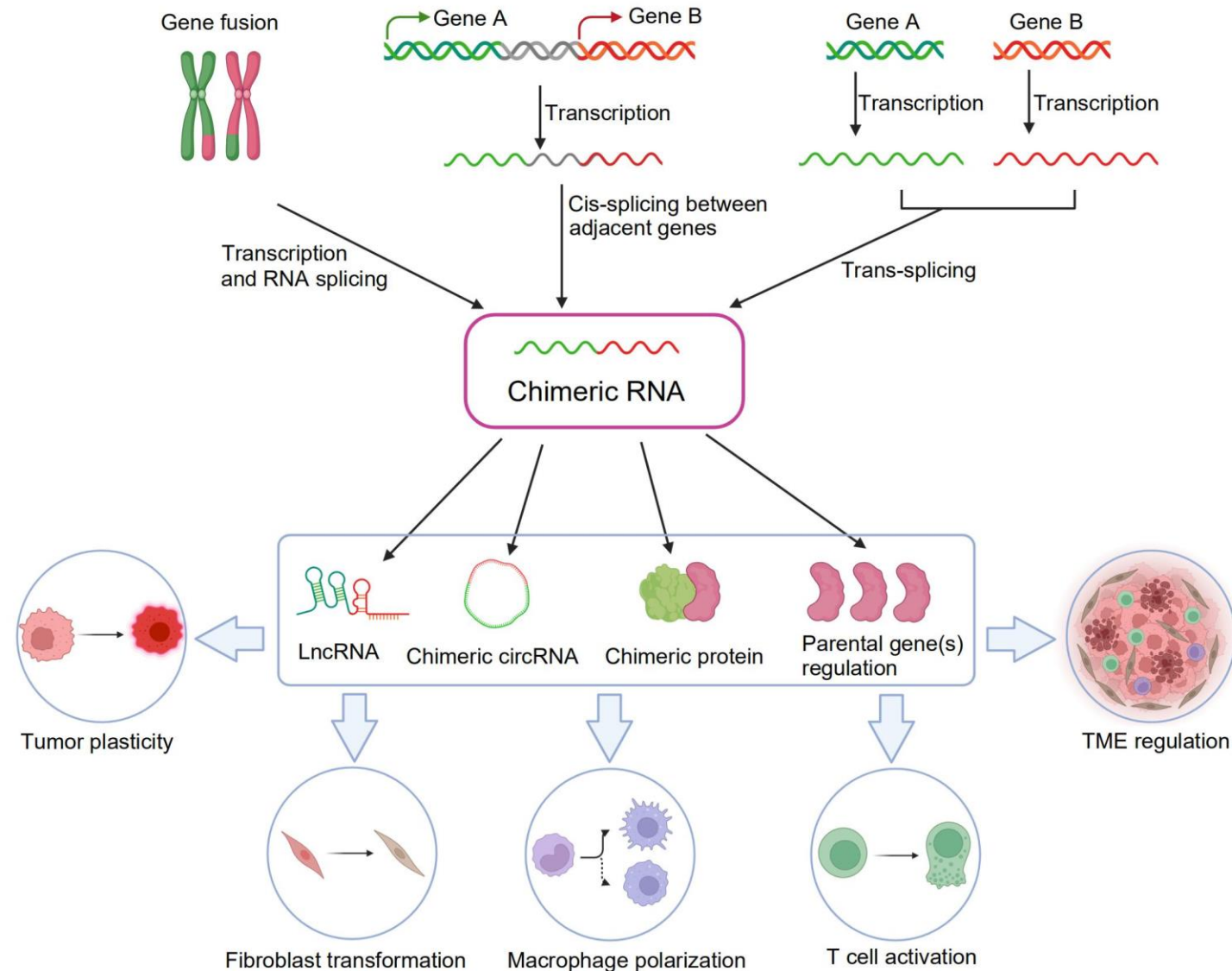
- ❑ **Prostate cancer (PCa) is the most common malignant tumor in men and exhibits significant racial disparities.**
- ❑ **Chimeric RNAs have been validated as cancer diagnostic and therapeutic targets for many years. Comprehensive landscape research on PCa-associated chimeric RNAs is still lacking, particularly in Chinese populations.**
- ❑ **This comprehensive study establishes a chimeric transcriptome atlas for Chinese PCa patients, highlights population-specific disparities, and presents validated chimeric RNAs with diagnostic, prognostic, and therapeutic potential.**



# Highlights

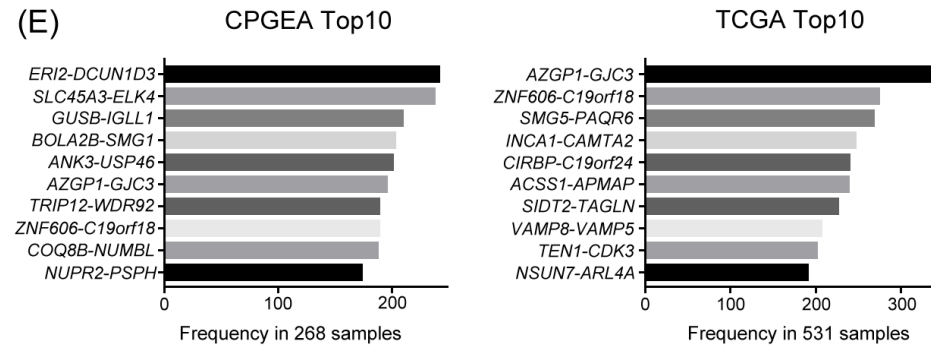
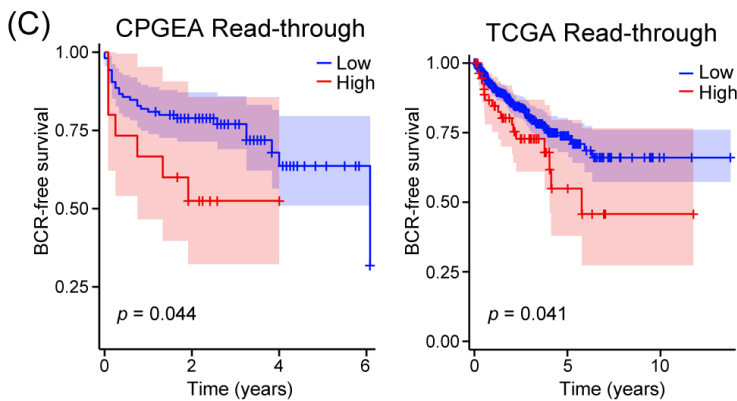
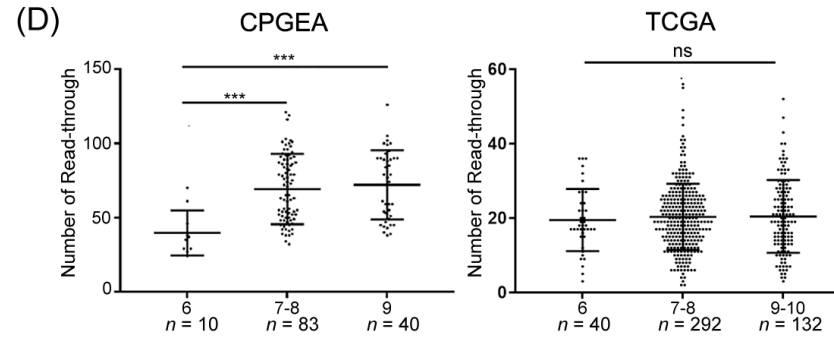
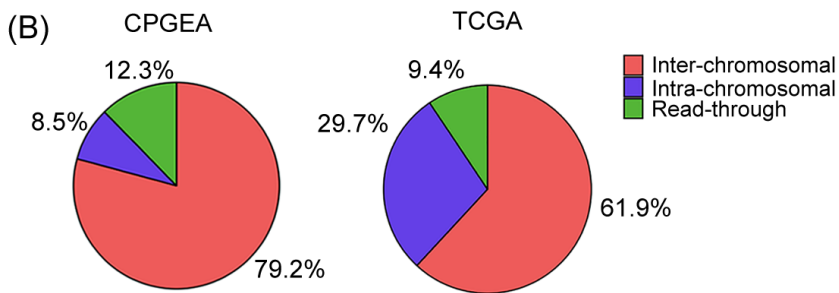
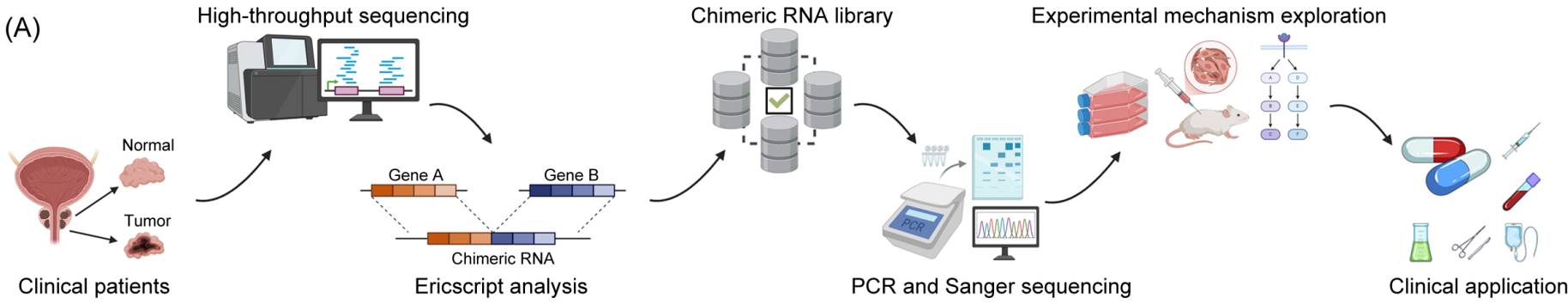


- ❑ This study systematically analyzed the chimeric RNAs of prostate cancer in Chinese population;
- ❑ We described the spatial expression profile of chimeric RNAs prostate cancer cells and stromal cells from tumor microenvironment;
- ❑ We explored the function of chimeric RNAs and analyzed their effect on tumor microenvironment.





# Results

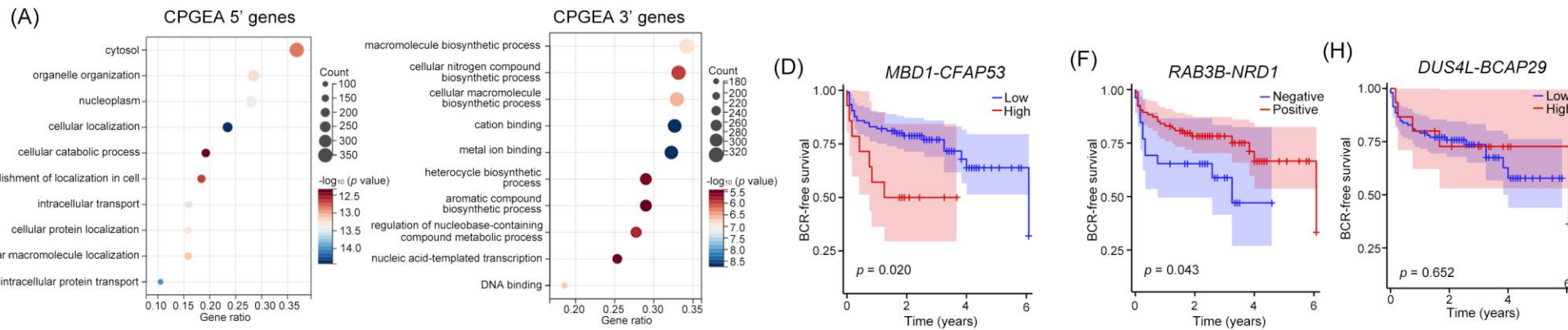


- ❑ A total of 30,315 non-M/M chimeric RNAs were categorized based on their fusion types in CPGEA and TCGA;
- ❑ The read-through chimeric RNA in TCGA was highly expressed in tumor tissues, while the read-through chimeric RNA in CPGEA was associated with higher Gleason scores;
- ❑ There were also differences in high-frequency chimeric RNA between the two cohorts.

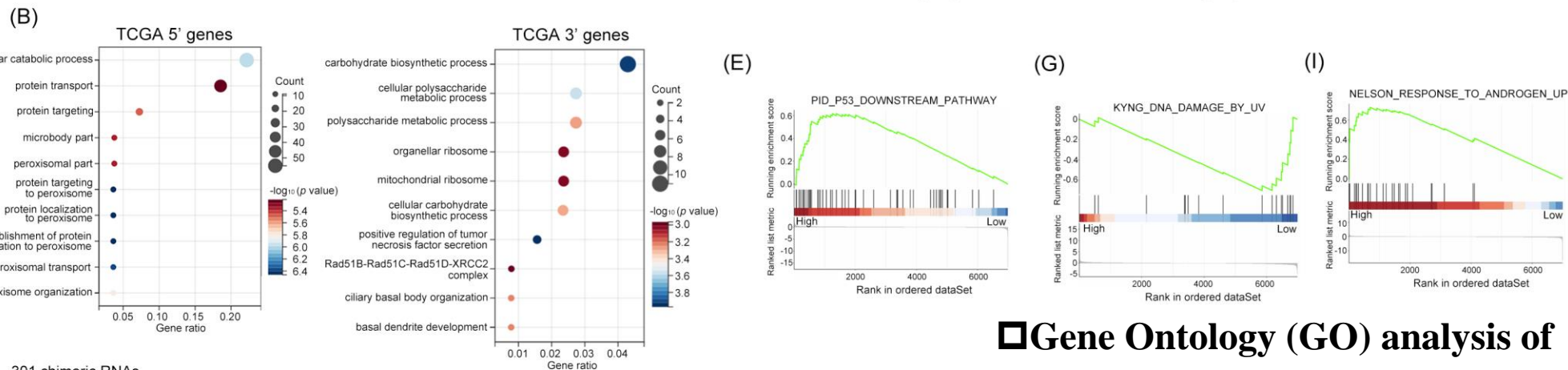
Figure 1. Discovery and identification of chimeric RNAs.



# Results

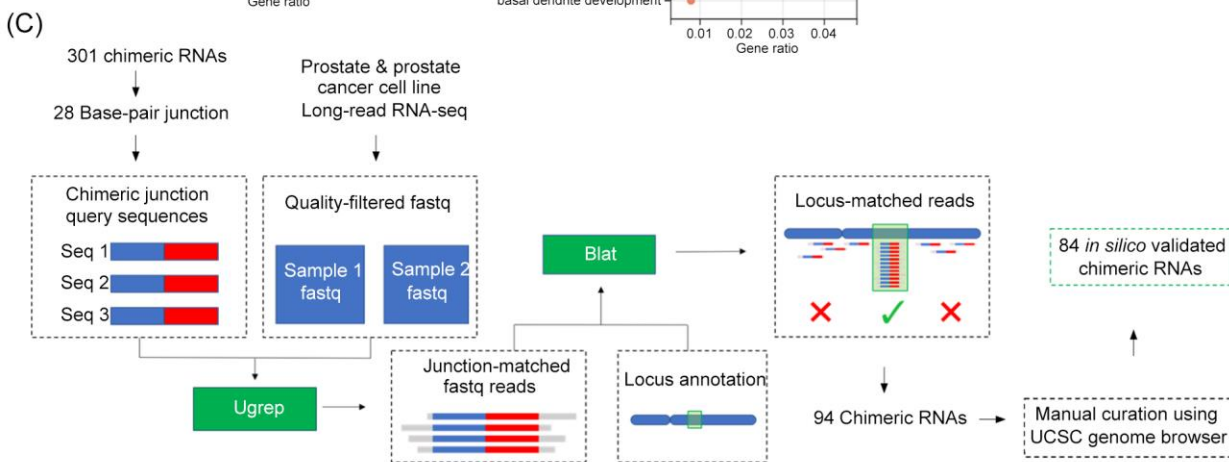


**Figure 2. The lassification of chimeric RNAs.**



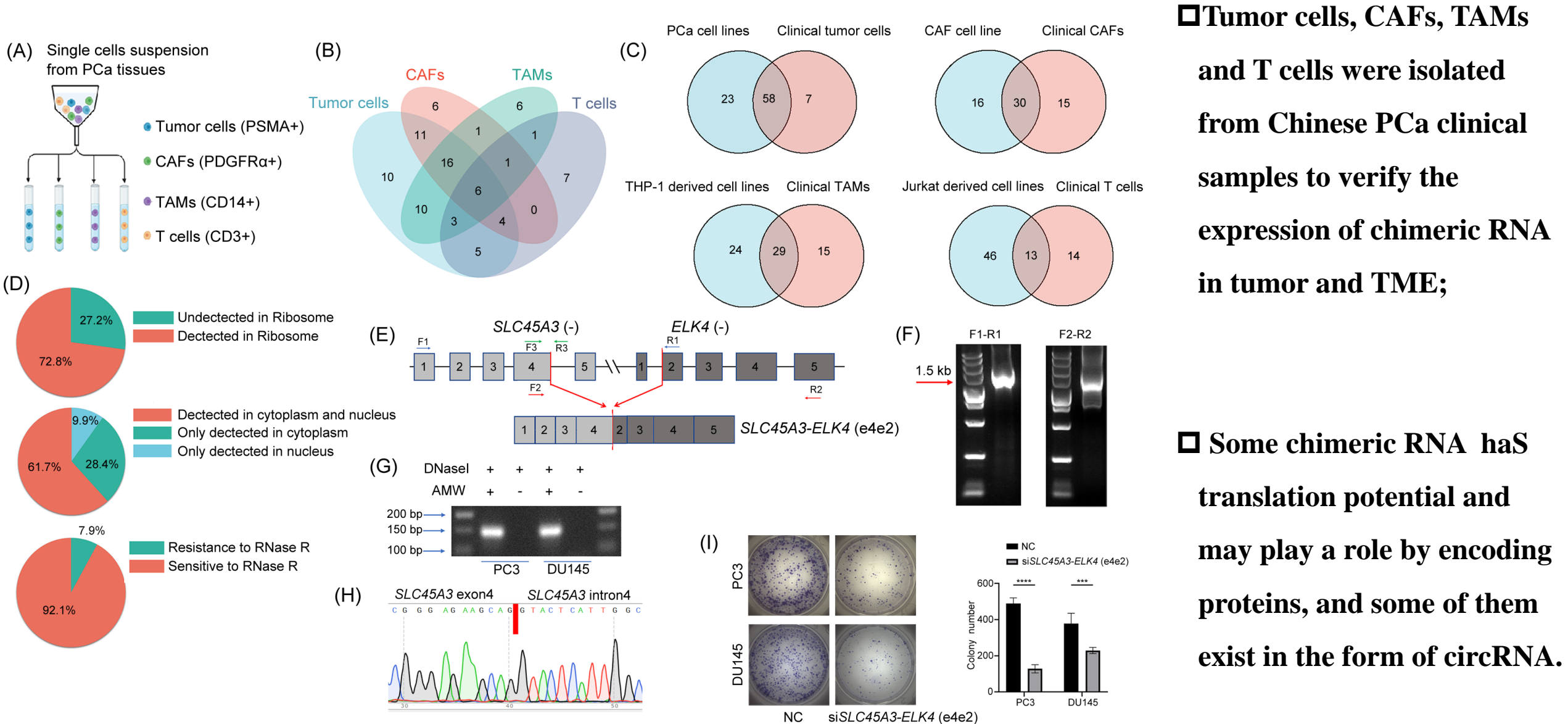
□ Gene Ontology (GO) analysis of parental genes showed that chimeric RNA may regulate PCa progression;

□ 101 chimeric RNAs from CPGEA were confirmed by Sanger sequencing, most of which were novel.





# Results



**Figure 3. Distribution and function of chimeric RNAs in clinical samples and immortalized cells.**

□ Tumor cells, CAFs, TAMs and T cells were isolated from Chinese PCa clinical samples to verify the expression of chimeric RNA in tumor and TME;

□ Some chimeric RNA has translation potential and may play a role by encoding proteins, and some of them exist in the form of circRNA.



# Results

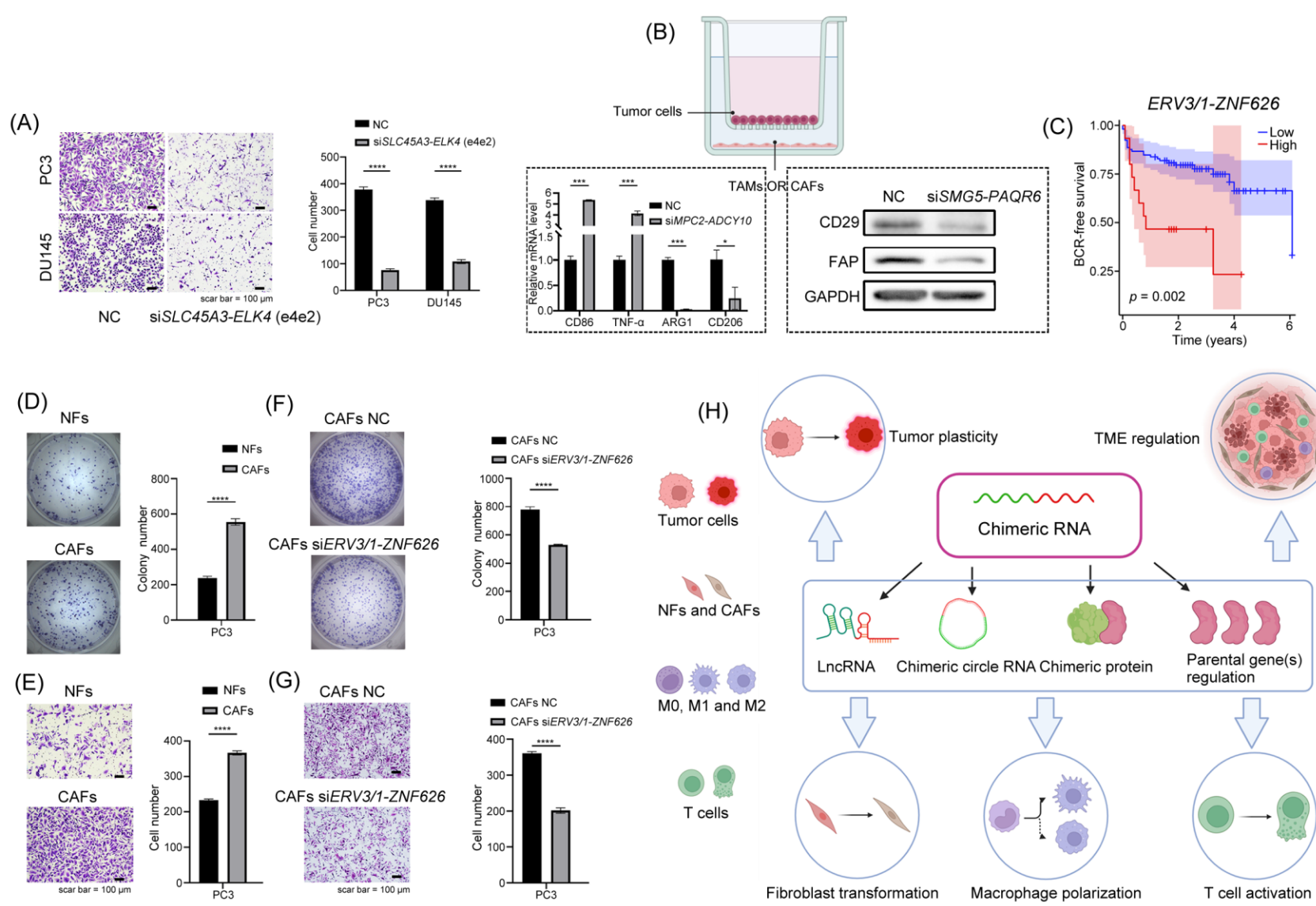


Figure 4. Chimeric RNA can affect tumor microenvironment and intercellular communication

□ Chimeric RNA can regulate the proliferation and migration of PCa, directly affecting the development of PCa;

□ Tumor cell-associated chimeric RNA can mediate the communication between tumor cells and stromal cells in tumor microenvironment, and change the phenotype of stromal cells;

□ Stromal cell-derived chimeric RNAs are involved in the regulation of tumor microenvironment and tumor cell plasticity.



# Summary



- We validated numerous novel chimeric RNAs, offering potential markers for different cells in PCa, complementing known genes.**
- We confirmed that these chimeric RNAs can regulate tumor progression through at least three mechanisms: influencing tumor growth and motility, contributing to communication between tumors and the microenvironment, and regulating the microenvironment.**


Qiong Wang, Shunli Yu, Jirong Jie, Justin Elfman, Zhi Xiong, Sandeep Singh, Samir Lalani, Yiwei Wang, Kaiwen Li, Bisheng Cheng, Ze Gao, Xu Gao, Hui Li, Hai Huang. 2025. Profiling chimeric RNA in prostate cancer in Chinese cohorts reveals similarities and differences compared to western populations. *iMeta* 4:70014. <https://doi.org/10.1002/imt2.70014>.



“***iMeta***” is a Wiley partner journal launched by iMeta Science Society in 2022, first **impact factor (IF) 23.8 in 2024, ranking 2/161 in the microbiology**. It aims to publish innovative and high-quality papers with broad and diverse audiences. **Its scope is similar to *Nature Biotechnology, Nature Methods, Nature Microbiology, Nature Food, etc.*** Its unique features include video abstract, bilingual publication, and social media dissemination, with more than 600,000 followers. It has published 220+ papers and been cited for 5600+ times, and has been indexed by **SCIE / WOS, PubMed, Google Scholar, and Scopus**.

“***iMetaOmics***” is a sister journal of “***iMeta***” launched in 2024, with a **target IF>10, and its scope is similar to *Nature Communications, Microbiome, ISME J, Nucleic Acids Research, Briefings in Bioinformatics, etc.*** All contributes are welcome!

 Society: <http://www.imeta.science>  
 Publisher: <https://wileyonlinelibrary.com/journal/imeta>  
Submission: <https://wiley.atyponrex.com/journal/IMT2>  
<https://wiley.atyponrex.com/journal/IMO2>

 [office@imeta.science](mailto:office@imeta.science)  
[imetaomics@imeta.science](mailto:imetaomics@imeta.science)

 [Promotion Video](#)

 [iMetaScience](#)

 [iMetaScience](#)