



Università degli Studi di Napoli Federico II

PhD in Biotechnology - 40th cycle

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Understanding the Role of Pheromone signalling system in *Fusarium oxysporum* Host Perception and Response

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Fusarium oxysporum, a destructive plant pathogenic fungus, utilizes a highly evolved pheromone signaling system to regulate its development and pathogenesis. Despite lacking a known sexual cycle, unisexual populations of *F. oxysporum* *MAT1-1* cells co-express both α - and A-pheromone and the respective pheromone GPCR receptors Ste2 and Ste3, resulting in autocrine regulation of conidial germination in a cell-density-dependent manner. In this scenario, the BAR1 aspartyl protease acts as a barrier against α -pheromone signaling by cleaving and controlling pheromone abundance (Vitale *et al.*, 2019).

Interestingly, chemotropic response to plant signal compounds, such as secreted class III peroxidases, is governed by the same pheromone signaling pathway (Turrà *et al.*, 2015). Additional molecular players might be critical for the regulation of this sensing system in *F. oxysporum* or other plant-pathogenic fungi to distinguish between self-generated autocrine signals and non-self signals, such as peroxidases from hosts, even when both are present and despite using a common set of GPCR receptors to sense them.

My PhD research aims to unravel the molecular mechanisms through which *F. oxysporum* processes and responds to complex environmental cues, with potential implications for the development of novel biocontrol strategies against this devastating plant pathogenic fungus.

References

1. Turrà, D., El Ghalid, M., Rossi, F., & Di Pietro, A. (2015). Fungal pathogen uses sex pheromone receptor for chemotropic sensing of host plant signals. *Nature*, 527 (7579), 521–524. <https://doi.org/10.1038/nature15516>
2. Vitale, S., Di Pietro, A. & Turrà, D. (2019). Autocrine pheromone signaling regulates community behaviour in the fungal pathogen *Fusarium oxysporum*. *Nat Microbiol* 4, 1443–1449. <https://doi.org/10.1038/s41564-019-0456-z>