

**P002** Fluorescence stopped-flow studies of conformational changes in DNA repair enzymes during the catalytic cycle  
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We have investigated the conformational transitions in several DNA repair enzymes, including DNA glycosylases (*E. coli* Fpg and Nei, human OGG1) and AP endonucleases (human APE1), and in their DNA substrates by stopped-flow detection of tryptophan (Trp) and 2-aminopurine (2-aPu) fluorescence as well as using FRET (Cy3/Cy5) labels in DNA. DNA substrates contained damaged bases or abasic sites of different natures. Multiple transient changes in fluorescence intensities of enzymes and DNA substrates were observed, indicating sequential conformational changes in both macromolecules during the catalytic cycle. Detailed kinetic schemes were derived that describe the mechanisms for substrate recognition and cleavage. A comparison of the fluorescence traces for wild-type Fpg and its mutant forms F110W and F110A suggests that the search for damaged bases in DNA proceeds through intercalation of Phe-110 residue into the DNA helix. This step could initiate the eversion of the damaged deoxynucleoside into the catalytic center of enzyme. Supported by grants from the Wellcome Trust, RFBR, INTAS, and Russian Ministry of Science and Education.