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# An integrated intraoperative diagnosis and therapy catheter system

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## OTHER INFORMATION

### CATEGORIZED AS

- » **Optics and Photonics**
  - » All Optics and Photonics
- » **Imaging**
  - » Medical
  - » Other
- » **Medical**
  - » Diagnostics
  - » Disease: Cancer
  - » Imaging
  - » Other
  - » Therapeutics

### RELATED CASES

2014-262-0

# BRIEF DESCRIPTION

In traditional cardiology and oncology, disease diagnosis and treatment are traditionally separate procedures resulting in increased costs and delayed treatment, which, in some cases, may increase morbidity. Therefore, a system that can diagnose and treat diseases simultaneously would greatly decrease costs and provide timely treatment, which may prevent death from the disease. Researchers in the Department of Engineering at UC Irvine, in collaboration with researchers at Shanghai Jio Tong University in China have invented a multimodal system for the diagnosis and treatment of cancer and cardiac disease.

## Summary of development

The present invention describes an intraoperative imaging and therapy catheter system for the accurate diagnosis and treatment of cancer and cardiac disease. This multimodal medical device combines imaging, cryosurgery, and thermal therapy thereby permitting accurate diagnosis and treatment of vulnerable plaques in blood vessels and various types of cancers. In addition, by adding low cost imaging modalities such as optical coherence tomography (OCT), ultrasound imaging, photoacoustic (PA) imaging, fluorescence imaging and thermal imaging, cryosurgery can be performed with much higher accuracy. Importantly, addition of these imaging systems enables accurate identification of lesion sites, precise depth of cryosurgery/heating probe placement, and the capability to monitor the extent of the freezing/heating process. Furthermore, the invention may include intravascular ultrasound (IVUS) facilitating visualization of cross-sectional images of the vessel wall, entire large lipid pools, and large tumor regions. These parameters are valuable for the guidance of cryoplasty regarding the treatment time, temperature and location.

# SUGGESTED USES

We are currently looking for a commercial partner to further develop this product for simultaneous diagnosis and treatment of a variety of cancers and cardiac diseases. Various embodiments of the intraoperative imaging catheter system allow device customization to meet diagnosis and treatment needs that differ between disease states.

# ADVANTAGES

## Advantages and Applications

- The intraoperative imaging and therapy catheter will reduce costs associated with separate diagnosis and treatment procedures for cancer and cardiac diseases.
- Individual or multiple imaging technologies can be integrated into a single catheter. These imaging tools can be used to monitor tissue temperature during cryosurgery and to identify sites of lesions, plaques, and large tumor regions.
- The catheter system can be used in any blood vessel, including arteries and veins and can be applied to cancers including but not limited to lung, liver, pancreatic, prostate, and breast cancer.

# PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,568,687	02/25/2020	2014-262

