5-2017

Kinetic Studies of DNA Repair Enzyme ALKBH2

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MICHAEL VITTORI (PharmD) Kinetic Studies of DNA Repair Enzyme ALKBH2
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The human ALKBH2 protein, an α-Ketoglutarate/Fe(II)-dependent dioxygenase, repairs alkylation damage in DNA through oxidative demethylation, with relative specificity for 1-methyladenine (m1A) and 3-methylcytosine (m3C) lesions. While several studies have already independently examined the factors associated with ALKBH2 enzyme functioning, a comprehensive analysis of these determinants has yet to be conducted. In this project we examined the factors that regulate ALKBH2 function. We evaluated the effects that varying concentrations of α-ketoglutarate, iron (II), and ascorbic acid have on the ability of ALKBH2 to correct m1A and m3C lesions in DNA. Additionally, we have determined the impact of pH and temperature on the catalytic repair of m1A and m3C lesions by ALKBH2. These findings will be the basis for future experimentation to further elucidate ALKBH2 functioning and its role in preventing the development of cancer.