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Genome-wide single-cell and single-molecule footprinting of transcription factors with deaminase

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Yeung Kin Man Academic Building

Abstract

Decades of research have established that mammalian transcription factors (TFs) bind to each gene's regulatory regions and cooperatively control tissue specificity, gene transcription and regulation. Mapping the combination of TF binding sites genome wide is critically important for understanding functional genomics. We have developed a technique to measure TFs' binding sites on the human genome with a single-base resolution by footprinting with deaminase (FOODIE) on a single-molecule and single-cell basis. Scalable and cost-effective, FOODIE offers exciting possibilities in biology and medicine.

Biography

Xiaoliang Sunney Xie is the Director of Changping Laboratory, the Lee Shau-kee Professor and Dean of Faculty of Sciences at Peking University. He received his B.Sc. in Chemistry from Peking University in 1984, and Ph.D. in Physical Chemistry from University of California at San Diego in 1990. He became the first tenured professor in 1998 and the first endowed Professor in 2009 at Harvard University among Chinese scholars since China's reform and opening up. He relocated to Peking University in 2018.

Xie has been a pioneer of single-molecule biophysical chemistry, coherent Raman scattering microscopy and single-cell genomics. The single-cell whole genome amplification methods that his group invented has to date benefited over 9,000 families with monogenic diseases by successfully preventing the passing of disease-causing mutations to their offspring.

Xie received numerous international awards, most notably Albany Prize in Medicine and Biomedical Research, Peter Debye Award in Physical Chemistry of American Chemical Society, Founders Award of Biophysical Society and Tengchong Science Award.

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