The Role and Function of Clr2

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The DNA in eukaryotes is packed and highly organized, and needs to be expressed or not expressed at different time points. Misregulation of genes can have severe consequences for the individual, for example cancer and neurological diseases. More research in this field is important to obtain more knowledge on how this regulation occurs and to discover new drug targets. Chromatin is the combination of DNA and protein and can be divided into two types, euchromatin and heterochromatin. Euchromatin have a more open structure which allows genes to be expressed whereas heterochromatin is more densely packed. Heterochromatin is therefore less accessible which results in very low expression of genes within heterochromatic regions. The formation of different types of chromatin and different time points involve many factors. If this regulation is disturbed and heterochromatin is formed, this can result in inappropriate silencing of genes, for example silencing of tumour suppressor genes. To study regulation of heterochromatin the yeast *Schizosaccharomyces pombe* has become a popular model. This yeast is a good model because chromatin structures are similar to chromatin structure found in humans and in addition, it has many of the modifications of chromatin that humans have.

The aim for this project is to study a protein that is important in regulation of heterochromatin, namely Clr2. This protein is part of a complex called SHREC, which together with other proteins affect the structure of chromatin. The protein Clr2 has so far unknown functions. We want to reveal the functions of this particularly protein to better understand how the SHREC complex works and regulate heterochromatin. Very little is known about this protein, but in previous work, DNA sequences from other fungi have been compared and genes with similarities with the Clr2 gene were found. In this region three parts were conserved in all sequences. Particularly some amino acids were highly conserved. This information has been used in this project and by molecular methods some of these have been changed to the amino acid glycine, which is neutral and the smallest amino acids. These changes were examined in a strain that have a gene inserted in a heterochromatin area in *S. pombe* and the silencing of this gene was measured. Disruption of silencing could be observed when two conserved amino acids were changed to glycine. This means that these two amino acids are important for the protein function. With this information further work will be carried out that hopefully reveal more about the function of Clr2 and how it interacts with other proteins.

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