Lasers have many applications in medicine

Lasers are also used for many medical procedures by making use of the fact that specific body tissues absorb different wavelengths of laser light. For example, lasers can be used to lighten or remove scars and certain types of birthmarks without affecting surrounding tissues. The scar tissue responds to the wavelength of light used in the laser, but other body tissues are protected.

Many medical applications of lasers take advantage of the fact that water can be vaporized by high-intensity infrared light produced by carbon dioxide lasers having a wavelength of 10 μm. Carbon dioxide lasers can cut through muscle tissue by heating and evaporating the water contained in the cells. One advantage of a laser is that the energy from the laser also coagulates blood in the newly opened blood vessels, thereby reducing blood loss and decreasing the risk of infection. A laser beam can also be trapped in an optical fiber endoscope, which can be inserted through an orifice and directed to internal body structures. As a result, surgeons can stop internal bleeding or remove tumors without performing massive surgery.

Lasers can also be used to treat tissues that cannot be reached by conventional surgical methods. For example, some very specific wavelengths of lasers can pass through certain structures at the front of the eye—the cornea and lens—without damaging them. Therefore, lasers can be effective at treating lesions of the retina, inside the eye. Lasers are used for other eye surgeries, including surgery to correct *glaucoma,* a condition in which the fluid pressure within the eye is too great. Left untreated, glaucoma can lead to damage of the optic nerve and eventual blindness. Focusing a laser at the clogged drainage port allows a tiny hole to be burned in the tissue, which relieves the pressure. Lasers can also be used to correct nearsightedness by focusing the beam on the central portion of the cornea to cause it to become flatter.

Did you know?

The principle behind reading the information stored on a compact disc is also the basis for the reading of bar codes found on many products. When these products are scanned, laser light reflected from the bars and spaces of the bar code reproduces the binary codes that represent the product's inventory number. This information is transmitted to the store's computer system, which returns the product's name and price to the cash register.

SCILINKS
www.scilinks.org
Topic: Bar Codes
Code: HF60135

SECTION REVIEW

1. How does light from a laser differ from light whose waves all have the same wavelength but are not coherent?
2. The process of stimulated emission involves producing a second wave that is identical to the first. Does this gaining of a second wave violate the principle of energy conservation? Explain your answer.
3. **Critical Thinking** Fiber-optic systems transmit light by means of internal reflection within thin strands of extremely pure glass. In these fiber-optic systems, laser light is used instead of white light to transmit the signal. Apply your knowledge of refraction to explain why.