# Multi-kinase-IN-4

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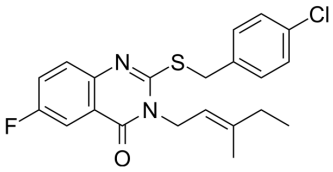
| **Cat. No.:** | HY-149407 |
| **Molecular Formula:** | $C_{21}H_{20}ClFN_2OS$ |
| **Molecular Weight:** | 402.91 |
| **Target:** | VEGFR; CDK; EGFR; Necroptosis; Apoptosis |
| **Pathway:** | Protein Tyrosine Kinase/RTK; Cell Cycle/DNA Damage; JAK/STAT Signaling; Apoptosis |
| **Storage:** | Please store the product under the recommended conditions in the Certificate of Analysis. |




## BIOLOGICAL ACTIVITY

**Description**

Multi-kinase-IN-4 (compound 5d) is multi-targeted kinase inhibitor, including VEGFR2, EGFR, HER2, and CDK2, with $IC_{50}$ values of 0.33, 0.22, 0.18 and 2.09 μM, respectively. Multi-kinase-IN-4 shows broad-spectrum anti-cancer activities against HepG2, MCF-7, MDA-231, and HeLa cell lines ($IC_{50}$ = 1.94–7.1 μM), but exhibits lower toxicity in the WI-38 cells ($IC_{50}$ = 40.85 μM). Multi-kinase-IN-4 induces apoptosis and arrests cell cycle at S phase in HepG2 cells. Multi-kinase-IN-4 has the potential for the research of cancer[1].

**$IC_{50}$ & Target**

| VEGFR2 | CDK2 | HER2 |
|---|---|---|
| 0.33 μM ($IC_{50}$) | 2.09 μM ($IC_{50}$) | 0.18 mM ($IC_{50}$) |

**In Vitro**

Multi-kinase-IN-4 (compound 5d) (48 h) has cytotoxic against the HepG2, MCF-7, MDA-231, and HeLa cell lines with $IC_{50}$ values of 7.10, 2.48, 1.94, and 6.38 μM, respectively, but displays less cytotoxic activity on the WI38 cells ($IC_{50}$ = 64.29 μM) [1].
Multi-kinase-IN-4 (7.1 μM, 24 h, HepG2 cells ) increases the cell population of 9.23% at the S phase and results in a drop in the cell population at the G0-G1 and G2/M phases: 4.50% and 4.73%, respectively[1].
Multi-kinase-IN-4 (7.1 μM, 24 h, HepG2 cells) induces early and late apoptosis as well as necrotic cell death by 7.51%, 3.45%, and 3.08%, respectively[1].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Apoptosis Analysis[1]

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| Cell Line: | HepG2 |
| Concentration: | 7.1 μM |
| Incubation Time: | 24h |
| Result: | Induced early and late apoptosis as well as necrotic cell death by 7.51%, 3.45%, and 3.08%, respectively. |

Cell Cycle Analysis[1]

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|---|---|
| Cell Line: | HepG2 |
| Concentration: | 7.1 μM |
| Incubation Time: | 24h |

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| Result: | Increased the cell population of 9.23% at the S phase and results in a drop in the cell population at the G0-G1 and G2/M phases: 4.50% and 4.73%, respectively |

## REFERENCES

[1]. Ali Altharawi, et al. Novel 2-Sulfanylquinazolin-4(3H)-one Derivatives as Multi-Kinase Inhibitors and Apoptosis Inducers: A Synthesis, Biological Evaluation, and Molecular Docking Study. Molecules. 2023 Jul; 28(14): 5548.



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