The TUNEL assay (terminal deoxynucleotidyl transferase dUTP nick end labeling) is a biochemical technique used to detect apoptotic cells in tissues or cell cultures. This assay is based on the detection of DNA strand breaks that occur during apoptosis.

In the TUNEL assay, cells or tissue sections are fixed and permeabilized to allow for access of the TUNEL reaction mixture. The TUNEL reaction mixture contains a terminal deoxynucleotidyl transferase enzyme, which adds labeled deoxynucleotides (often fluorescein or biotin labeled) to the free 3'-OH ends of DNA strand breaks in apoptotic cells. The labeled DNA fragments can then be detected using microscopy or flow cytometry.

The TUNEL assay is commonly used to detect apoptotic cells in a wide variety of tissues, including tumors, embryos, and developing organs. The assay is also used in drug discovery and development to evaluate the apoptotic effects of potential therapeutics. The TUNEL assay is a powerful tool for understanding the role of apoptosis in normal development and disease states.

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