chapter 4

Light and Life

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Since the 10th century B.C., light has been appreciated as a source of energy. Psychologically, a powerful ray of light can induce calmness and excitement in humans. We have been told in the holy books of Islam, Judaism, and Christianity, how the Queen of Sheba (Balqis) had lived with hundreds of windows that allowed beams of sunlight in every morning before she prostrated in front of them. It is probably through this ancient practice that the physician Niels Finsen was inspired to use light to treat diseases and developed the first artificial light source for this purpose back in the 1900s.

The revolution of light in medicine has led to the drastic development of devices for clinical applications. Visible light is used as a transilluminator to detect hydrocephalus (water-head) or pneumothorax (collapsed lung) in infants, and as optical fibres to examine the interior of a hollow organ or cavity of the body (endoscopy). The exposing of visible light (phototherapy) is also known to safely reduce high bilirubin levels that causes neonatal jaundice. Ultraviolet light at wavelengths less than 290 nm is germicidal and is used to sterilise medical instruments. More recently, the area of biophotonics was developed. The combination of biology and light particles (photon) as a scanner has been clinically proven to be a terrific indicator of the body's complete antioxidant network, without any invasiveness. This method can also manipulate light and lasers for precise monitoring of our environment and food.

The concept of using mirrors and lenses to magnify images using light reflection dates back to pre-history. With the advancement of technology, a new generation of microscopes such as the cryo-electron microscopy has facilitated the studying of structures of various biological molecules. Precise reconstructed images of virus particles, for instance, offer researchers valuable knowledge for vaccine strategy. The artefacts in this section depict indirect representations of light in the medical field.

Strabismus or 'Squint', is a refractive error of the eye, which can cause double vision in adults or lazy eye in children when reflected light enters the cornea. The artefact is displayed to demonstrate the different types of deviated eyes. 'The Bouncy Beam' and 'Circuit of Life' introduce the audience to the wonders of neuro cells. The 'jumping' action of information from one axon of a neuron to another requires electrical and chemical signals. This intricate neuronal action travels like a circuit in all parts of the brain.

'Bioluminescence' describes the production and emission of light by miniature organisms or coined as microcosms. In the medical field, bioluminescent animal models such as zebrafish can be applied as a biophotonic tool to measure toxicity upon inoculation of drugs or chemicals.

The various functions of pandan leaves are the emphasis of 'Rhythm of Pandanaceae'. While the article describes the aromatic and therapeutic uses of pandan leaves, the artefact manipulates light refraction to display the captivating movement of pandan essential oil as it enters water.

If you receive light at the right time, everything will be extraordinary.