

URACIL DERIVATIVE WITH RADIOSENSITIZING PROPERTIES

Market

Radiotherapy (RT), which is used in about every second cancer treatment, is one of the most common curative or palliative treatment methods. The growing number of cancer diagnoses calls for an intensive search for new anticancer therapeutics. One possible way to resolve this problem is to improve the efficacy of radiotherapy by employing radiosensitizing substances.

According to report "Radiotherapy Market by Type (External (IGRT, IMRT, 3D-CRT), Internal (LDR, HDR) & Systemic), Product (Proton Beam, Cyberknife, LINAC, Seed, Samarium), Application (Prostate, Breast, Cervical), End User, and Region - Global Forecasts to 2022", the value of radiotherapy market is expected to grow by 2022 to almost \$9.47 billion.

Technology

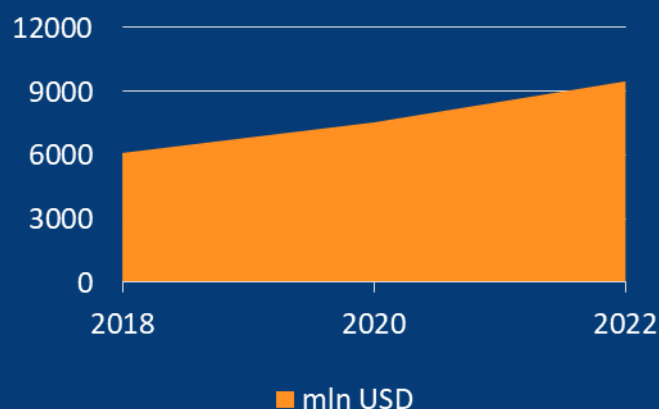
The structural modifications of radiosensitizing nucleosides should rely on introduction of suitable substituents to a nucleobase that would increase their sensitivity to degradation induced by solvated electrons, which are one of the most abundant product of water radiolysis under hypoxia.

5-selenocyanatouracil (SeCNU) described herein is a promising candidate for hypoxic radiosensitizer, due to its propensity for rapid decomposition by electron attachment - computational prediction of which were confirmed using stationary radiolysis.

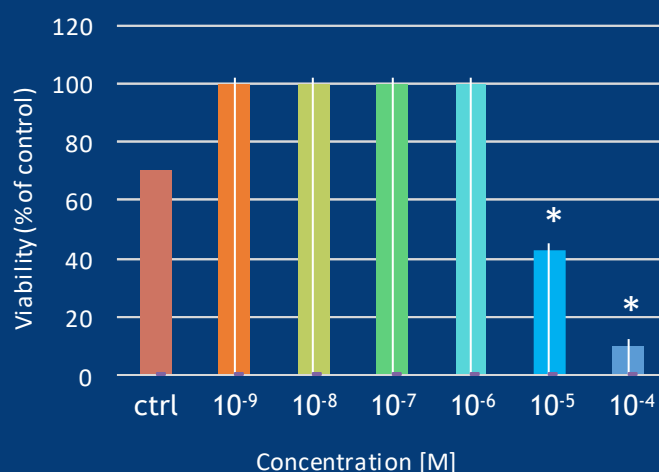
Radiotherapy - Opportunity Analysis and Forecasts to 2022



Radiotherapy market



Viability of MCF-7 cells following 48h treatment with SeCNU in a range of concentrations.



Technology highlights

- 1 5-selenocyanatouracil (SeCNU) is a promising candidate for hypoxic radiosensitizer due to its propensity for rapid decomposition by electron attachment.
- 2 Sensitivity of SeCNU to electron attachment in aqueous solution was confirmed by steady state radiolysis at ambient temperature followed by liquid chromatography-mass spectrometry (LC-MS) analysis of radiolytes.
- 3 Established synthetic route enabling 5-selenocyanatouracil to be chemically synthesized with a high yield and purity.
- 4 SeCNU is demonstrated to be kinetically and thermodynamically more sensitive to hydrated electron attachment than BrU - a well-known radiosensitizer.

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Commercialization opportunities

- ➔ Licensing agreement
- ➔ Transfer of ownership
- ➔ Spin off

IP Status



The invention was submitted for patenting according to Polish (P.419323) procedures.

Implementation progress



TRL 4
Technology validated in
laboratory conditions

Summary



Radiotherapy is one of the most common therapeutic methods employed for human cancer treatment. This method uses ionizing radiation, which mainly acts indirectly via the radiolysis products of water damaging cellular DNA. Commonly used radiotherapy causes many side effects. Two classes of radiosensitizing agents are distinguished: hypoxic cell sensitizers, which rely on hypoxia occurring only in cancer cells, and pyrimidine analogues that could be incorporated into DNA due to their structural similarity to native nucleosides.

The method allowing to increase the effectiveness of radiotherapy is the use of the respective derivatives of nucleic bases radiosensitizers, operating in a low oxygen environment, that are incorporated into cellular DNA during its biosynthesis.

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