

《Epigenetics》 Glossary

Definition of “Epigenetics” 【エピジェネティクスの定義】: In biology, and specifically genetics, “Epigenetics” is the study of heritable changes in gene expression or cellular phenotype caused by mechanisms other than changes in the underlying DNA sequence – hence the name epi- (Greek: ἐπί- over, above, outer) -genetics. (from Wikipedia, <http://en.wikipedia.org/wiki/Epigenetics>)

Histone 【ヒストン】: Histones are small (~20KDa), highly basic nuclear proteins conserved in broad range of eukaryotic cells. There are five major classes of histones exist: H1/H5, H2A, H2B, H3, and H4. Among them, histones H2A, H2B, H3 and H4 are known as the core histones, while histones H1 and H5 are known as the linker histones. Two of each of the core histones assemble to form one octameric nucleosome core particle, and 147 base pairs of DNA wrap around this core particle 1.65 times in a left-handed super-helical turn. High order structure of nucleosomes are also called “chromatin”, whose structural alteration influences transcription of genes which are incorporated into/adjacent to the chromatin, thus chromatin plays important roles in gene regulation.

Histone methylation 【ヒストンメチル化】: It is one of the modifications that occur in either lysine (K) or arginine (R) residues of histones, catalyzed by histone methyltransferases and removed by histone demethylase. Each K or R residue is recognized and catalyzed by different enzymes. Interestingly, the effect of methylation on gene expression is dependent to which K or R is methylated, and also how many methy groups are added. In general, histone H3K4, K36, K79 methylations function as transcriptional activators, whereas H3K9, K27, and H4K20 methylations cause transcriptional suppression.

Spermatogenesis 【精子形成】 & Spermatogonial stem cell 【精子幹細胞】: Spermatogenesis is the process by which male primary germ cells undergo cell division, and produce a number of cells termed spermatogonia (SG: 精原細胞), from which the primary spermatocytes (SC: 精母細胞) are derived. Each primary spermatocyte divides into two secondary spermatocytes, and each secondary spermatocyte into two round

spermatids (RS:円型精子細胞) . Nucleus of a round spermatid is elongated and condensed during maturation (ES: 伸長精子細胞), and they finally develop into mature spermatozoa (精子) , also known as sperm cells.