Defining Copper systems in Model Eukaryotes

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INTRODUCTION

Diseases relating to the incorrect regulation of copper distribution include Menkes and Wilson's disease in humans and the neurological disorder swayback disease in sheep. Copper is also important for the human immune system. In order for the activities of Copper in the cell to be effective, it functions by binding to proteins and changing conformations to suit the function. This project is directed towards understanding the signalling systems responsible for copper uptake and distribution in eukaryotic cells. We will work with *Saccharomyces cerevisiae* as a model organism to establish a profile of copper distribution in a eukaryotic cell. We used 3 variants of *S. cerevisiae*:

- BY4741WT-pRS316
- BY4741CCS-pRS316

AIM

The aim of the project was to identify proteins in the eukaryotes which bind to copper in the cell.

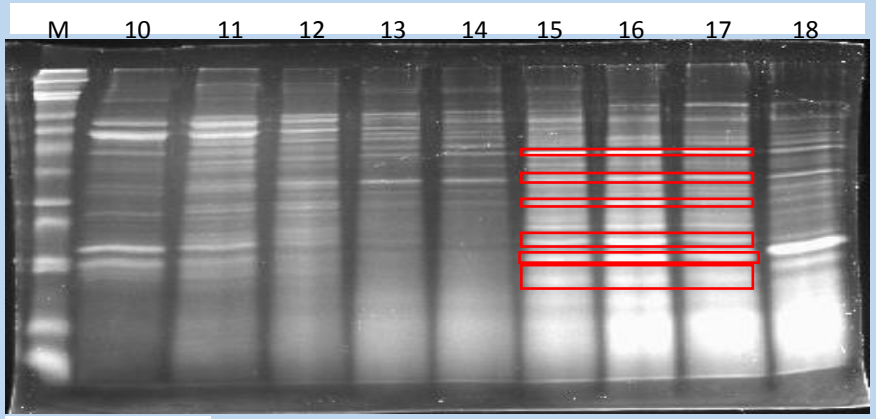
REFERENCE

K. J. Waldron, J. C. Rutherford, D. Ford, N. J. Robinson. Metalloproteins and Metal Sensing. *Nature* 2009, Vol. 406 p. 823-829.

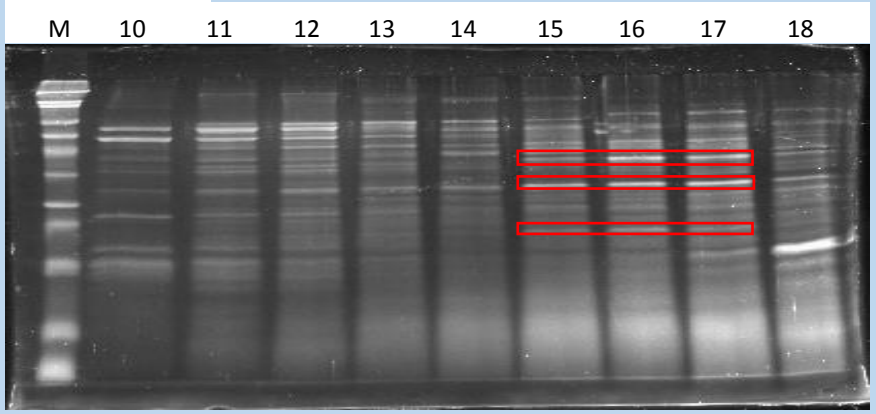
METHODS

- The cells were then cultured in a selected concentration of CuSO4
- The cells were purified and the proteins extracted
- The protein of interest was identified using SDS and NATIVE PAGE techniques

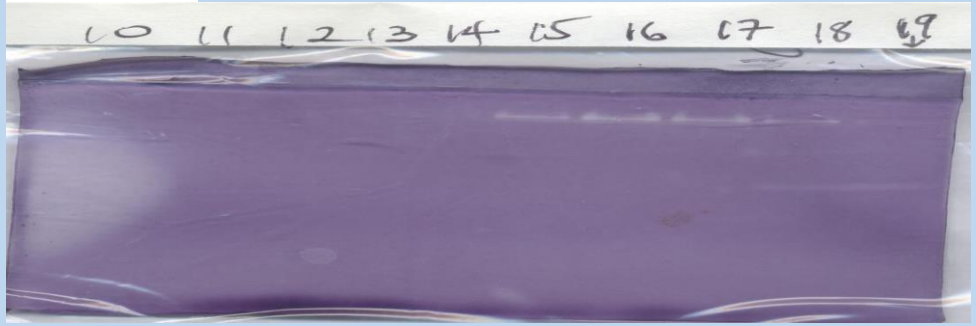
RESULTS



CCS mutant



CCS mutant



DISCUSSION AND CONCLUSION

- Picture 1 and 2 represent the SDS-PAGE analysis carried out on the WT and CCS mutant respectively and the highlighted areas are the suspected copper proteins lanes.
- Picture 3 and 4 represent the NATIVE-PAGE analysis of these suspected proteins in the SDS gel. The transparent patches show the activity of Superoxide Dismutase 1 (SOD1).
- In conclusion, the SOD1 is seen as the final destination f copper in eukaryotes among other proteins.
- Further work involves investigating the proteins which aids the activity of SOD1 in the CCS mutant.