

Poster

Study of PMT target specificity in *Ustilago maydis*



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ABSTRACT

Ustilago maydis is a pathogenic fungi responsible for the corn smut fungus disease, which causes a significant loss in maize production every year. The PMT is a family of well-conserved O-mannosylating proteins. In *Ustilago maydis*, the deletion of *Pmt2* has been shown to be deleterious and the deletion of *Pmt4* disrupts completely the infectious process; on the other hand, the deletion of *Pmt1* doesn't manifest any phenotype. All PMT proteins have three domains, named PMT, MIR and 4TMC, and several transmembrane regions. We hypothesized that one of these domains of *Pmt4* is responsible for the substrate specificity that confers the virulence phenotype in *Ustilago maydis* *Pmt4* and, if this would be the case, we could develop an antifungal drug specific to this domain. To check this, we built three chimerical protein strains, changing one domain in *Pmt4* for the same domain of *Pmt1* at a time, and measure the tumor formation in 3 independent experiments. We also built a full *Pmt4* length strain as a positive control. The results indicate that either the protein requires all three *Pmt4* domains to infect or the chimerical protein is not working properly.

Furthermore, we also wanted to check what region gives *Pmt2* its specificity for growth. In *Schizosaccharomyces pombe*, an ortholog of *Pmt2*, named *Ogm2*, present the same essential-for-growth phenotype than in *U. maydis*. Since *U. maydis* doesn't have any repressible promoter, we built a *S. pombe* strain with the shut-off promoter *nmt81* in the endogenous *Ogm2* gene and will complement the phenotype with mutagenized plasmids containing the *U. maydis* *Pmt2* and measure its viability.

Finally, we also plan to build other three strains interchanging *Pmt4* domains in the *Pmt1* protein.

REFERENCES

- Fernández-Álvarez, A., Marín-Menguiano, M., Lanver, D., Jiménez-Martín, A., Elías-Villalobos, A., Pérez-Pulido, A.J., Kahmann, R., Ibeas, J.I., 2012. Identification of O-mannosylated virulence factors in *Ustilago maydis*. *PLoS Pathog.* 8. <https://doi.org/10.1371/journal.ppat.1002563>
- Fernández-Álvarez, A., Elías-Villalobos, A., Ibeas, J.I., 2009. The O-mannosyltransferase PMT4 is essential for normal appressorium formation and penetration in *Ustilago maydis*. *Plant Cell* 21, 3397–3412. <https://doi.org/10.1105/tpc.109.065839>
- Blanquero, A., Ramon, R., Biológico, C., Universidad, D., Olavide, P. De, 2019. Development of an antifungal drug discovery system against the plant pathogen *Ustilago maydis* 21, 2019.
- Maundrell, K., 1990. *nmt1* of Fission Yeast. *J. Biol. Chem.* 265, 10857–10864.
- Tanaka, N., Fujita, Y., Suzuki, S., Morishita, M., Giga-Hama, Y., Shimoda, C., Takegawa, K., 2005. Characterization of O-mannosyltransferase family in *Schizosaccharomyces pombe*. *Biochem. Biophys. Res. Commun.*

