

# Gene Expression Encyclopedia Article

## Gene Expression

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# Gene Expression

Genes, the biological unit of inheritance, are present in all living organisms. The majority of the time these genes are silent; they are not expressed. At certain times, however, genes are switched on to produce their particular product. This is called gene expression. Different genes have different triggers to activate them and then to subsequently switch them off. For some genes, such as developmental genes, expression occurs only once in a life time, even though the genes are present at all times within the body.

When DNA is folded to take up the least amount of room, the genes are inaccessible and it is impossible for the genes to be expressed. For gene expression, enzymes are used to unfold the DNA to allow transcription and translation.

Gene expression can be switched on by external stimulus, and once the product has been manufactured the genes are then deactivated. For example, in certain species of bacteria the enzyme  $\beta$  galactosidase is only produced when lactose is present in the growth medium. The enzyme is basically produced to order. Some genes, which are present in high copy number, are present as such because their expression is required in high quantities. This allows for a rapid expression and production of product. The current hypothesis of how the gene expression is controlled is called the Jacob-Monod Hypothesis.