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DISSERTATION SUMMARY

Vegetative incompatibility in *Aspergillus niger*

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The parasexual cycle, recombination by cell fusion and subsequent mitotic recombination, is a well known phenomenon in ascomycete fungi. Beside the sexual cycle, this is an alternative way for genetical recombination between isolates. For fungal strains which do not have a sexual life cycle, this is the only way for recombination.

The process of cell fusion is controlled by the so called *het* (heterokaryon incompatibility) or *vic* (vegetative incompatibility) genes. The number of *het* genes differs in every genus. If there is at least one *het* locus which differs in the strains forming anastomoses, karyogamy (and in certain strains even plasmogamy) does not occur and autolytical processes are induced. This process is an effective barrier against infectious genetic elements, like mycoviruses or plasmids and can prevent resource plundering. The incompatibility systems can be allelic or non-allelic; in the first case different alleles of the same gene, while in the latter case different genes rule the process, respectively. In certain strains only one of the systems work.

Aspergillus niger is a member of a species-complex with the same name. It became an increasingly important microorganism in the last few decades, especially due to industrial applications. Mapping of its genome was finished in 2001 and now it is available for scientists. The fungus has a unique life-cycle: it does not appear to have a sexual cycle and most of the natural isolates are highly incompatible with each other. Possibilities for genetic recombination thus seem to be highly reduced in *A. niger*. We aimed to get a better understanding of the incompatibility process and the genes regulating the steps. There is a worldwide collection of wild *A. niger* isolates and many of mutant strains which are available for use in our experiments.

het-c is one of the well characterized incompatibility genes. It has one known allele in *Podospora anserina* and in *Aspergillus nidulans* and three alleles in *Neurospora crassa* (termed as Groveland, Oakridge and Panama; these allels differ in a 50 amino acids long insertion/deletion motif). Although the *het-c* homolog of *P. anserina* is not allelic, the *het-c*^{Panama} allele of *N. crassa* could trigger incompatibility reaction.

Based on PCR experiments we established that the *het-c* gene from different *A. niger* isolates does not have an allelical region (this feature differs from *N. crassa het-c*). On the other hand different isolates bear different numbers of glutamine-repeats at the C-carboxy terminus of the protein. The role of the glutamine-repeats has not cleared yet. In protoplast-transformation experiments the *het-c*^{Panama} allele of *N. crassa* triggered an incompatibility reaction, similarly to that observed in *P. anserina*.

In the near future we plan to make some protoplast-transformation experiments with the modified *het-c* of *A. niger* and GFP-tagged (green fluorescent protein) *N. crassa het-c* alleles.

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