Potential Anticancer Complexes from Platinum and Clove Basil Oil (Ocimum grastissimum L.)

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Platinum-based drugs are irreplaceable in cancer chemotherapy, including three globally approved generations: cisplatin, carboplatin and oxaliplatin, however, these drugs still have undesirable side effects and tumor resistance. Studies over last few decades showed that potential anticancer complexes of Pt(II) must contain at least one amine ligand. Additionally, using a natural compound as ligand in complexes for target of reducing toxicity has attracted researchers. Nevertheless, there has not been any publication about Pt(II) complexes containing eugenol (4-allyl-2-methoxyphenol, main component of clove basil oil). In this project, we established an effective and economical procedure to synthesize Pt(II) complex bearing eugenol (Eug), K[PtCl3(Eug)] (1), directly from clove basil oil instead of pure eugenol to react with Zeise's salt. From 1, we gained complexes containing both amine and eugenol, which are trans-[PtCl2(Eug)(caffeine)] (2), [PtCl(Eug)(8-oxiquinoline)] (3), PtCl(Eug)(5-nitro-8-oxiquinoline)] (4) and [PtCl(Eug)(5,7-dichloro-8-oxiquinoline)] (5). Structure of 1-5 was determined by Pt proportion, analyzing ESI-MS, IR, 1H NMR, NOESY spectra and XRD (measured by professionals), in which Eug coordinates with Pt(II) through C=C of the allyl group. The N atom of coordinated chelating amines is at trans position compared to the allyl group. 3-5 exhibit notable anticancer activity against four human cancer cell lines (KB, LU-1, Hep-G2, MCF7, tested by experts), especially 3, 4 (IC50 values of 0.51 - 2.86 ug/mL) show multiple times stronger anticancer activity than that of cisplatin. The result suggested potential application of these complexes for medical purpose and the effective exploitation of abundant source of clove basil oil as well.

Awards Won:

Third Award of $1,000