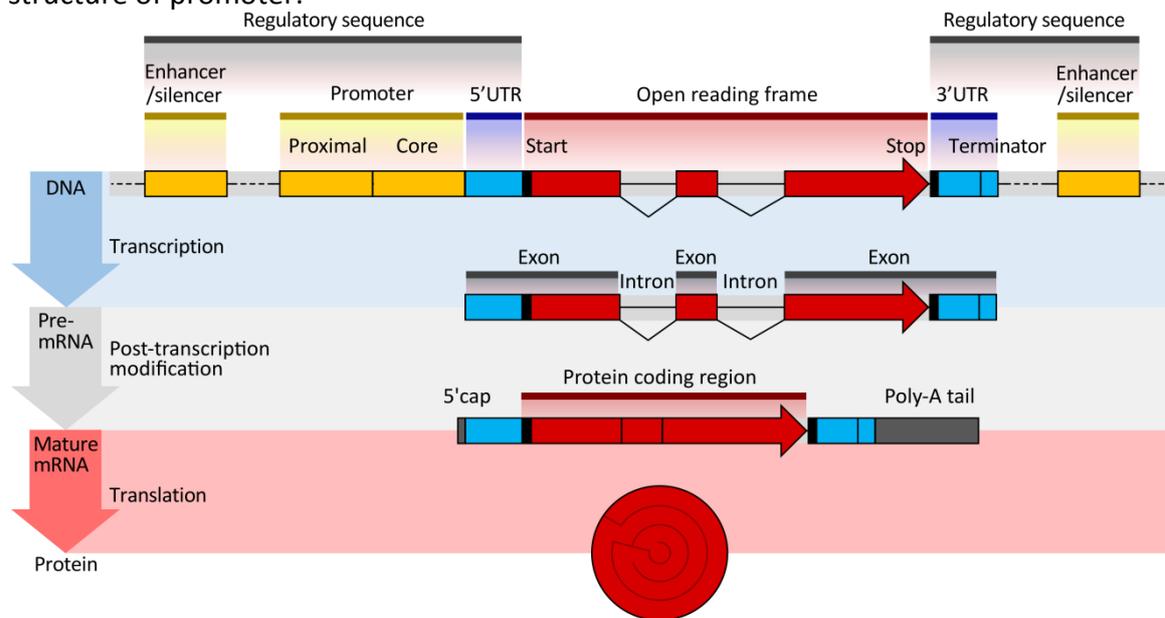


Answer on Question #64321, Biology / Molecular Biology

What is the difference between core promoter and regulatory promoter?
P.S. I didn't find any information online.

Answer

Let's use the picture from https://en.wikipedia.org/wiki/Regulatory_sequence to illustrate structure of promoter:

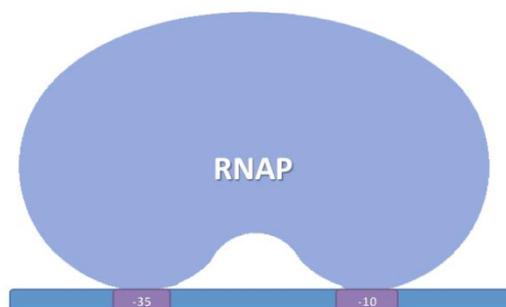


Promoter consists of two regions: core promoter and proximal promoter. Sometimes there are further parts of promoter called distal promoter. Beside the promoter, orientation-independent distal control elements can be present (enhancers & silencers). Some authors consider enhancers and silencers as distal promoter elements, others distinguish them as a different group called distal regulatory elements, because of their location and orientation-independent behavior.

Core promoter - the minimal portion of the promoter required to properly initiate transcription. It includes:

- A transcription start site (TSS) and a few bases around
- A binding site for RNA polymerase
- General transcription factor binding sites

For example, in prokaryotes sequences at -10 and -35 are essential for binding of sigma factor, part of RNA polymerase (picture below)



Eukaryotic promoters, usually, contain a sequence called TATA box, with which transcription factor TBP interacts. General transcription factors recruits the polymerase to the TSS.

So, without core promoter it is almost impossible for RNA polymerase to bind DNA in an appropriate place and start transcription. Destruction of core promoter region prevents expression of the particular gene (unless other mechanisms of polymerase-recruiting are used).

Further part of promoter (proximal promoter) is known as regulatory sequence of promoter, contains elements for binding different transcription factors. They assist formation of RNA polymerase complex and can considerably change the expression rate.

Definition:

Proximal promoter - the proximal sequence upstream of the gene that tends to contain primary regulatory elements, these elements are binding sites of transcription factors.

In addition to promoter, there are some distant regulatory elements - enhancers and silencers (plus some other regulatory regions like insulators). These elements can be located quite far from the gene (far away upstream, downstream, inside intron and so on) and can work in both orientations (i.e. even after inversion).

References:

<https://www.ncbi.nlm.nih.gov/books/NBK21780/>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2764519/>

<http://www.columbia.edu/cu/biology/courses/c2006/lectures11/lect9.11.html>

[https://en.wikipedia.org/wiki/Promoter_\(genetics\)](https://en.wikipedia.org/wiki/Promoter_(genetics))

[https://en.wikipedia.org/wiki/Enhancer_\(genetics\)](https://en.wikipedia.org/wiki/Enhancer_(genetics))

[https://en.wikipedia.org/wiki/Silencer_\(genetics\)](https://en.wikipedia.org/wiki/Silencer_(genetics))

https://en.wikipedia.org/wiki/General_transcription_factor

Answer provided by <https://www.AssignmentExpert.com>