P032 Transcriptomic analyses of radioresistance and metal tolerance in *Thermococcus gammatolerans*

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Thermococcus gammatolerans is one of the most radioresistant archaeon described thus far and is able to grow in heavy metals rich environments. We investigated the ability of this organism to face gamma irradiation and cadmium exposure by combined transcriptomic and molecular biology approaches. We evaluated the radioresistance of this organism according to energy requirements and growth phase. Chromosomal DNA repair kinetics have been performed under diverse experimental conditions indicating the time necessary for the cells to repair shattered chromosomes. Our results suggest that rapid DNA repair is not a prerequisite for extreme radioresistance. To decode specific strategies that *T. gammatolerans* develop to resist in an exceptional way to radiation, transcriptomic kinetics were performed after a γ-rays exposure of 2500 Gy. We also determined minimal inhibitory concentrations of several metals and try to decipher transcriptional mechanisms underlying cadmium tolerance using microarray. Exposure to cadmium during a time course pointed out 363 differently expressed genes such as genes involved in metal homeostasis or drug detoxification and a cluster of genes containing membrane bound hydrogenases. All together, transcriptomic data analyses highlight specific transcriptional responses for each type of stress but also convergent transcriptional responses related to a general stress.