

CORRELATION BETWEEN REACTIVE OXYGEN SPECIES (ROS) AND CANCER (CR).

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Introduction

It has been demonstrated a strong correlation between ROS and CR heterogeneity which may contribute to modulate therapy.

Heterogeneity, which is a hallmark of CR, is one of the main factors related to resistance to chemotherapeutic agents.

Methods

It is known that heterogeneity is affected by increasing levels of ROS. Tumor cells express increased levels of antioxidant proteins to detoxify from ROS, suggesting that a delicate balance of intracellular ROS levels is required for CR cell function.

CR comprises a group of several malignancies characterized by distinguishing hallmarks of CR which may correspond to several parameters: hyper proliferation, angiogenesis, insensitivity to antigrowth factors, resistance to apoptosis, escape from destruction by the immune system, inflammation and genome instability.

Results.

Although the breakthroughs in CR therapy experienced recently have clearly improved the quality of life of the patients, statistically, many of them still succumb. The information about CR statistics have shown that, the majority of tumors exhibit a substantial sensitivity to current traditional therapies, but often, these tumors relapse and anticancer drug resistance is established.

Resistance to chemotherapy is closely related to tumor heterogeneity.

ROS are pleiotropic molecules of free radicals generated by several complex mechanisms of which the most relevant is the incomplete oxidative phosphorylation that occurs during biomolecule catabolism, especially in the electronic transport chain.

Under homeostasis, the cells are protected from the deleterious effects of ROS because they prevent enzymatic systems responsible for dismantling these highly reactive molecules or even antioxidant substances capable of inactivating excessive ROS and in turn reducing their toxicity.

ROS overproduction, failures in the scavenging mechanisms, or even the insufficiency of antioxidants may lead to ROS accumulation culminating in oxidative stress, state of a cell which is characterized by the oxidation of essential biomolecules.

Conclusion

It has been clearly suggested that ROS are important and pleiotropic signalling molecules actuating as a double-edged sword in physiologic and pathologic processes such as several diseases, carcinogenesis and even CR heterogeneity.