

Laboratory for Advanced Electron and Light Optical Methods

College of Veterinary Medicine
4700 Hillsborough Street
North Carolina State University
Raleigh, NC 27606
Tel: 919-513-6202
Fax: 919-513-6464
Email: Michael_Dykstra@ncsu.edu
www.cvm.ncsu.edu.research/laelom

Different Embedding Media and Their Potential Applications/Fixative Applications

Different Embedding Media and Their Potential Applications

Embedding Medium	Immunolabeling	Light Microscopy	Electron Microscopy
JB-4 (Glycol Methacrylate)	Yes	Yes (1-3 μm thick sections; most histological stains work)	No
LR White (Methyl Methacrylate)	Yes (do not osmicate tissues)	Yes (0.5 μm thick sections; osm ication not recommended)	Yes (can osmicate or not)
Spurr Resin (and Other Epoxides)	Rarely (samples osmicated)	Yes (0.5 μm thick sections; blue only)	Yes (excellent for structural analyses)
Paraffin	Yes	Yes (many histological stains work)	No
Ultrathin Frozen Sections	Yes	Rarely	Yes
Cryostat Sections	Yes	Yes (most histological stains work)	No

Uses of Various Fixatives for Different Applications

Fixative	Application	Post-Fixation with OsO₄	References
10% Buffered Neutral Formalin; 4% Formaldehyde in Phosphate Buffer (BNF)	Histology, Histochemistry, Glycolmethacrylate (JB-4™)	No	
Carson's Fixative: 4% Formaldehyde in Phosphate Buffer (Carson's)	Histology, Cytochemistry, Electron Microscopy, Glycolmethacrylate (JB-4™)	Yes, for Electron Microscopy and Some Cytochemistry (not for Histology or JB-4™)	F.L. Carson, J.H. Martin, and J.A. Lynn. 1973. AJCP 59:365-373.
2-4% Glutaraldehyde in Phosphate or Cacodylate Buffer	Electron Microscopy, Some Cytochemistry	Yes, for Electron Microscopy and Some Cytochemistry	
McDowell's and Trump's 4% Formaldehyde:1% Glutaraldehyde in Phosphate Buffer (4F:1G)	Histology, Electron Microscopy (Immersion or Perfusion), Some Cytochemistry, Glycolmethacrylate (JB-4™)	Yes, for Electron Microscopy and Some Cytochemistry (not for Histology or JB-4™)	E.M McDowell, and B.F. Trump. 1976. Arch.Pathol. Lab. Med. 100:405-414.
Karnovsky's (5% Glutaraldehyde, 4% Formaldehyde in Cacodylate Buffer with Added CaCl ₂)	Electron Microscopy (Perfusion); ½ Strength for Immersion, Some Cytochemistry	Yes	M.J. Karnovsky. 1965. J. Cell Biol. 27:137A
2-4% Formaldehyde in Phosphate Buffer, Prepared from Paraformaldehyde Powder	Cytochemistry, Immunocytochemistry, Glycolmethacrylate (JB-4™)	No	