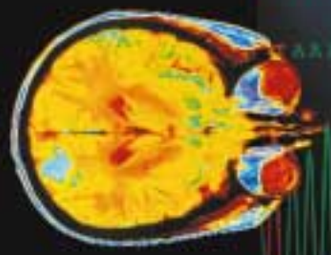
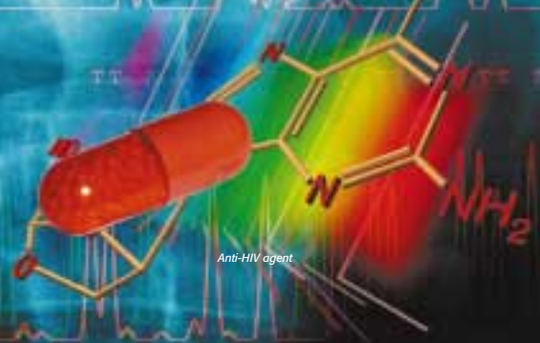
Biomedical Optics and Biophotonics

Light for Health



Noninvasive diagnostics using light-based technologies, such as brain imaging and optical diagnostics, and minimally invasive techniques and devices such as endoscopy and ingestible cameras improve disease detection and help to ease patient trauma.



Anti-HIV agent

Genomic sequencing techniques enabled by light-driven technologies aid in new drug discoveries, allowing us to combat diseases and illnesses both old and new, and will lead to better medical approaches for many ailments.

Lasers are used in dermatology, dentistry, eye surgery, and oncology—and new techniques will improve medicine even further, from better sutures to treating osteoporosis. New surgical techniques using light will make surgeons more efficient and cost-effective.

High-Quality DNA
Image courtesy of Michael W. Davidson, Florida State Univ.

Scientists are using new devices and techniques such as optically coupled atomic force microscopes to manipulate cell membranes, laser trapping to isolate and study proteins, and optical standing wave interferometry to study proteins in cell membranes. Researchers aim to create biochips to identify disease-causing bacteria or viruses.

Virtual Colonoscopy Image courtesy of Arie Kaufman, Copyright Arie Kaufman, Stony Brook University

Advanced imaging technologies such as OCT (optical coherence tomography) and CT (computed tomography) allow for virtual colonoscopy and optical mammography, advances made possible through optics and biophotonics.

Optical technologies are improving biological and biochemical screening and detection systems and will improve our knowledge of how substances in the environment affect us.

Optics and Photonics
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