



# QBIC SEMINAR

Speaker

**Terence R. Strick, Ph.D.**

*Institut Jacques Monod/CNRS*

Date &  
Location

**Monday, May 19, 2014**  
**15:00 - 16:00**

OLABB 1F Lounge  
(6-2-3, Furuedai, Suita, Osaka)

\*There will be a video broadcast in CDB Bldg.D, E-206

Title

**Real-time, bottom-up reconstruction of DNA  
repair pathways at single-molecule resolution**

Abstract

The processes leading to DNA repair are by necessity multi-step, requiring separate specialized proteins to identify the lesion, excise the damaged DNA, re-synthesize the excised DNA, and terminate the process. As these processes operate under strong temporal constraints their kinetics are of particular import, yet their multi-component nature makes such dynamics particularly challenging to study using classical ensemble approaches. Here we will discuss recent progress in the use of combined single-molecule nanomanipulation and visualization approaches to reconstruct such complex, multi-component repair processes. By combining magnetic trapping and single-molecule TIRF imaging we are thus able to extract information on the catalytic state of a DNA repair complex as reported by the conformation of the DNA, and correlate it with the compositional state of the complex as assessed by simultaneous single-molecule fluorescence imaging. We will focus in particular on two canonical forms of DNA repair which are tightly coupled to other types of DNA processing, namely transcriptionally-coupled repair and post-replicative mismatch repair, and show that it is possible to tease apart the different kinetic contributions of the succession of steps leading to DNA repair. The information obtained on the kinetics of these processes *in vitro* leads to new insights into their functioning *in vivo*.

Host

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