Available online at www.scholarsresearchlibrary.com

Scholars Research Library

Annals of Experimental Biology, 2022, 10 (1): 4-5

(http://www.scholarsresearchlibrary.com)

ISSN:2348-1935

Methods for Molecular Imaging that will Help Bacteria-Mediated Cancer Therapy

Demet Castilo*

Editorial office, Annals of Experimental Biology, Uxbridge, United Kingdom

***Corresponding Author:** Dr. Demet Castilo, Editorial office, Annals of Experimental Biology, Uxbridge, United Kingdom*

E-mail: info@scholarsresearchlibrary

***Received:** 10-Jan-2022, Manuscript no. AEB-22-82761; **Editor assigned:** 12-Jan-2022, Pre QC no AEB-22-82761 (PQ); **Reviewed:** 22-Jan-2022, QC no AEB-22-82761 (Q); **Revised:** 24-Jan-2022, Manuscript no. AEB-22-82761 (R); **Published:** 29-Jan-2022*

ABSTRACT

An innovative treatment option for cancer, bacteria-mediated cancer therapy has the ability to target a wide range of tumors, may be administered through a variety of channels, is flexible in its delivery, and supports the host's immune responses. The therapeutically injected bacteria can be seen, and molecular imaging of bacterium-mediated cancer therapy demonstrates that the therapeutic bacteria were successfully delivered to the target lesion. Bacteria-specific imaging is difficult because to a number of obstacles, such as the requirement to distinguish between a therapeutic bacterial infection and inflammation or other pathologic diseases. The creation of bacteria-specific targets that can be linked to imaging assays is required to fully fulfill the potential of bacteria-specific imaging. The present state of bacterial imaging methods is discussed in this review, along with the benefits and drawbacks of various imaging modalities. We also discuss possible imaging targets for microorganisms and associated applications.

Keywords: Cancer, Molecular imaging

INTRODUCTION

Due to its special characteristics, Bacteria-Mediated Cancer Treatment (BMCT) is a promising therapeutic approach. The bac-teria employed in BMCT are effective when administered via a variety of methods and can target a wide range of tumor types. Therapeutics based on protein, RNA, or DNA can all be delivered using BMCT. Additionally, the bacteria stimulate the host immune system to eliminate tumor cells. As a result, BMCT in combination with traditional therapeutic modalities (such as chemotherapy, radiation, and immunotherapy) is now being researched and has demonstrated encouraging outcomes in both animal studies and clinical trials. A number of BMCT clinical trials utilizing Clostridium, Listeria, Salmonella, and the gut or fecal microbiome are already underway or in the planning stages. Recently, we examined the state of live bacteria or bacterial derivatives used in preclini-cal and clinical cancer therapy. New therapeutic strategies can be created by combining bacteria, viruses, nanoparticles, antibodies, and immune cells that have been produced. Recent research shows that, in spite of these advancements, not everyone experiences a therapeutic benefit in the same way and that some people do not respond to treatment. Therefore, to monitor these novel therapeu-tic strategies, molecular imaging tools that allow us to track the tailored therapies in living people are required. Before the inven-tion of microscopy, it was incredibly difficult to cure infectious infections. The success of a medicine could not be determined by whether it eliminated germs from bacterial culture media because there was no technology available to visualize microorganisms.

We will be able to peer into the body and determine why a medicine is working or failing thanks to molecular imaging techniques. A key factor in ensuring the precise distribution of bacteria to the target lesion and tracking the effectiveness of treatment is bacterium-specific molecular imaging. The creation of new modalities has aided in the advancement of molecular imaging technol-ogies. Among these, in vivo imaging is now possible thanks to the development of non-invasive imaging technologies like Positron Emission Tomography (PET) and Magnetic Resonance Imaging (MRI), which is compatible with the clinical application of BMCT.

A novel form of cancer therapy called BMCT is distinguished by its ability to target a particular type of cancer, penetrate deeply

into cancer tissues, promote intratumoral growth, deliver therapeutic payloads, activate the immune system, and work in concert with existing therapies. There are many barriers to clinical translation, including drug safety, the CMC process, GMP production, and uncertainty regarding clinical outcome, despite the fact that many scientifically outstanding BMCT approaches have been developed and a number of these have undergone or are planned to undergo clinical trials. Through quantitative and non-invasive visualization of therapies in patients, molecular imaging techniques play a significant role in overcoming some of these obstacles. Because the concentration of tumoricidal bacteria is a determinant of therapeutic efficacy, molecular imaging will enable us to evaluate the correlation between bacterial concentration (or delivered molecule) and therapeutic outcomes.

Bacteria may be hazardous, particularly in patients with compromised immune systems, though genetic engineering can lessen this risk. The use of molecular imaging in BMCT could be expanded to assess side effects from the administration of bacteria that target tumours or to forecast the therapeutic response. For instance, imaging agents based on antibiotics might be utilized not only to reveal where bacteria are located but also to direct clinical management strategies when eradicating the bacteria is necessary. Additionally, there are various ways to administer BMCT, and each one will have a varied predicted side effect profile. Molecular imaging may be useful for predicting toxicity and creating the best administration routes for BMCT because it can show the distribution of bacteria along each channel of administration. One of the potential prospects of BMCT is the fusion of several treatment approaches with various mechanisms of action. It is accurate to say that bacterial monotherapies have not had a powerful enough therapeutic effect on cancer patients. By allowing for the monitoring of therapeutic microbes in the body and coordinating the timing of other therapeutic alternatives, molecular imaging holds enormous potential for improving combination therapy. Additionally, many imaging techniques might be complementary in the treatment of tumors. Bacteria-targeted molecular imaging may be used to pinpoint the location of tumor tissues, define them using a tumor-specific imaging assay, choose the best moment to begin the next therapeutic approach, and monitor the body's bacterial distribution.

Which imaging tracers or modalities will contribute the most to BMCT is impossible to predict. The use of bacterial-specific molecular imaging in cancer treatment, particularly in live cell therapy, will undoubtedly become more significant. Even though BMCT clinical studies are being conducted all over the world, there are still many obstacles to overcome. The clinical application of BMCT will be facilitated and its indications will be expanded with the aid of molecular imaging.