

P014 TFB3: the missing link between UV irradiation and transcriptional response?

**Sonia Paytubi, Dorothee Götz, Stacey Munro,
Malcolm F. White**

CBMS, North Haugh, University of St Andrews.

Multiple divergent genes encoding the eukaryal-like TFIIB transcription initiation factor have been identified in the archaeon *S. solfataricus*. Two of them (*tfb1* and *tfb2*) encode full-length TFB proteins. The third homologue, TFB3, shares high similarity with the N-terminal region of TFB, which is required for the recruitment of RNA-polymerase to the initiation complex.

The analysis of the transcriptional response to UV irradiation in *Sulfolobus solfataricus* revealed that no increase in expression of DNA repair genes following UV irradiation takes place. There is however a clear transcriptional response. Following UV irradiation, we observed no significant changes in the transcript levels of TBP, nor any of the RNA polymerase subunits. Interestingly however, there was a big change in transcription levels for the homologues of the basal transcription factor TFB. Expression of *tfb3* was induced in response to UV irradiation at the transcriptional level, and this was also reflected in the increased concentrations of the TFB3 protein. We demonstrate that both TFB1 and TFB3 can interact directly with RNAP, and compete with one another for binding to the polymerase. Moreover, we show that TFB3 can stimulate transcription *in vitro* in the presence of TFB1. These observations raise the possibility that TFB3 enhances transcription in response to DNA damage in *Sulfolobus* species.