

Mechanism of Gene Silencing

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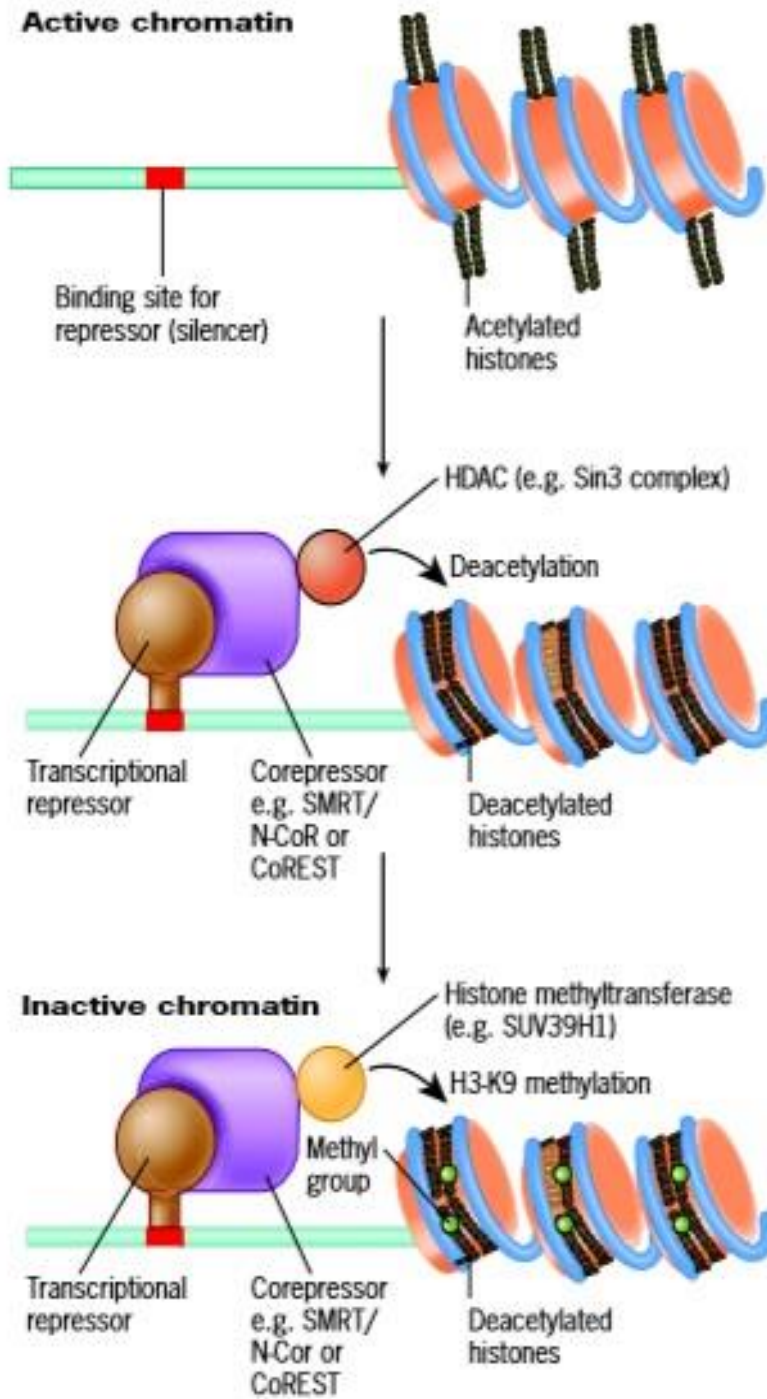
Gene activation is associated with the changes in the state in a particular region of chromatin.

- The state of acetylation of chromatin makes it active and is a dynamic property.



- Just as there are histone acetyltransferase enzymes to add acetyl groups, there are also enzymes to remove them.

- Removal of acetyl groups is accomplished by the enzymes histone deacetylases as shown in the diagram of the next slide.



- When a transcriptional repressor binds to its DNA binding site that is silencer, it recruits a corepressor complex and an associated histone deacetylases activity.

- Histone deacetylases are associated with transcriptional repression and are present as subunits of larger complexes described as corepressors (e.g., SMRT/N-CoR or CoREST)

Corepressors are similar to coactivators in action, except that they are recruited to specific genetic loci by repressors that cause the targeted gene to be silenced rather than activated.

- Another histone modification that is methylation of the lysine residue at number 9 position of histone H3 molecules, takes place which is also responsible for a key event in the formation of heterochromatin.

- A separate protein(SUV39H1) containing histone methyltransferase activity adds methyl groups to the lysine residue of H3 histone protein

- The loss of acetyl groups and addition of methyl groups lead to chromatin inactivation and gene silencing.



• THANK YOU