Molecular Characterization of *Aspergillus fumigatus* Carbonic Anhydrases

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Gas carbon dioxide(CO_2) represents 0.033% of the atmospheric gases but it is found at concentrations up to 5% in the human bloodstream and in tissues. The reversible interconversion of CO_2 and HCO_3^- is in equilibrium and it is spontaneously balanced. This reaction can be catalyzed by Zn^{2+}-metalloenzymes named carbonic anhydrase. Since some studies demonstrated the role of CAs in many essencial cellular processes in fungi, we intend to investigate the role of CO_2 and the CAs in growth, differentiation, and virulence in the pathogenic fungus *A.fumigatus*. We identified three homologues of CAs in *A.fumigatus* named *cafA-C*. We generated CafA-C null alleles and the deleted strains do not have striking defects independently of the nutrient and CO_2 atmosphere conditions, except for *DcafA* and *DcafC* that had pronounced reduction in conidiation in minimum medium(MM); *DcafA* has also a slightly reduced radial growth when grown in complete medium(CM) at 5% CO_2. We also constructed the double CA deletion mutants. The only phenotypic defect observed in these strains was the inability of the mutant *DcafADcafB* to grow in both MM and CM at 0.033% CO_2. Then, we evaluated if these deletion strains were more sensitive to different pHs at either 0.033 or 5% CO_2. There are no differences in terms of growth rate and conidiation between the wild strain and the *caf* mutants. Our results suggest that CafA and CafB are the most expressed genes and that they are important for growth in the presence of reduced CO_2 concentrations. We also conclude that there is not a direct correlation between pH regulation and carbon dioxide conditions for *A. fumigatus* growth and conidiation.

Palavras chaves: *Aspergillus, fumigates, Carbonic, anhydrase*.
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