

# Lasers Drive Personalized Medicine

New ways to kill cancer, diagnose disease, and do genetics, all require lasers

**W**orldwide the quest for killing cancer is gaining momentum. Simultaneously cost of healthcare is soaring. Photonics is a key player in new therapies & diagnosis. Key tool for tackling the cost is establishing methods for sharing information across platforms and enabling usage-based business models.\*)

Cancer is becoming more common as the population ages, and lasers are utilized in many therapies, such as photoimmunotherapy (PIT), surgery and diagnostics both ex- and in-situ. PIT is based on the reaction of a light-activated drug that generates tumor cell-damaging species. Modulight is active in the oncology space where we are engaged in ongoing clinical trials for example in uveal melanoma, head and neck cancers, and glioblastoma. We are in this because we see a chance to kill cancer – there have been even palliative care patients being healed. Besides cancer therapy, studies suggest that lasers could have a role in fighting the Methicillin-resistant *Staphylococcus aureus* (MRSA) bacterium. Lasers are also finding their way both as scalpel as well as sensor in the next-generation surgical robots.

Gene sequencing is key tool of personalized medicine. In practice this means tailoring treatment based on the individual's genetic information. Sequencing is expanding rapidly, and many platforms rely on diode lasers for fluorophore-conjugated base identification. It has become affordable for the general public to get own genome sequenced to get information about disease-related genes. In oncology, sequencing tumor biopsy can reveal information on specific mutations, which can be used for diagnosis as well as to monitor cancer regression, resistance and even to decide the most effective anticancer medicine for the patient.

Advances in medical research are firmly connected to advances in instruments, many of which utilize lasers. Technology is developing fast to answer the diverse needs of modern pharma research and quality control – our biomedical illumination system ML8500 enables automatization of in-vitro photodynamic therapy research, multiple independent laser beams in multi-parametric surface plasmon resonance (MP-SPR) enable deeper analysis of biomolecular interactions, and new single cell sequencers unveil mutational information on a single cell level, to name just a few examples. Integration of simultaneous diagnostics and therapy into a single agent has created a totally new field in medicine, called theranostics. Combining fluorescent dyes with nanotechnological approaches, such as antibodies or light-activated liposomes, has shown very promising results and many agents are translating into clinic.

The future of medical lasers is looking bright. Thus we are making lasers and optics for personalized medicine and a better life.

Yours,  
Seppo Orsila



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\*) Central piece to this in our strategy is [cloud.modulight.com](http://cloud.modulight.com)



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