

2.2.2 Summary of methods for studying cell proliferation and viability in individual cells

DNA Synthesis

Method/ Roche Applied Science product	Assay principle	Advantages	Limitations	For product information, see
Autoradiography	<ul style="list-style-type: none"> The samples are incubated with [³H]-TdR for a certain period of time. If [³H]-TdR is present for 1 h or less, only those cells which are in the S-phase (DNA synthesis) of the cell cycle will be labeled. The samples are fixed and immersed in emulsion. The radiolabel is visualized as black grains on the film. 	<ul style="list-style-type: none"> Quantitative detection of S phase cells: Determination of growing fraction in population 	<ul style="list-style-type: none"> Long exposure time (days) required Radioactive isotope, handling and storage problems 	
Immunocytochemistry (fluorescence microscopy) <i>In Situ Cell Proliferation Kit, FLUOS</i> BrdU Labeling and Detection Kit I	<ul style="list-style-type: none"> The samples are incubated with BrdU for a certain period of time. If BrdU is present for 1 h or less, only those cells which are in the S-phase (DNA synthesis) of the cell cycle will be labeled. The samples are fixed and the DNA is denatured. Incorporated BrdU is bound by a fluorescein-conjugated monoclonal antibody against BrdU. Bound Anti-BrdU-Fluorescein is detected by fluorescence microscopy or flow cytometry. 	<ul style="list-style-type: none"> Quantitative detection of S-phase cells: Determination of growing fraction in population Results within a few hours Can counterstain the tissue simultaneously to reveal tissue morphology 	<ul style="list-style-type: none"> Stained samples cannot be stored for long periods of time Histological tissue organization cannot be observed simultaneously 	pages 101-104 of this guide
Immunocyto/histochemistry (light microscopy) BrdU Labeling and Detection Kit II	<ul style="list-style-type: none"> The samples are incubated with BrdU for a certain period of time. If BrdU is present for 1 h or less, only those cells which are in the S-phase (DNA synthesis) of the cell cycle will be labeled. The samples are fixed and the DNA is denatured. Incorporated BrdU is bound by an alkaline phosphate (AP)-conjugated monoclonal antibody against BrdU. Bound anti-BrdU AP is detected by a substrate reaction and visualized by light microscopy. 	<ul style="list-style-type: none"> Quantitative detection of S-phase cells: Determination of growing fraction in population Results within a few hours Can counterstain the tissue simultaneously to reveal tissue morphology 		page 101 of this guide

▲ Table 18: Summary of methods to study DNA synthesis in individual cells.

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