Mitochondria in human pluripotent stem cell apoptosis.

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Public Summary:
Human pluripotent stem cells (hPSCs) have great potential in regenerative medicine because they can differentiate into any cell type in the body. Genome integrity is vital for human development and for high fidelity passage of genetic information across generations through the germ line. To ensure genome stability, hPSCs maintain a lower rate of mutation than somatic cells and undergo rapid apoptosis in response to DNA damage and additional cell stresses. Furthermore, cellular metabolism and the cell cycle are also differentially regulated between cells in pluripotent and differentiated states and can aid in protecting hPSCs against DNA damage and damaged cell propagation. Despite these safeguards, clinical use of hPSC derivatives could be compromised by tumorigenic potential and possible malignant transformation from failed to differentiate cells. Since hPSCs and mature cells differentially respond to cell stress, it may be possible to specifically target undifferentiated cells for rapid apoptosis in mixed cell populations to enable safer use of hPSC-differentiated cells in patients.

Scientific Abstract:
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