Title: Monofunctional Pt(II)–complex: A potential anticancer chemotherapeutic drug

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KEYWORDS: Pt(II) anticancer drug, Redox-active, Monofunctional, Organoselenide-based
DOMAIN: Chemistry

SUMMARY:

The newly synthesized monofunctional Pt(II)-complex is a rigid, small molecule, synthesized from organoselenide-tethered Schiff base ligand, specifically targeting the MCF7 (breast cancer cell line). Its selective cytotoxicity and chemotherapeutic potential are due to its multimodal action mechanism, including the ability to induce DNA damage, inhibit cellular growth, induce apoptosis, and create oxidative stress in cancer cells. Therapeutic failure of the currently available drug exists due to its molecule orientation of the currently available nonfunctional drug, making it viable for nucleophilic attack by sulfur donor molecules. Therefore, the unique structural orientation of the monofunctional Pt(II) complex provides rigid steric protection against nucleophilic attack, preventing undesired or premature deactivation of the complex before targeting the DNA.

ADVANTAGES:

1. Its potency against the human breast cell line is 5-fold higher than that of cisplatin-based drugs.
2. 17-fold higher reactive oxygen species than cisplatin, indicating improved pharmacological parameters as a drug.
3. Reduced side effects without affecting noncancerous drugs.
4. The drug showed anti-cancer and anti-metastasis effects by suppressing cell migration and invasion.

APPLICATION: Pharmaceutical properties of Pt(II) complex displayed synergistic inhibition of breast cancer.

SCALE OF DEVELOPMENT: The compound is lab-synthesized and in vitro test performed on MCF7 (breast cancer cell line)

TECHNOLOGY READINESS LEVEL: TRL 3

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