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Editorial

Target Specific Cancer Treatment with Carbon Monoxide Releasing Molecules

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Carbon monoxide (CO) is a colorless, odorless, and tasteless gas which has been defined as "silent killer" for a long time. CO has strong affinity for hemoglobin, and CO-hemoglobin (carboxyhemoglobin) complex inhibits oxygen delivery to tissues by red blood cells [1]. Apart from this poisoner effect, the therapeutic potential of CO has been extensively evaluated in pathogenesis of many diseases. CO is naturally produced by heme oxygenase 1 and 2 (HO-1 and HO-2) activity in tissues. Heme oxygenase enzymes catalyze degradation of heme and production of CO, biliverdin and iron. HO-1 and HO-2 are defined as cytoprotective signaling molecules, and they play significant role in protection of cellular hemostasis [2]. HO-1 (heat shock protein 32) is overexpressed against cellular stress conditions (ROS, hypoxia, ROS, heat, oxidative stress, UV irradiation and hydrogen peroxide), and provides survival of cells. Recent experimental studies indicate that HO-1 participate in each step of tumorogenesis (apoptosis, angiogenesis, invasion, cell proliferation and metastases). Cancer cells are exposed to oxidative stress and consequently, antiapoptotic and metastatic pathways are stimulated in cancer cells. In early stage of tumoregenesis, overexpression of HO-1 improves macrophages and glioma cells activity against stress factors, and increases antioxidant response. As a result, antiapoptotic, metastatic and cell proliferation processes are inhibited in tumor cells due to anticancer activities of CO [3,4]. Metal containing CO-releasing molecules (CORMs) have the ability to release CO into cancer cells, and their anticancer activities are extensively evaluated with experimental and clinical studies. CORMs are designed to supply optimum amount of CO to cancer cells [5]. In this regard, my research group designs novel manganese containing CORMs, and their anticancer activities and molecular experiments are performed in human cancer cell lines. Obtained results implicate that CORMs are promising candidate of target specific agents in the treatment of cancer.

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