AXUMIN™
Fluciclovine F 18 Injection

Disease State Overview and Unmet Clinical Need

In 2016 an estimated 180,890 American men will be diagnosed with prostate cancer, making it the most commonly diagnosed non-cutaneous neoplasm in men in the US. The average age at diagnosis is 66 years and the age-adjusted incidence rate is 1 case per 7 men per year with 6 of 10 new cases occurring in men older than age 65. The American Cancer Society estimates that 26,120 men will die as a result of prostate cancer in 2016. Given this impact on the healthcare system, the importance of successful diagnosis, staging and treatment of this disease cannot be overstated.[1]

Up to one third of patients treated with curative intent following a diagnosis of primary prostate cancer will experience recurrent disease within 10-15 years following primary treatment.[2,3,4] One third of those men who have recurrence will go on to develop metastatic disease within 8 years.[5] In a vast majority of cases, evidence of recurrent disease is based on serial measurement of prostate specific antigen (PSA) alone. This is often referred to as biochemically recurrent (BCR) prostate cancer and is clearly defined within clinical guidelines.[6,7] Determining the location of the recurrence is critical, as this guides the optimal choice of therapy. The diagnostic accuracy of standard imaging tests for the identification of sites of recurrence is low. Almost 90% of the standard battery of imaging tests, for example, CT, MRI and bone scintigraphy, may be negative.[8] Some imaging procedures may be unable to detect recurrent prostate tumors <1 cm in size or when PSA levels are <20 ng/mL—when cancer may be more effectively managed or treated with localized therapy.[9-14] For this reason more accurate, non-invasive imaging techniques for the detection of recurrent cancer are needed.

Positron emission tomography (PET) is a well-established, non-invasive, molecular imaging technique. The principle behind the PET radiotracers used in oncology is to image the altered metabolism or receptor profile of tumor cells. Nuclear medicine imaging procedures have been utilized for the detection of recurrent prostate cancer for a number of years, however it is widely recognized that improved imaging techniques are needed to improve diagnostic detection rates in these patients.

One key area of interest has been PET tracers that visualize the increased amino acid transport associated with tumor cells in comparison to normal tissues.[15,16] Extensive preclinical and clinical research has identified several desirable features for an effective amino acid-based oncology PET imaging agent for use in prostate cancer imaging;[16,17] these include: the ability to be radiolabeled with fluorine 18 (provides a 110 minute half-life, more practical for clinical use), substrate for amino acid transporters upregulated in cancer cells or associated with malignant phenotype,[18] lack of incorporation into protein (potential safety implications of introducing synthetic amino acids into proteins) and limited urinary excretion.

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Fluciclovine F 18 is a synthetic amino acid which has these key features. It is actively transported into mammalian cells by amino acid transporters (AATs), most notably LAT1 and ASCT2 transporters.[19,20,21] It is not metabolized, nor is it incorporated into newly synthesized proteins.[20] PET imaging studies have demonstrated that fluciclovine F 18 is preferentially taken up into prostate cancer compared with surrounding normal tissue and that visualization of the image is not obscured by bladder uptake.[22] It was therefore selected as a suitable radioligand for development for the molecular imaging of prostate cancer, particularly in men with biochemical recurrence following prior treatment.

Axumin (fluciclovine F 18) has been specifically developed by Blue Earth Diagnostics as a molecular imaging agent for the detection and localization of biochemically recurrent prostate cancer. Axumin was approved by the FDA on May 27, 2016, and its indication is as follows:

Axumin is a radioactive diagnostic agent indicated for positron emission tomography (PET) imaging in men with suspected prostate cancer recurrence based on elevated blood prostate specific antigen (PSA) levels following prior treatment.

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INDICATION

Axumin™ (fluciclovine F 18) injection is indicated for positron emission tomography (PET) imaging in men with suspected prostate cancer recurrence based on elevated blood prostate specific antigen (PSA) levels following prior treatment.

IMPORTANT SAFETY INFORMATION

- Image interpretation errors can occur with Axumin PET imaging. A negative image does not rule out recurrent prostate cancer and a positive image does not confirm its presence. The performance of Axumin seems to be affected by PSA levels. Axumin uptake may occur with other cancers and benign prostatic hypertrophy in primary prostate cancer. Clinical correlation, which may include histopathological evaluation, is recommended.
- Hypersensitivity reactions, including anaphylaxis, may occur in patients who receive Axumin. Emergency resuscitation equipment and personnel should be immediately available.
- Axumin use contributes to a patient's overall long-term cumulative radiation exposure, which is associated with an increased risk of cancer. Safe handling practices should be used to minimize radiation exposure to the patient and health care providers.
- Adverse reactions were reported in ≤1% of subjects during clinical studies with Axumin. The most common adverse reactions were injection site pain, injection site erythema and dysgeusia.

To report suspected adverse reactions to Axumin, call 1-855-AXUMIN1 (1-855-298-6461) or contact FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

Full Axumin prescribing information is available at: www.axumin.com.