Recent bio-informatic studies have established that in the human genome there are ca. 350,000 guanine-rich sequences that can potentially form quadruplex DNA. Some of these sequences have been identified as targets for the development of anticancer drugs. Therefore there is great current interest in developing small molecules that can selectively interact with quadruplex DNA and study their biological effects. We have previously investigated the quadruplex DNA binding properties of several families of transition metal complexes. In this lecture, our more recent results in this area will be presented. More specifically, it will be shown that a series of metal complexes with copper(II) and platinum(II) have high affinity and good selectivity for quadruplex DNA. The biological activity of a selected group of these complexes will be presented and their potential as potential anticancer drugs discussed.