

SE-05-03

Next-generation cancer therapy pioneered by the fusion of quantum bioscience and robotic surgery

Nobu OSHIMA*Kyoto Univ./ KCGH*

Abstract

In next-generation medicine, technologies that visualize the biological properties of specific cells hold vast potential for various applications. For instance, hyperpolarized MRI has already been introduced into cancer clinical practice worldwide. This advanced imaging technology enables real-time observation of specific biological activities within cancerous tissues. From a physician's perspective, hyperpolarized MRI is not only capable of precisely identifying tumor boundaries but also holds the potential to realize "theranostics"—combining diagnosis and treatment in a single approach. In the treatment of solid tumors, surgery remains the most powerful therapeutic method, but with the advent of robotic surgery, we are entering a new era of surgical treatment. Robotic surgery is highly compatible with a range of digital technologies and has the potential to leverage cutting-edge imaging technologies and AI to deliver innovative, unprecedented surgical treatments. These next-generation surgical techniques aim to comprehensively incorporate these technologies to further improve safety and treatment outcomes. In this presentation, I will demonstrate the practical applications of robotic surgery using the latest technologies. Additionally, I will explore the potential for future cancer treatment pioneered by the fusion of quantum life science technologies and robotic surgery, from the perspective of a physician.