

# Transcriptional Control of Proteostasis in Cell Stress and Disease

## Principal investigator(s) and affiliation(s), contact information

Lea Sistonen, PhD, Professor of Cell and Molecular Biology  
Faculty of Science and Engineering, Cell Biology, Åbo Akademi University  
Turku, Finland  
E-mail: lea.sistonen@abo.fi lea.sistonen@btk.fi

## Members of the research group

### Doctoral candidates:

Marek Budzynski, MSc  
Alejandro Da Silva, MSc  
Samu Himanen, MSc  
Jenny Joutsen, MSc  
Mikael Puustinen, MSc

### Post-docs:

Alexandra Elsing, PhD  
Cynthia Swan, PhD  
Anniina Vihervaara, PhD

### Senior researchers:

Eva Henriksson, PhD  
Pia Roos-Mattjus, PhD



## Description of the scientific aims

The protein quality control and stress protection machineries are regulated by complex signaling and transcriptional programs, involving dynamic changes in the chromatin environment. Maintenance of protein homeostasis (proteostasis) on the transcriptional level is under strict control of heat shock factors (HSFs), whose genome-wide functions in the context of chromatin are the focus of our research. We will determine the mechanisms by which HSFs integrate and coordinate cellular responses, cell fate and transcriptional memory. This knowledge is a prerequisite for the basic research in stress biology and rational development of therapeutic interventions for age-onset pathologies, including oncogenic, metabolic, and neurodegenerative diseases.

## Selected publications 2010-

1. Jaeger AM, Pemble IV CW, Sistonen L, Thiele DJ. Structures of HSF2 reveal mechanisms for differential regulation of human heat shock factors. *Nat Struct Mol Biol.* 2015, in press.
2. Björk JK\*, Åkerfelt M\*, Joutsen J, Puustinen MC, Cheng F, Sistonen L\*\*, Nees M.\*\* Heat shock factor 2 is a suppressor of prostate cancer invasion. *Oncogene*, doi: 10.1038/onc.2015.241, 2015. \*equal contribution, \*\*corresponding authors
3. Budzynski MA, Puustinen MC, Joutsen J, Sistonen L. Uncoupling stress-inducible phosphorylation of heat shock factor 1 from its activation, *Mol Cell Biol*, 35(14):2530-40, 2015.
4. Elsing AN, Aspelin C, Björk JK, Bergman HA, Himanen SV, Kallio MJ, Roos-Mattjus P, Sistonen L. Expression of HSF2 decreases in mitosis to enable stress-inducible transcription and cell survival. *J Cell Biol.* 206(6):735-49, 2014.
5. Vihervaara A, Sergelius C, Vasara J, Blom MAH, Elsing AN, Roos-Mattjus P, Sistonen L. Transcriptional response to stress in the dynamic chromatin environment of cycling and mitotic cells. *Proc Natl Acad Sci USA*, 110(36):E3388-E97, 2013.