M001 The DNA-damage response: new molecular insights and new approaches to cancer therapy

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Our work aims to decipher the mechanisms by which eukaryotic cells detect DNA damage and signal its presence to the DNA-repair and cell-cycle machineries. Specifically, we study responses to radiation-induced DNA double-strand breaks (DSBs), probably the most cytotoxic cellular lesions known to man. In this seminar, I will first provide an overview of the DNA-damage response, and will explain its biological and medical importance. Next, I will describe our recent work that has identified new proteins that mediate responses to DSBs and control DSB processing in a cell-cycle dependent manner. Finally, I will explain how this type of knowledge is providing opportunities for developing novel classes of drugs, and how some such drugs display striking, selective toxicity towards cancer cells: both in the test tube and in the clinic.