

Abstract

Cytochrome c oxidase (COX) is the terminal enzyme of the mitochondrial electron transport chain and its main function is transfer of electrons to the terminal acceptor, oxygen. Moreover, COX contributes to the generation of proton gradient, which is indispensable for the production of vast majority of ATP molecules in the mammalian cells. The present work summarizes available data concerning the structure and function of nuclear-encoded subunits, which are specific for the eukaryotic form of COX. Particular emphasis is put on the role of subunit Cox4 and its regulatory properties within the enzyme. The study also describes other proteins associated with the enzyme, which are able to regulate the activity of COX, but are mainly involved in formation and stabilization of the respiratory supercomplexes. Based on the summarized data, three levels model of quaternary COX structure is postulated. They correspond to subunits of the catalytic center, nuclear-encoded subunits and substoichiometrically associated proteins, which may give rise to several forms of COX with varying composition and differentially regulated function.