

# Self-protection against the sphingolipid biosynthesis inhibitor fumonisin B1 is conferred by a *FUM* cluster-encoded ceramide synthase.

Janevska S, Ferling I, Jojić K, Rautschek J, Hoefgen S, Proctor RH, Hillmann F, Valiante V (2020) Self-protection against the sphingolipid biosynthesis inhibitor fumonisin B1 is conferred by a *FUM* cluster-encoded ceramide synthase. *mBio* 11(3), e00455-20.

[Details](#)



## Abstract

Fumonisin (FB) mycotoxins produced by species of the genus *Fusarium* detrimentally affect human and animal health upon consumption, due to the inhibition of ceramide synthase. In the present work, we set out to identify mechanisms of self-protection employed by the FB<sub>1</sub> producer *Fusarium verticillioides*. FB<sub>1</sub> biosynthesis was shown to be compartmentalized, and two cluster-encoded self-protection mechanisms were identified. First, the ATP-binding cassette transporter Fum19 acts as a repressor of the *FUM* gene cluster. Appropriately, *FUM19* deletion and overexpression increased and decreased, respectively, the levels of intracellular and secreted FB<sub>1</sub>. Second, the cluster genes *FUM17* and *FUM18* were shown to be two of five ceramide synthase homologs in *Fusarium verticillioides*, grouping into the two clades CS-I and CS-II in a

phylogenetic analysis. The ability of *FUM18* to fully complement the yeast ceramide synthase null mutant *LAG1/LAC1* demonstrated its functionality, while coexpression of *FUM17* and *CER3* partially complemented, likely via heterodimer formation. Cell viability assays revealed that Fum18 contributes to the fungal self-protection against FB<sub>1</sub> and increases resistance by providing *FUM* cluster-encoded ceramide synthase activity.

## Involved units

[Biobricks of Microbial Natural Product Syntheses](#) Vito Valiante [Read more](#)

[Evolution of Microbial Interactions](#) Falk Hillmann [Read more](#)

## Leibniz-HKI-Authors



**Iuliia Ferling**

[Details](#)



**Falk Hillmann**

[Details](#)



**Sandra Höfgen**

[Details](#)



**Slavica Janevska**

[Details](#)



**Katarina Jojić**

[Details](#)



**Julia Rautschek**

[Details](#)



**Vito Valiante**

[Details](#)

## Identifier

**doi:** 10.1128/mBio.00455-20.

**PMID:** 32546615