

## **Molecular Neuroscience - Outline**

*Foundations of Neuroscience I., BNS program, Fall, 2016.*

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Main text is: *Watson et al., Molecular Biology of the Gene 7<sup>th</sup> ed. Cold Spring Harbor Laboratory Press 2014.*

The Molecular Neuroscience section will consist of 3 parts:

**Part I**, will review the basic concepts of molecular biology with the purpose of providing a basic understanding of the topics discussed later. For this purpose understanding the fundamentals of the properties of nucleic acids and proteins, the “dogma” of molecular neurobiology (DNA to RNA to proteins) and the general logic of gene regulation is sufficient. A separate handout is provided to help with selective reading of *Watson et al.*

**Part II**, will review the key techniques of molecular neuroscience with emphasis on issues that are most relevant for the scope of the BNS program. In particular, we will emphasize methods relevant for investigation of circuit, system and behavioral functions including, gene transfer, selective targeting of neuron types defined by gene expression, connectivity or activity, optogenetics, pharmacogenetics and fluorometric reporter methods. Methods that are primarily relevant at the sub-cellular and molecular level will be mostly omitted.

A reading list, including review articles will be provided.

**Part III**, will be an exploration of the role of genetically encoded information in neuronal function.

The goal of this section is to explore a preliminary framework for approaching this question.

Reading list will be provided.