

**THE UNCOUPLING PROTEIN AND ALTERNATIVE OXIDASE OF
DICTYOSTELIUM DISCOIDEUM (MYCETOZOA) DURING
VEGETATIVE LIFE AND STARVATION-INDUCED EARLY
DEVELOPMENT**

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Alternative oxidase and uncoupling proteins are free energy dissipating systems, both of which divert energy from ATP synthesis. Uncoupling protein dissipates the H⁺ gradient built by the respiratory chain, and alternative oxidase consumes reducing power without energy conservation into a H⁺ electrochemical gradient. In this study, we showed that *Dictyostelium discoideum* alternative oxidase is stimulated by purine mononucleotides, is monomeric (non-plant type) and can efficiently divert energy from oxidative phosphorylation in state 3 respiration. The uncoupling protein of *Dictyostelium discoideum* is stimulated by free fatty acids, is insensitive to GTP, and can induce a decrease in transmembrane potential in state 4 and in ADP/O ratio in state 3 respiration, respectively. It was also shown that both proteins can collaborate in energy-dissipation, as they occur together. Alternative oxidase expression in free-living amoeboid cells decreases strongly from the exponential phase to the stationary phase, but is maintained at quite a high level during starvation-induced aggregation. By contrast, uncoupling protein expression is constant in all conditions, indicating a permanent need for it. Our results favor a peculiar role of AOX in *Dictyostelium discoideum* development and differentiation.

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