

# Regulation of Carbon Catabolite Repression in the Filamentous Fungus *Aspergillus nidulans*

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By

Paraskevi Georgakopoulos

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Genetics Discipline

School of Molecular and Biomedical Sciences

Faculty of Sciences

The University of Adelaide

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## Abstract

In *Aspergillus nidulans*, acetate is a repressing carbon source that leads to similar levels of CreA mediated repression as glucose. *acdX* was identified in a mutation screen in *Aspergillus nidulans* to identify genes involved in acetate repression but not in glucose repression. The conservation of the amino acid sequence of AcdX of *A. nidulans* and Spt8 of *Saccharomyces cerevisiae* suggests that the SAGA (Spt-Ada-Gcn5-Acetyltransferase) complex may have a role in acetate repression in *A. nidulans*, since Spt8 is a component of the SAGA complex. We also made mutations in *sptC*, homologous to the yeast SAGA component gene *SPT3*, which show a similar phenotype to the *acdX* mutants.

The SAGA complex is highly conserved from yeast to humans. In yeast it is involved mostly in the regulation of highly regulated genes that respond to environmental stresses, such as metabolic starvation, DNA damage and heat. SAGA in yeast has been shown to have positive and negative functions on transcription. Bioinformatic analysis indicates that the components of the SAGA complex are also present in *A. nidulans*.

CreA has been shown to repress the expression of the *alc* regulon, which is required for the ethanol utilization pathway. Although plate tests indicated that *acdX* and *sptC* null mutations led to derepressed alcohol dehydrogenase activity, RT-qPCR showed no derepression of *alcA* or *aldA*, but rather elevated induced levels. Our results indicate that acetate repression is due to repression via CreA together with metabolic changes, rather than due to an independent regulatory control mechanism.

Furthermore experiments were undertaken to confirm the existence of the SAGA complex in *A. nidulans*. SptC was N terminally tagged with the TAP tag to allow the purification of the

SAGA complex. Proteomic analysis indicates that the SAGA complex does exist in *A. nidulans*, although there are some differences, one of which is that it lacks the deubiquitinating subgroup.

## 1 Declaration

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Signed

PARASKEVI GEORGAKOPOULOS

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### 3 List of publications

#### **SAGA Complex Components and Acetate Repression in *Aspergillus nidulans***

Georgakopoulos, P, Lockington, RA, and Kelly, JM

G3, Volume 2, November 2012

DOI: 10.1534/g3.112.003913

#### **The SAGA Complex in *Aspergillus nidulans***

Georgakopoulos, P, Lockington, RA, and Kelly, JM

Submitted manuscript, under review