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Abstract

The thesis gives detailed account of synthesis, characterization and cytotoxicity evaluation of some pyrazole tethered heterocyclic analogues. All the synthesized compounds were characterized by detailed IR, ^{1}H NMR, ^{13}C NMR, mass spectral data and elemental analysis. *In vitro* cytotoxicity of all these compounds were measured by MTT assay against a panel of three different human cancer cell lines and a normal cell line. Most of these compounds displayed moderate to good cytotoxicity against the tested cancer cell lines and weak toxicity towards normal cell.

A series of pyrazolic chalcones **4a-i** were synthesized, characterized and evaluated their cytotoxicity. Among these pyrazolic chalcones, analogues **4f, 4g, 4h** showed significant cytotoxicity against Caco-2, MIA PaCa-2, MCF-7 and NIH-3T3 cell lines as compared to standard drug etoposide. Compound **4g** exhibited superior cytotoxicity with IC_{50} value 15.32±0.62 against Caco-2 cancer cell line.

In an another study, some pyrazolyl pyrazoline derivatives **5a-i**, **6a-i**, **7a-i** were synthesized, characterized and evaluated their cytotoxicity. Compounds **5b**, **5f**, **5g**, **6b**, **6g**, **7f**, **7g** and **7i** showed significant cytotoxicity against a panel of three different human cancer cell lines (HeLa, NCI-H460, PC-3) and a normal cell line (NIH-3T3) as compared to standard drug etoposide. The compound **6g** displayed superior cytotoxicity with an IC_{50} value of 7.98±1.08 μM for Hela cancer cell line.

In continuation, some pyrazolyl cyclohexenone derivatives **8a-i** were synthesized, characterized and evaluated their cytotoxicity. Among them, analogues **8c, 8d, 8f** and **8g** showed significant cytotoxicity against a panel of three different human cancer cell lines (MCF-7, NCI-H460, HeLa) and normal cell line (HEK-293T) as compared to standard drug Etoposide. Compound **8d** displayed superior cytotoxicity with an IC_{50} value of 7.01±0.60 μM for HeLa cancer cell line.

Encouraged by our previous findings, a series of pyrazolyl thiocarboamide derivatives **9a-i** were synthesized, characterized and evaluated their cytotoxicity. Analogues **9d, 9e** and **9g** showed significant cytotoxicity against a panel of three different human cancer cell lines namely; MCF-7 (human breast), NCI-H460 (human lung), HeLa (human cervix) and HEK-293T (Human embryonic kidney cells) normal cell line. as compared to standard drug etoposide. The compound **9g** exhibited superior activity with an IC_{50} value of 9.74±0.35 μM against.

Furthermore, a series of pyrazolyl aminopyrimidine derivatives **10a-i** were synthesized, characterized and evaluated their cytotoxicity. Compounds **10b**, **10c**, **10d**, **10e**, **10f**, **and 10g** showed significant cytotoxicity against a panel of three different human cancer cell lines (Hela, NCI-H460, PC-3) and normal cell line (NIH-3T3) as compared to standard drug etoposide. The compound **10g** exhibited superior activity with an IC_{50} values of 5.47±0.44 μM against Hela cancer cell line.