**SFBC系列报告**

**报告题目：Bisulfite-free direct detection of 5-methylcytosine and**

**5-hydroxymethylcytosine at base resolution**

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**报告时间： 2019年6月4日 上午10:30**

**报告地点：化学院A717室**

**附：报告摘要**

**Bisulfite-free direct detection of 5-methylcytosine and**

**5-hydroxymethylcytosine at base resolution**

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Bisulfite sequencing has been the gold standard for mapping DNA modifications including 5-methylcytosine (5mC) and 5-hydroxymethylcytosine (5hmC) for decades. However, this harsh chemical treatment degrades the majority of the DNA and generates sequencing libraries with low complexity. Recently, we developed a bisulfite-free and base-level-resolution sequencing method, TET-assisted pyridine borane sequencing (TAPS), for detection of 5mC and 5hmC. TAPS combines ten-eleven translocation (TET) oxidation of 5mC and 5hmC to 5-carboxylcytosine (5caC) with pyridine borane reduction of 5caC to dihydrouracil (DHU). Subsequent PCR converts DHU to thymine, enabling a C-to-T transition of 5mC and 5hmC. TAPS detects modifications directly without affecting unmodified cytosines. This method is nondestructive, preserving DNA fragments over 10 kilobases long. Compared with bisulfite sequencing, TAPS results in higher mapping rates, more even coverage and lower sequencing costs, thus enabling higher quality, more comprehensive and cheaper methylome analyses.



Dr. Chunxiao Song is currently an Assistant Member at Ludwig Institute for Cancer Research, University of Oxford. He worked as a postdoctoral scholar at the Department of Bioengineering, Stanford University from 2013 to 2016. He obtained Ph.D. degree in Chemistry at the University of Chicago in 2013 and B.S. degree in Chemistry at Peking University in 2008, with the work recognized by several awards, including the Extraordinary Potential Prize of Chinese Government Award for Outstanding Self-financed Students Abroad and the Elizabeth R. Norton Prize for Excellence in Research in Chemistry.