Fixation

Additive	chemically linked
Non-Additive	not chemically linked
Coagulant	creates mesh
Non-coagulant	creates gel

Fixatives

Formaldehyde	Additive	Non-coagulant
Gluteraldehyde	Additive	Non-coagulant
Osmium tetroxide	Additive	Non-coagulant
Potassium dichromate	Additive	Non-coagulant
Mercuric chloride	Additive	Coagulant
Chromic acid	Additive	Coagulant
Picric acid	Additive	Coagulant
Zinc salts	Additive	Coagulant
Alcohol	Non-additive	Coagulant
Acetone	Non-additive	Coagulant
Acetic acid	Non-additive	Coagulant

Factors Affecting Fixation

Temperature increase	speeds up fixation and autolysis
Temperature decrease	slows down fixation and autolysis
Size (Electron microscopy)	1 mm thick
Size (Routine surgical)	4 mm thick, 20 mm width, 30 mm length
Volume of fixative	15-20x greater than tissue
Time	At least 24 hours
Penetration (Fast)	Alcohol, acetic acid, acetone
Penetration (Slow)	Osmium tetroxide, gluteraldehyde
pH (Formalin fixed)	6.8-7.2

Fixation Accelerators

What accelerates fixation?

> Heat, agitation, and vacuum

Cell Reaction with Fixative

Nucleus	No reaction
Protein	Stabilized
Lipid	Only fixed with osmium tetroxide and chromic acid, not aldehydes
Carbohydrates	Some loss during fixation

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