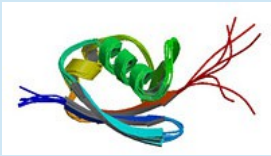


# Sumoylation and Repression of Gene Expression

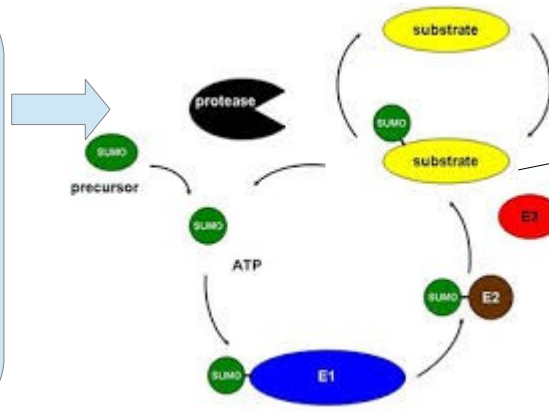


**Sumoylation** is a response to change in environmental conditions of the cell or position of the cell in the cell cycle.

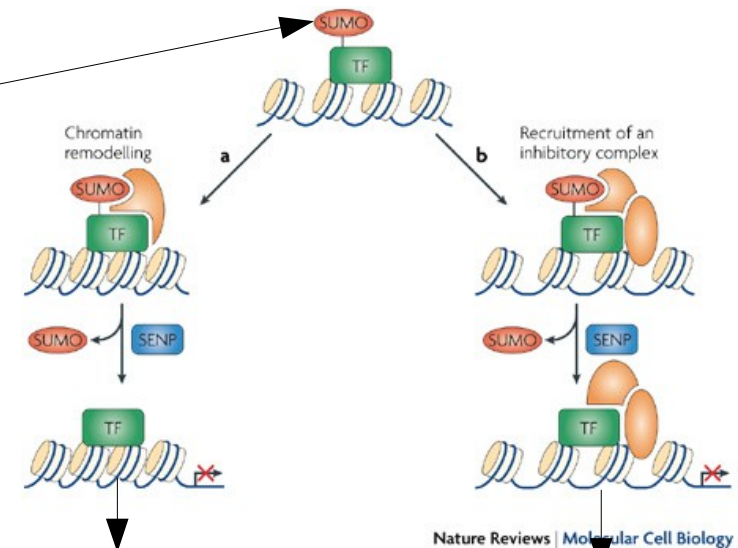
**SUMO** (Small Ubiquitin- like MOdifier) is a small protein which can reversibly bind to other proteins, modifying their structure and thus allowing them to perform a specific function in a cell.

**Binding of SUMO** to **transcription factors** or **histones** has been shown to cause repression of gene expression

- A SUMO-precursor is cleaved by a protease, into a SUMO protein
- E1, E2 and E3 enzymes assist SUMO link to the substrate
- Substrate can be transcription factor
- A protease can release SUMO from substrate reversing the binding process



## 2 types of transcription factor (TF) sumoylation



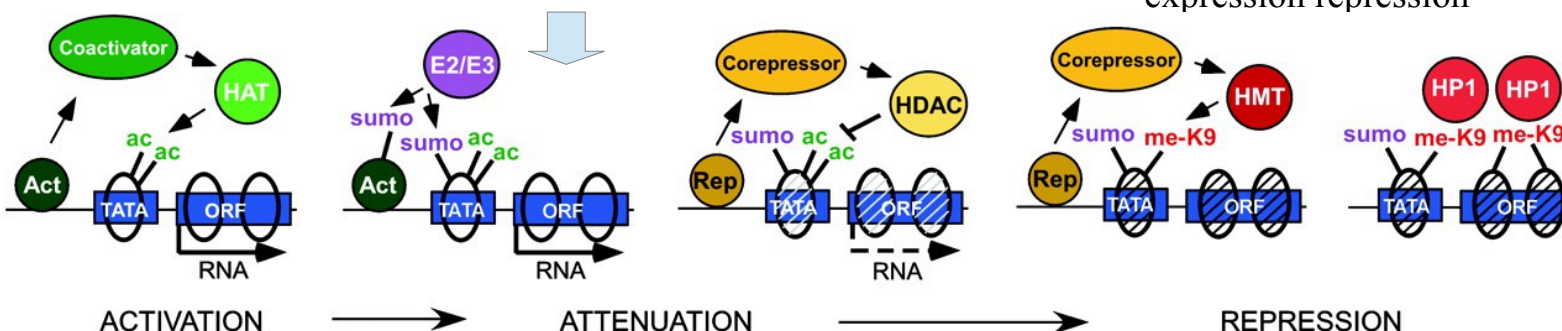
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SUMO causes TF to recruit proteins for chromatin modulation and gene expression repression

SUMO creates a platform where partners recruited by TF can bind to form inhibitory complex

## Histone sumoylation triggers cascade to gene repression:

- Increased acetylation causes recruitment of SUMO which binds both to activator and histones to attenuate gene expression
- Attenuation causes recruitment of HDAC, HMT and heterochromatin protein 1 which cause gene repression



## Conclusion:

More work required to elucidate mechanism to histone sumoylation