National Institutes of Health
Clinical Center

Transperineal Ultrasound-Guided Prostate Biopsy

Summary (1024-character limit)
The National Institutes of Health (NIH) Clinical Center (CC) seeks Cooperative Research and Development and/or license agreements for Transperineal Ultrasound-Guided Prostate Biopsy

NIH Reference Number
E-277-2015

Product Type
- Devices

Keywords
- Prostate biopsy, ultrasound-fusion image, transperineal 3-D ultrasound imaging, sensorless, guided biopsy, Wood

Collaboration Opportunity
This invention is available for licensing and co-development.

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Description of Technology

Prostate cancer is the most common male cancer in the United States, and the third most common worldwide. Prostate biopsies are often performed to confirm a cancer diagnosis and examine suspect tissue. Prostate biopsies are most often performed under transrectal ultrasound imaging (TRUS) guidance. TRUS images in real-time, at relatively low cost, and shows both prostate and boundaries. However, major problems with TRUS imaging are poor spatial resolution and low sensitivity for cancer detection. Fusion of TRUS images with preoperative images such as Magnetic Resonance (MR) or CAT may improve accuracy and resolution. But, this approach still requires TRUS imaging during the procedure and negates some of the relatively low cost. In addition, fusion of TRUS and MR images requires sensors such as electromagnetic (EM) tracking to determine position and orientation. This increases the expense and complicates the process. The TRUS imaging process itself is invasive, stressful to patients, and increases infection risk.

Researchers at Clinical Center (CC) developed a system that enables less-invasive prostate biopsies

without the need for a tracking sensor. This is done through elimination of the TRUS probe in favor of a 3D ultrasound probe and custom image pre-registration to preoperative high-resolution volume scan (such as MR or CAT). The use of the 3-D probe allows for ultrasound image acquisition via perineal placement. The ultrasound images are registered to a biopsy needle guidance grid. To improve accuracy, the image registration to the grid trajectories is fused with grid registration images from preoperative MR or CAT images. The specific apertures in the needle guidance grid is selected based on the optimal trajectories to target tissue area for biopsy. This system offers a simpler, more accurate, less invasive and less expensive procedure than traditional TRUS-guided fusion biopsy.

Potential Commercial Applications

- Cancer screening
- Prostate biopsy

Competitive Advantages

- Real-time modality for lower cost
- Improved detection sensitivity;
- Sensorless
- Minimally noninvasive ultrasound imaging of prostate

Inventor(s)

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Development Stage

- Prototype

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number , Filed 28 Jul 2016
- **U.S. Patent Filed:** U.S. Patent Application Number , Filed 28 Jul 2017

Therapeutic Area

- Cancer/Neoplasm