

B M B 400
Part Four: Gene Regulation

Overview of Regulation

Regulation is the controlled expression of gene *functions*. This can be done in many ways, but these can be grouped into two classes. The level of enzyme **activity** can be regulated by noncovalent or covalent modification of a protein. The **amount of the protein** can also be regulated. This latter class of regulation can be exerted at any step in the pathway of gene expression or during protein turnover. For many (perhaps most) genes, the principal level of regulation of expression is at transcription, and Part Four of this course will focus primarily on this. However, post-transcriptional control is also important in many genes, and this will also be discussed.

Protein activity can be regulated by:

- allostery
- covalent modification
- sequestration.

Protein amount can be regulated by the rates of:

- gene transcription
- RNA processing
- RNA turnover
- mRNA translation
- protein modification
- protein assembly
- protein turnover.