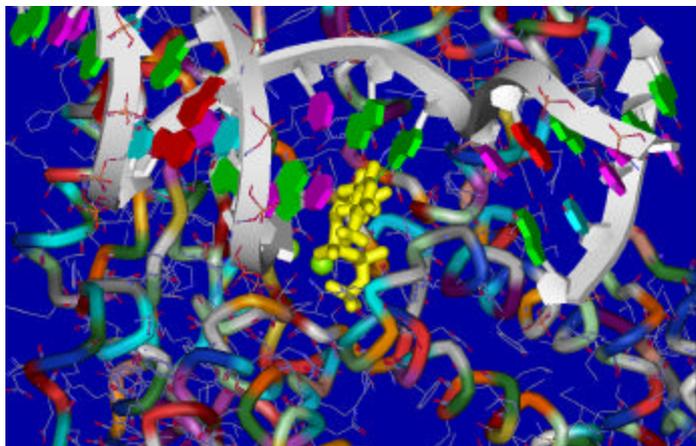


Base Excision Repair



The function of the DNA repair enzyme polymerase β is to insert a nucleotides to repair gaps in double-stranded DNA. Computer simulations are carried out in order to better understand the fidelity mechanism by which the enzyme selects the correct nucleotide to insert. The proposed induced fit mechanism is tested by performing molecular dynamics (MD) simulations of the enzyme-DNA complex in which the correct nucleotide cytosine has been replaced by the incorrect base thymine, in the form of its deoxynucleoside triphosphate (shown in yellow).

Comparison of simulations of the polymerase β – gapped DNA complex with correct and incorrect nucleotide substrate in the active site have identified several conformational differences that are relevant to the fidelity mechanism. In addition, the active site of the enzyme has been characterized more completely than was previously accomplished by X-ray diffraction experiments.