Metal complexes of 2-imine-8-hydroxyquinolines as anticancer drugs

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Cancer treatment remains a critical public health challenge, underscoring the need for effective and selective therapeutic agents. Metal complexes of 8-hydroxyquinoline (8HQ) have long shown promise in this area due to their strong chelating ability, high stability, and broad-spectrum bioactivity. When coordinated to therapeutically relevant metal centers, these ligands can produce synergistic or additive biological effects. In our recent work, we synthesized, characterized, and evaluated a series of 8HQ-derived metal complexes containing Zn, Cu, V, Ni, Fe, and Ru. The study focused on 8HQ ligands bearing an imine substituent at position 2, addressing key challenges of selectivity and solubility. The anticancer activity of these complexes was screened *in vitro* against malignant melanoma, colon, lung, and triple-negative breast cancer cell lines. Cellular assays indicated that their mechanisms of action involve reactive oxygen species (ROS) generation and apoptosis induction. To enhance *in vivo* selectivity and solubility, a nanoliposomal encapsulation strategy was employed for passive drug delivery. Overall, the findings highlight the strong potential of these 8HQ-based metal complexes as candidates for next-generation anticancer therapeutics, demonstrating efficacy in both *in vitro* and *in vivo* models.

Keywords: 8-hydroxyquinoline, Schiff bases, hydrazones, metal complexes, anticancer.