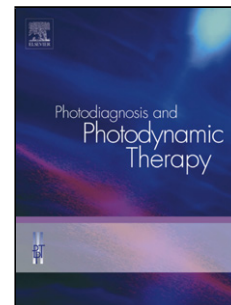


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Liaison between Heme Metabolism and Bioenergetics Pathways-A Multimodal Elucidation for Early Diagnosis of Oral Cancer

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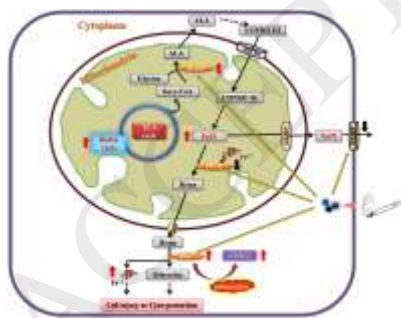
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Graphical Abstract



Graphical abstract: Proposed role of cigarette smoking on cellular metabolic pathways. The schematic diagram shows heme metabolism that takes place in mitochondria and cytoplasm, and how the pathway is impaired under long exposure to smoking. NADH and FAD from TCA and other pathways in mitochondria are affected and the redox is imbalanced. Expression of ALAS1 gene in mitochondria is increased after cigarette smoking leading to over-synthesis of PpIX. Excess PpIX is toxic for cells and is excreted out from the cells through ABCG2 channel. Cigarette smoke also suppresses expression of membrane protein ABCG2. In the final step of heme biosynthesis, PpIX is coupled with ferrous ion to form heme by the enzyme FECH. Excess heme accumulation is controlled by feedback inhibition of ALAS1

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