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Abstract— The talk reviews how UV LEDs and visible LEDS in the future may be utilized in new medical applications. The first topic concerns how LED can be used to treat human infectious diseases. Antibiotics provide the most common treatment for a variety of human infectious diseases. However, in recent years, there has been an increase in bacterial resistance due to the overuse of antibiotics. Therefore, there is a need to reduce the amount of antibiotics used in the treatment of infections, and UV LEDs may offer new solutions. The UV LED technology has developed significantly in recent years and it is now possible to use these light systems for a number of antibiotic applications. We discuss a synergy that exists between certain UV wavelengths and antibiotics, which helps to reduce the usage of antibiotics and increase the disinfection effect. The principle can be used to activate antibiotics in specific places in the human body where it may be used for the treatment of an infection. By using UV LEDs, antibiotics can be photoactivated so that even small amounts of antibiotics can lead to effective treatment of infectious diseases.

We also discuss how visible LEDs can be used for new medical applications. It is well known that LEDs in the visible wavelength range can be used to control the human circadian rhythm and that this application has significant potential to improve the health of humans. However, it is less well known that visible LEDs also have the potential for the treatment of diseases such as Alzheimer's and Parkinson's. We show that it is possible to temporal modulate and tailor the wavelength spectrum of the LED to activate brain waves. The human retina consists of five types of photoreceptors that influence how the brain is affected by light. We suggest using the intrinsically photosensitive retinal ganglion cells (ipRGC) based on melanopsin to modulate the neuron response and at the same time increase the metabolism in different parts of the brain. The technology is attractive to maintain the brain in a good condition, and it may in the future be used for the treatment of a large number of neurological diseases.