

# Lab-on-a-molecule: a “master key” unlock various “locks”

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## Abstract:

The concept of lab-on-a-molecule was pioneered by de Silva *et al* for multi-analytes detection. In this report, we described a lab-on-a-molecule sensor for identification of various bacteria based on a new strategy, namely transformable fluorescent sensor (TFS).<sup>1-3</sup> TFS was conceptually formed by transformable elements via a cohesive combination with control elements. When TFS interacted with bacteria, it was able to bind bacteria surface by transformable elements in different binding modes (i.e., Mode A and Mode B) or different combinations of these two modes. Due to the diverse electronic properties of bacteria surface, the sensor transformed between these binding modes and thus gave rise to different emission profiles. These profiles could serve as useful fingerprints for bacteria identification. The transformable ability allows the sensor to act as a “master key” to unlock various “locks” (bacteria) even containing very slight difference. TFS can rapidly identify 10 species of bacteria and 14 clinical isolated multidrug-resistant bacteria, and determine their staining properties (Gram-positive or Gram-negative) with a direct signal transduction procedure for visual interpretation.

## References:

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## Biography

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Zhaochao Xu received his PhD in 2006 from Dalian University of Technology under the supervision of Prof. Xuhong Qian. Subsequently, he joined the group of Juyoung Yoon at Ewha Womans University as a postdoctoral researcher. Since October 2008, he was a Herchel Smith Research Fellow at University of Cambridge in David Spring's group. In 2011, he moved to Dalian Institute of Chemical Physics, CAS, where he is currently a Professor. His research is focusing on the development of fluorophores for super-resolution imaging and environment-sensitive probes. He is studying the fundamental structure-property relationships of organic fluorescent dyes and sensors, which can be used in a diverse range of applications, such as protein recognition and imaging. He has published 70 papers with 8100 citations and a 37 H-index.