Fully Automated Synthesis Of 16B-[18F] Fluorodihydrotestosterone ([18F]-FDHT)

Tech ID: 27562 / UC Case 2015-388-0

SUMMARY

UCLA researchers in the Department of Molecular and Medical Pharmacology have developed a method for the fully automated synthesis of 16β- ^{18}F-fluorodihydrotestosterone (^{18}F-FDHT), a probe to monitor prostate cancer.

BACKGROUND

Prostate cancer is the second leading cause of cancer-related death in American men. Effective management of prostate cancer requires early detection and the availability of accurate diagnostic modalities for predicting and monitoring the disease. Increased androgen receptor (AR) expression in primary tumors of prostate cancer is a strong indicator of disease; however, due to heterogeneity of the tumors, biopsy samples alone may not be sufficient for disease detection. Molecular imaging agents that can non-invasively provide information for distinguishing AR-positive tumors are critically important for the treatment of prostate cancer.

16β-^{18}F-fluorodihydrotestosterone (^{18}F-FDHT), a fluorinated analog of the native AR-binding ligand dihydrotestosterone, has proven to be one of the most effective in vivo AR-binding radiotracers studied to date. The demand for ^{18}F-FDHT is expected to increase as the clinical potential of this PET tracer to predict AR expression levels in prostate cancer patients is being recognized. Currently, the clinical production of ^{18}F-FDHT is generally performed manually by trained radiochemists; as such, its widespread use is limited to a few sites. Automation of this synthesis would enable many more facilities currently equipped for PET synthesis to routinely obtain ^{18}F-FDHT without the need for specialized personnel.

INNOVATION

UCLA researchers led by Prof. Jennifer Murphy have developed a new fully automated method to manufacture the ^{18}F-FDHT probe using the ELIXSYS system. This will allow PET centers around the globe without the expertise to synthesize these PET probes to begin utilizing ^{18}F-FDHT as a widespread probe to monitor prostate cancer.

APPLICATIONS

This automatically generated ^{18}F-FDHT probe will be a great utility in monitoring and diagnosing prostate cancer patients.

ADVANTAGES

- Highly reproducible synthetic strategy
- Lowers radiation exposure to PET probe synthetic chemists
- Enables PET centers with ELIXSYS systems to make probe at will
- Production does not require specially trained radiochemist

STATE OF DEVELOPMENT

This automated protocol is currently utilized at UCLA and MSKCC.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,065,985	09/04/2018	2015-388

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INVENTORS

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OTHER INFORMATION

KEYWORDS

prostate cancer, 18F-FDHT, FHDT, 16ß- 18F-Fluorodihydrotestosterone, Fluorodihydrotestosterone, androgen receptor, PET, PET probes, molecular imaging, ELIXSYS, automation

CATEGORIZED AS

- **Biotechnology**
  - Health
- **Imaging**
  - Molecular
- **Medical**
  - Diagnostics
  - Disease: Cancer
  - Imaging
  - Screening

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