GluCAB: A Radioisotope Theranostic Compound

Improved cancer diagnosis and treatment through two-stage direct targeting of tumours

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Background

Radiopharmaceuticals are popularly used as tracers in medical imaging as well as for therapy for many types of cancer. In recent years, however, radiopharmaceutical cancer research started to focus on imaging and radiotherapeutic methods which directly target tumours with minimal side effects or damage to healthy cells. Through the partnership between the Nuclear Energy Corporation of South Africa (NECSA) and the University of Cape Town (UCT) an exciting technology has been developed which has application in both cancer diagnostics and therapy.

Technology Overview

GluCAB (Figure 1) is a new two-stage direct targeting radiopharmaceutical to treat and/or diagnose tumours (theranostic). The novel GluCAB compound comprises three functional components to achieve a two-stage targeted cancer diagnostic/treatment activity: a **Glu**cose and a **C**yclam which is linked to **A**lbumin to form the (**B**io)conjugated compound.

The **C**yclam is a chelating agent complexing a radioisotope which acts as the payload for therapeutic or diagnostic purposes; this chelator is connected to the Human Serum **A**lbumin macromolecule that serves as the passive targeting agent which delivers the radioisotope (payload) complex from the blood stream to the tumour site; the chelator is also connected to the **Glu**cose functional area which is the active targeting agent for uptake of the compound within tumour cells;

The compound functions as follows:

Stage 1: The GluCAB compound localises in the regions of the tumour site through the compound's passive targeting functional area via the enhanced permeability and retention (EPR) effect.

Stage 2: Once at the targeted tumour area, the compound uses its active targeting functional component to attach itself to a specific receptor on the surface of the cancer cell and delivers a radioisotope into the tumour cell. The type of radioisotope makes it possible to diagnose the cancer through SPECT or PET scanning (using a Cu-64 radioisotope as example), or to destroy the cancer cells through ionising emissions (using Pd-103 as example radioisotope).

Benefits

- Improves bio-distribution, which will significantly reduce pharmacological toxicity. There will therefore be fewer side effects and less damage to healthy cells

- 2-Stage targeting system allows for better targeting of tumours as well as delivery of payloads to the tumour site
- Single technology platform for diagnostic and therapeutic purposes – “theranostic” – which reduces complexity and costs
- The technology has a specific focus on well vascularised tumours such as breast and cervical cancer tumours

Applications

The technology has application as a potential:

- Cancer theranostic (especially well vascularised tumours)
- Cancer diagnostic
- Cancer therapeutic

Opportunity

The compound has been continuously matured and improved by the UCT/NECSA partnership. Multiple rodent studies have been completed and significant data exists that are available to share with interested partners.

NECSA and UCT is looking for partner to further develop and commercialise the technology. UCT and NECSA have access to clinical infrastructure for trial purposes and are seeking a commercial partner willing to drive the technology to the market. The ideal partner should:

- Understand the cancer pharmaceutical market especially in nuclear medicine
- Understand clinical trials and the management thereof
- Be willing to support the technology development, clinical trials and regulatory requirements
- Lead the commercialisation direction

Patents

- USA 15/514,138
- Europe 15778046.1
- China 2015800598821
- South Africa 2017/02638

IP Status

- Patented
- Patent application submitted

Seeking

- Development partner
- Commercial partner
- Licensing
- Seeking investment