Translational regulation of plant developmental and environmental responses

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ABSTRACT

Translational regulation has long been recognized as a vital process in the cell responses to the environment and in the execution of developmental programs, yet still little is known about the selective translation of specific mRNAs and its regulation (1).

Our research tries to understand the role of translational regulation in developmental and environmental responses, and to that, we are using different perspectives: 1) we are studying ribosome heterogeneity in Arabidopsis and trying to determine whether it is involved in the selective translation of specific mRNAs under different cell conditions, and we have been able to show that there is phenotypic variance within paralog mutants in each family, in both control and abiotic stress conditions; 2) we are trying to identify the translational machinery and RNA-binding proteins involved in the translational regulation of hormonal, nutritional and defence signalling pathways using well-known translationally regulated genes (2–4) ; and 3) we are trying to determine de translational landscape of the plant-virus interaction, for which we are using both virus-resistant and susceptible plants (5). To carry out these tasks, we are employing phenotypical analyses, polysome fractionation, RNA-seq, RNA immunoprecipitation, TRAP-seq and Ribo-seq.

Our progress regarding these objectives will be presented.

References

1. **Merchante C, Stepanova AN, Alonso JM**. (2017) *Plant J*. **90**(4).
2. **Hanfrey C, Elliott KA, Franceschetti M, Mayer MJ, Illingworth C, Michael AJ**. (2005) *J Biol Chem*. **280**(47):39229–37.
3. **Merchante C, Brumos J, Yun J, Hu Q, Spencer KR, Enríquez P, et al**. (2015) *Cell*. **163**(3).
4. **Yamashita Y, Takamatsu S, Glasbrenner M, Becker T, Naito S, Beckmann R.** (2017) *FEBS Lett*. **591**(9):1266–77.
5. **Yan Z, Wolters AMA, Navas-castillo J, Bai Y.** (2021) *Microorganisms*. **9**(4):1–19.

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