实验室网站文案

# Index page

从细胞外到活细胞内的单分子观测与操纵

近年来单分子技术手段的快速发展使我们可以在纳米空间尺度和毫秒或者更快的时间尺度上精确观测和操纵单个生物分子的位置、指向、分布以及化学反应等动态过程，极大地推进了生命科学许多领域的发展。科学家不仅可以在细胞外（体外实验）而且能够在活细胞内实时观测和操纵单分子，由此在分子水平上理解生命现象。我们实验室将致力于继续开创、发展和应用单分子技术，研究生物体系的动态过程，包括生物大分子非平衡态的动力学过程，以及细胞内的生物化学反应，特别是基因的表达调控机理。这些新的信息将加深我们对生物和医学基础问题的理解。

Observation and manipulation of single molecules from outside to inside living cells

In recent years, the rapid development of single-molecule technology has allowed us to accurately observe and manipulate the position, orientation, distribution, and chemical reactions of individual biomolecules on nano-space scales and milliseconds or faster time scales, greatly advancing life. Development in many areas of science. Scientists can not only observe and manipulate single molecules outside the cell (in vitro experiments) but also in living cells in real time, thereby understanding life phenomena at the molecular level. Our lab will continue to create, develop, and apply single-molecule technology to study the dynamic processes of biological systems, including the dynamic processes of biological macromolecules in non-equilibrium state, and the biochemical reactions in cells, especially the mechanism of gene expression regulation. This new information will deepen our understanding of basic biological and medical issues.

超高空间分辨率细胞成像

传统光学显微镜的分辨率由于受到光学衍射极限的制约，只能达到几百纳米。近年来多种技术的发展突破了这一限制，达到十纳米左右的空间分辨率，因而在生命科学研究中打开了广阔的应用前景。我们实验室将利用此类技术研究高分辨率的静态结构，如细胞核内的染色体三维结构；以及活细胞内的动态行为，以在更精确的层次上理解各种生命过程。

Ultra-high spatial resolution cell imaging

The resolution of traditional optical microscopes is restricted by the optical diffraction limit and can only reach a few hundred nanometers. In recent years, the development of a variety of technologies has broken through this limitation, reaching a spatial resolution of about ten nanometers, thus opening up broad application prospects in life science research. Our lab will use this type of technology to study high-resolution static structures, such as the three-dimensional structure of chromosomes in the nucleus, and dynamic behaviors in living cells, to understand various life processes at a more precise level.

**ABOUT US**

We are a young lab based on the Biomedical Pioneering Innovation Center (BIOPIC) and the School of Life Sciences at Peking University, and also supported by Beijing Advanced Innovation Center for Genomics (ICG).

We aspire to create a diverse, stimulating, and collaborative lab environment. Motivated scientists of all stages and all backgrounds are welcome to join our growing team.

**Latest News**

# Research

## OUR ASPIRATION

Gene expression programs establish and maintain specific cell states. These programs are controlled by thousands of transcription factors, cofactors, and chromatin regulators, which "extract" the information stored in the shared genomic sequences of an individual organism in a cell-specific manner that in turn gives the cells particular functions and identities. We want to understand how this fascinating process happens.

​The DNA exists in cells in the form of chromatin in eukaryotes. Our laboratory studies how DNA-binding transcription factors, chromatin regulators and signaling molecules cooperate on chromatin, how regulatory DNA elements talk to each other, and how these transcription events associate with development, differentiation and diseases. We make use of single molecule tracking, fluorescence microscopy, epigenomics, biochemistry, and genome editing to study gene regulatory mechanisms. We are also interested in developing medical diagnostics and therapeutic interventions for human diseases that are associated with abnormal gene expression.