

## Apoptosis and Cell Death

### Intrinsic Pathway

- Mitochondrial pathway
- Cytochrome c release
- Apoptosome formation
- Triggered by DNA damage, stress

### Extrinsic Pathway

- Death receptor activation
- FAS, TNF receptors
- DISC complex formation
- Immune-mediated

### Caspase Cascade

- Initiator caspases (8, 9)
- Executioner caspases (3, 7)
- Proteolytic cleavage
- Irreversible commitment

### Regulation

- Bcl-2 family: pro and anti-apoptotic
- IAPs: caspase inhibitors
- p53: apoptosis inducer
- Cancer dysregulation