Summary

As sessile organism plants are extremely plastic. This feature is due their ability to integrate external and internal signals to modulate developmental processes. Therefore, understand the molecular mechanism underlying this feature is of great importance. Signals such as light, hormones and the circadian clock contribute to this plasticity. During this Thesis we address how the circadian clock and DELLA proteins, the negative regulators of the gibberellin (GA) signaling integrate environmental signals and relay this information to transcriptional networks, for these we use the plant model Arabidopsis thaliana.

We have demonstrated that the circadian clock modulate transcriptional levels of the GAs receptors GIDs, which promote the degradation of DELLA proteins, this result in a daily oscillation of DELLA proteins, which reach a minimum at the end of the night. This oscillation is key to modulate hypocotyl rhythmic growth and to control transcription of many genes.

In this Thesis we present two mechanisms of cross-talk among GAs and two plant hormones; ethylene and cytokinin. These mechanisms of cross-talk rely on the interaction between DELLA proteins and two transcriptional factors involved in signaling of these two hormones. The interaction with RAP2.3, this inactivation contributes to the regulation of apical hook opening by ethylene and GAs. On the contrary, the interaction with ARR1, a transcription factor that promotes cytokine signaling, is positive for the activity of ARR1, thus contributing to the regulation of some developmental processes which are antagonistically regulated by GAs and cytokinin, such as root growth and photomorphogenesis. This interaction define a new mechanism of DELLAs action. Additionally, by chromatin immunoprecipitation followed by massive sequencing, allowed us to show that DELLA proteins are near the promoter of many genes, this indicated that this mechanism is wide extensive.

Based in these results an in the identification of more than 50 transcription factors as interactors of the DELLA GAI, we propose that DELLAs act as "**hubs**" in signaling networks. In particular we propose that this is the mechanism by which these proteins are key for the integration of internal signals and developmental processes.