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TRANSITION METAL COMPLEXES/ORGANOMETALLIC COMPOUNDS AS ANTICANCER/ANTI HIV DRUGS IN PHARMACEUTICAL INDUSTRY

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Cancer is a dreadful disease and any practical solution in combating this disease is of paramount importance to public health. Cancer patients have burdened by drug induced toxic side effects, and no one turned to seek help from the complementary and alternative medicine hoping for a better cure. Research on platinum based drugs and non-platinum based drugs is a multi-million dollar industry in USA and there is every need to produce safe drugs for the cure of this monstrous disease. Flavonoids have a long history of use in traditional medicines in many cultures. The phytochemical, curcumin is one of the major dietary flavonoid, belonging to a group of flavonol. Curcumin is a natural polyphenol. It is highly potential molecule capable of preventing and treating various cancers. Various dietary chemo preventive agents, turmeric powder or its extract are broadly used as therapeutic preparations in Indian system of medicine. We provide a summarized synthesis and structural determination of curcumin oxime, curcumin thiosemicarbazone derivative of gold (III) complex. These analogs are used for prevention of cancer tumor progression and treatment of human malignancies. A pharmacologic agent is observed for treating and/or preventing cancer, among other diseases and conditions, and particularly breast, prostate, and pancreatic cancer, in humans and animals. The novel pharmacologic agent is an isoflavonoid or isoflavonoid mimetic covalently attached to a cytotoxic pharmacophore that, preferably has the ability to conjugate with a metal salt to form a more potent metal complex, particularly a Au (III) complex and other complexes of platinum, palladium, ruthenium, copper etc. My talk would mainly encompass different transition metal complexes/organometallic compounds that are presently used as drugs, especially anticancer and anti-HIV drugs, apart from anti-inflammatory, antimicrobial, antibacterial and diseases like arthritis and Parkinson's disease etc. The talk would mainly focus on the use of medicinal chemistry and its application to drug design and development in pharmaceutical industry, especially transition metal complexes and organometallic compounds viz. gold, platinum, palladium and ruthenium apart from copper, cobalt, iron, nickel, zinc, cadmium etc. The main emphasis of my talk would be on different class of ligands, their Schiff's bases and transition metal complexes especially Au, Pt, Pd and Ru, with the main aim of designing, developing very novel small molecules, as possible and extremely potential candidates as anti-cancer and anti-HIV drugs. The talk would provide an overview of current programs being undertaken in our laboratories, especially focused on the development of potent ligands capable of recognizing binding sites and diverse strategies employed by my group for elucidation of anti-cancer and anti-HIV drug leads to circumvent the problem caused by cis-platin. We have synthesized and characterized several phytochemicals from traditional medicinal plants and isolated some phytochemicals and made the corresponding oximes, thiosemicarbazones and substituted thiosemicarbazones as ligands and synthesized, characterized, structurally elucidated their transition metal complexes especially with gold, platinum, palladium, ruthenium, copper etc. and studied their anticancer activity, nuclease activity etc. and tested their potential as anticancer drugs. The main aim of our extensive/preclinical pharmaceutical development program is to investigate the use of these extremely novel small molecules-metal complexes/compounds of phytochemicals, flavanoids etc., which have very interesting structural features and properties and hence are excellent candidates as anti-cancer and anti-HIV drugs. The main aim of our research is design, development and synthesis of transition metal complexes/organometallic compounds that would certainly help to bring this force of nature from bench to bedside and enhance cancer killing with less toxic effects and would certainly lead to initiation of clinical trials.

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