5-hydroxy deoxycytosine (5-OH-dC) is classified as an oxidized nucleotide, and is primarily used in studies of oxidative DNA damage and associated repair mechanisms. In the cell, 5-OH-dC DNA lesions are formed by reaction of cytosine with reactive oxygen species (ROS) generated either via normal oxidative metabolic processes or by UV ionizing radiation. 5-OH-dC lesions can potentially mispair with both A and C (leading to C-to-T transitions or C-to-G transversions) (1). 5-OH-dC lesions can deaminate to form a second lesion, 5-hydroxy-deoxyuridine (5-OH-dU). As a single-base lesion, 5-OH-dC is removed by the base excision repair (BER) mechanism and the native cytosine base restored (2). However, the observation of 5-OH-dC in cellular DNA from liver, kidney and brain tissue at levels that remain relatively constant and high over time, suggests that the BER system is not completely effective at removing this lesion, and its presence in DNA may be a significant factor in both tumorigenesis and the aging process (3).

References