

Study Questions for 9.02.

I. Match the terms on the left with the definitions on the right.

1. Golgi Stains	A. Targeted against rough endoplasmic reticulum. Excellent for viewing neurons, since they have a lot of RER
2. Horseradish peroxidase	B. A technique that uses antibodies targeted against specific epitopes and that can be used to localize their expression and their distribution.
3. Radioactive amino acids	C. A high resolution anatomical technique that uses electrons (as opposed to photons) and that is used to study the ultrastructure of cells and their processes.
4. Immunohistochemistry	D. A silver impregnation method that gives a complete fill, including dendrites and axons, of a few, randomly targeted cells.
5. Nissl Stain	E. A tracer that gets taken up by cell bodies, incorporated into proteins, and then transported down the axon. It is used primarily to trace anterograde projections.
6. Electron microscopy	F. An anatomical tracer that is taken up by cells as well as axon terminals. It is transported both retrogradely and anterogradely.

II. The term “homologous cell groups” pertains to a structural relationship between two cell groups present in two different species; the term implies that the two cell groups shared a common origin at some point in evolution, but then their development diverged to best serve the evolutionary niche in which each organism found itself. This means that homologous cell groups may not look the same, and may not even be positioned similarly in the brain. As comparative neuroanatomists, your task is to study the organization, cellular morphology and connections of two structures, the optic tectum of the bird brain and the superior colliculus of the mammalian brain, and to determine whether these are homologous structures. Outline the anatomical techniques you would apply to this problem. Discuss what information you might obtain using each of these methods, and how your findings could help you resolve the issue of homology between the two structures.