and BAX inhibitor-1 homolog gene (*BI1*) were also tested. According to our results in addition to the cysteine proteases their inhibitors also have fundamental role in the regulation of protein degradation. It is very important to see the connection between the processes of salt induced PCD and different stress hormones from which one of the most important is abscisic acid (ABA) which might have a role in this regulatory pathway. ABA is commonly recognized as naturally occurring plant hormone. ABA plays a key role in many developmental processes, from the promotion of seed desiccation tolerance to the synthesis of storage proteins and organ senescence. In addition, ABA acts as an endogenous messenger in the regulation of plant-water status and regulates some aspects of the plant's physiological responses to environmental stresses, such as osmotic stress-induced stomatal closure and salt, drought and cold tolerance. Our first results show that ABA might induce protease activity during PCD.

To gain a better understanding of the salinity stress responses at physiological and molecular level in cultivated tomato we carried out a comparative physiological analysis. Tomato has a medium tolerance to salinity and it can acclimate to high salinity at morphological and physiological level. In addition to the wild-type, an ABA deficient-tomato mutant, *flacca* was studied, too. Plants were treated with sublethal and lethal concentrations of NaCl. The growth of this plant is not inhibited by medium NaCl stress but it is affected by strong one. The salt stress-induced changes in ROS content and in the gene expression level were shown at the beginning of the treatment. Protein content and protease activity were also studied as a function of time. There was a nice correlation between decreased protein content and increased protease activity in the first 24 hours. Finally, we suggest that cysteine proteases might participate in salt-induced PCD in tomato as a function of time depending on intensity of the stress.

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Nuclear function for the actin binding cytoskeletal protein, moesin

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The most dynamic component of the cytoskeleton in every eukaryotic cell is the microfilament network of linear polymers of actin subunits. Extensive research in the past decade has significantly broadened our view about the role actin plays in the life of the cell and added novel aspects to actin research. The discovery of the existence of nuclear actin became evident only recently. Nuclear activities, including transcriptional activation in the case of all three RNA polymerases, export of certain mRNAs and proteins, chromatin remodeling, and nuclear assembly after mitosis, all depend on actin.

Moesin, the well-known cytoplasmic actin binding protein is the only member of the evolutionary conserved mammalian ezrin-radixin-moesin (ERM) protein family in *Drosophila melanogaster*. ERM proteins are responsible for the organization of the cortical actin network and anchor membrane proteins to it. They all have an N-terminal FERM domain, which is a general protein binding domain, a mid-domain which is a flexible hinge region and a C-terminal actin-binding domain. Our laboratory demonstrated previously that moesin is present in the interphase nucleus but the biological significance of this localisation remained unknown.

We are studying currently the exact localisation and function of moesin in the interphase nucleus. Our experiments showed that moesin accumulates as a ring at the nuclear envelope; it is present in the nucleoplasm, in some chromosome regions and occasionally in the nucleolus. We found that the quantity of moesin in the nucleus increases upon heat stress, which suggests a function for moesin in the nucleus and that its transportation into the nucleus is an active process.

To further analyse the chromosomal localisation of moesin, we performed immunostaining experiments on larval polytene chromosomes. Moesin was detected in the euchromatic bands moreover, it also showed colocalisation with the active form of RNA Polymerase II, and the intensity of the accumulation of the two proteins on the chromosomes was identical. Moesin staining was found especially strong in the chromosome puffs which are special euchromatic regions of extremely active transcription sites in the polytene chromosomes. The transcription on a transgene regulated by an inducible promoter resulted in the formation of an extra moesin band in the corresponding chromosome region suggesting that moesin is required for transcription rather than the formation of the puff structure. This idea was confirmed by the finding that the disassembly of the RNA polymerase complex caused by the drug triptolide, resulted in the detachment of moesin from the chromosomes.

We have also performed a preliminary screen to identify the proteins that are responsible for the nuclear transport of moesin. Our results both with cultured cells and in the live animal revealed that the Nup98 protein is involved in the nuclear export of moesin.

In summary, our results demonstrate that besides its cytoplasmic functions, moesin also plays important roles in the nucleus. We have shown that moesin is actively transported to the nucleus where it participates in the process of RNA transcription.

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