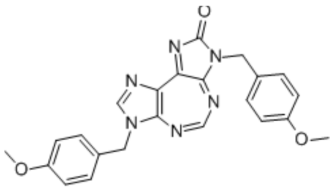
RK-33

Cat. No.:	HY-100455
CAS No.:	1070773-09-9
Molecular Formula:	$C_{23}H_{20}N_6O_3$
Molecular Weight:	428.44
Target:	DNA/RNA Synthesis
Pathway:	Cell Cycle/DNA Damage
Storage:	Powder -20°C 3 years 4°C 2 years In solvent -80°C 2 years -20°C 1 year



SOLVENT & SOLUBILITY

In Vitro

DMSO : 50 mg/mL (116.70 mM; Need ultrasonic)

Preparing Stock Solutions	Solvent / Mass / Concentration	1 mg	5 mg	10 mg
	1 mM	2.3340 mL	11.6702 mL	23.3405 mL
	5 mM	0.4668 mL	2.3340 mL	4.6681 mL
	10 mM	0.2334 mL	1.1670 mL	2.3340 mL

Please refer to the solubility information to select the appropriate solvent.

BIOLOGICAL ACTIVITY

Description

RK-33 is an RNA helicase inhibitor against DDX3, and inhibits its helicase activity.

In Vitro

RK-33 shows inhibition of many kinds of cancer cells with IC_{50} of 3-6 μM, while PC3 is much less sensitive to RK-33 (IC_{50} >12 μM). RK-33 treatment causes a significant accumulation in the G1 phase for DU145 and LNCaP, although treatment with RK-33 causes only a moderate accumulation of the G1 phase for 22Rv1, and the treated cells have significantly reduced G2 phase. RK-33 treatment also causes 12 moderate G1 accumulation in 22Rv1[1]. RK-33-loaded NPs demonstrate cytotoxicity to MCF-7 cells in a dose-dependent manner, while equivalent doses of empty NPs have no killing effect. The IC_{50} value of 5% RK-33 loaded NPs is 49 μg/mL, and the IC_{50} value of 10% RK-33 loaded NPs is 25 μg/mL[2].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

In Vivo

There is more cell death (pyknotic or condensed nuclei) admixed with fibrin and interstitial edema in the tumors from mice from the combination RK-33 and radiation group compared to the control or single treatment groups. The treatment combination of RK-33 and radiation has an advantage in reducing tumor proliferation[1]. In the mice treated with RK-33-PLGA, RK-33 can be detected in the plasma (34 μg/mL) and liver (28 μg/g), but not lungs[2].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Cell Assay [2]	Briefly, 8×10^2 MCF-7 cells are seeded in a 96-well plate, and treated with different concentrations of RK-33 loaded nanoparticles and unloaded nanoparticles next day. After 72-h incubation, MTS reagent is added to the cells, and the absorbance is measured at 490 nm after 2-h incubation with MTS reagent. The experiment is repeated three independent times. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [1]	Mice are randomLy redistributed into four groups of eight according to their tumor growth, which results in an approximately equal distribution of tumor size at the beginning of radiation and RK-33 drug treatment. The four groups of mice are blindly chosen for four different experimental procedures, including control (injection of DMSO only), RK-33 treatment (injection of RK-33 only 50 mg/kg), radiation (one-time radiation of 5 Gy), or radiation and RK-33 treatment (combination of radiation of 5 Gy and RK-33 injection). RK-33 and DMSO are injected intraperitoneally thrice weekly for two weeks. Radiation is performed at the beginning of drug injection using the Small Animal Radiation Research Platform (SARRP) with a circular beam of 1 cm diameter, focusing on the tumor site. Mice of each group are euthanized 0 h and 24 h after radiation and tumors are extracted for γH2AX, cleaved Caspase 3, and Ki67 staining. The remaining mice of each group are imaged with a Xenogen IVIS Spectrum, with injection of D-luciferin 5 minutes before imaging. Mice are euthanized after six weeks of imaging and tumors are extracted for H&E staining, cleaved Caspase 3, and i67 staining. Morphology of the tumors after RK-33 and radiation treatment is assessed by a veterinary pathologist on hematoxylin and eosin stained sections. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Int Immunopharmacol. 2023 Apr.

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REFERENCES

[1]. Xie M,et al. RK-33 radiosensitizes prostate cancer cells by blocking the RNA helicase DDX3. Cancer Res. 2016 Sep 12.

[2]. Bol GM, e tal. PLGA nanoparticle formulation of RK-33: an RNA helicase inhibitor against DDX3. Cancer Chemother Pharmacol. 2015 Oct;76(4):821-7.

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