

Product Data Sheet

Product Name: Fluorouracil (Adrucil)

Cat. No.: GC14466

Chemical Properties

Cas. No. 51-21-8

Chemical Name 5-fluoro-1H-pyrimidine-2,4-dione

SMILES C1=C(C(=O)NC(=O)N1)F

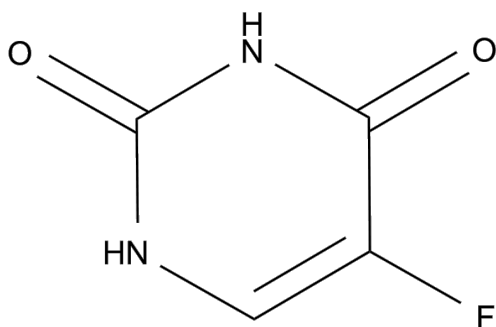
Formula C4H3FN2O2 M.Wt 130.1

Solubility ≥ 6.5 mg/mL in DMSO, ≥ 8 mg/mL in Water with ultrasonic and warming Storage 4°C, protect from light

General tips For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.

Shipping Condition Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.

Structure



Protocol

Cell experiment [1]:

Cell lines HCT116 parental cell line (ATCC CCL247) and HCT116 ContinB and ContinD resistant derivatives (all wild-type TP53 cell lines)

Caution: Product has not been fully validated for medical applications. For research use only.

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Preparation Method 770 μ M Fluorouracil (Adrucil) (5-FU) was added to the media 24 hours after seeding. Cells were harvested by trypsinization or scraping at 0, 8, and 24 hours after addition of 5-FU to the culture medium. Control wells received no Fluorouracil (Adrucil).

Reaction Conditions 770 μ M for 0, 8, and 24 hours

Applications Cells were treated with Fluorouracil (Adrucil) (5-FU) for 24 hours and followed for up to 40 days in drug-free medium. After day 7, the cell counts for ContinD increased steadily, the cell counts for ContinB and parental cultures began to increase after about 15 and 20 days, respectively.

Animal experiment [2]:

Animal models Male C57BL/6 mice, azoxymethane/dextran sodium sulfate (AOM/DSS) model of CRC

Preparation Method Fluorouracil (Adrucil) (5-FU) was dissolved in sterile PBS, pH7.4 and then sterile filtered through a 0.2 μ m syringe filter. Fluorouracil was administered in 3 cycles; cycle 1: 40mg/kg, cycle 2 and 3: 20mg/kg via intraperitoneal injection. Fluorouracil was prepared fresh at the beginning of each cycle. Sterile filtered PBS alone was used as the vehicle control. Each cycle consisted of 5 consecutive days of injections followed by 9 days of recovery. The treatment period lasted for 5 weeks and mice were sacrificed 24 hr after the final injection of the third cycle.

Dosage form Intraperitoneal injection, 40mg/kg and 20mg/kg

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Applications Fluorouracil reduces tumor burden but decreases survival in AOM/DSS mice.

References:

- [1]: De Angelis P M, Svendsrud D H, Kravik K L, et al. Cellular response to 5-fluorouracil (5-FU) in 5-FU-resistant colon cancer cell lines during treatment and recovery[J]. Molecular cancer, 2006, 5(1): 1-25.
- [2]: Sougiannis A T, VanderVeen B N, Enos R T, et al. Impact of 5 fluorouracil chemotherapy on gut inflammation, functional parameters, and gut microbiota[J]. Brain, behavior, and immunity, 2019, 80: 44-55.

Background

Fluorouracil (Adrucil) (5-FU) is an analogue of uracil with a fluorine atom at the C-5 position in place of hydrogen [1]. Fluorouracil is widely used in the treatment of a range of cancers, including colorectal and breast cancers, and cancers of the aerodigestive tract [1].

The mechanism of cytotoxicity of Fluorouracil (Adrucil) has been ascribed to the misincorporation of fluoronucleotides into RNA and DNA and to the inhibition of the nucleotide synthetic enzyme thymidylate synthase (TS) [1]. Fluorouracil (Adrucil) at the concentration of 770μM treated HCT116 parental cell line and its 5-FU-resistant derivatives, Fluorouracil (Adrucil) led to a G1/S arrest at 8 and 24 hours [2]. The G1 arrest was most pronounced in ContinD cells at 24 hours, whereas the S phase arrest was most pronounced in parental HCT116 cells at 24 hours [3].

Fluorouracil (Adrucil) beneficial effected in intestinal tumorigenesis in the Apcmin/+ mice model where a 60-80% reduction in polyps [4]. Fluorouracil (Adrucil) reduces body weight, exacerbates symptom severity score, increases liver weight, and decreases epididymal fat mass, and decrease in survival [5].

References:

- [1]. Longley D B, Harkin D P, Johnston P G. 5-fluorouracil: mechanisms of action and clinical strategies[J]. Nature reviews cancer, 2003, 3(5): 330-338.

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- [2]. Takeda H, Haisa M, Naomoto Y, Kawashima R, Satomoto K, Yamatuji T, Tanaka N: Effect of 5-fluorouracil on cell cycle regulatory proteins in human colon cancer cell line. Jpn J Cancer Res. 1999, 90: 677-684.
- [3]. De Angelis P M, Svendsrud D H, Kravik K L, et al. Cellular response to 5-fluorouracil (5-FU) in 5-FU-resistant colon cancer cell lines during treatment and recovery[J]. Molecular cancer, 2006, 5(1): 1-25.
- [4]. J.M. Tucker, C. Davis, M.E. Kitchens, et al. Response to 5-fluorouracil chemotherapy is modified by dietary folic acid deficiency in Apc(Min/+) mice. Cancer Lett., 187 (2002), pp. 153-162
- [5]. Sougiannis A T, VanderVeen B N, Enos R T, et al. Impact of 5 fluorouracil chemotherapy on gut inflammation, functional parameters, and gut microbiota[J]. Brain, behavior, and immunity, 2019, 80: 44-55.

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