Endorphins Reading

The word "endorphin" was coined from "endogenous morphine" and refers to the brain's natural painkillers (opiates). After Candace Pert and Solomon Snyder identified "opiate receptors" in brain areas linked with pain, the race to identify the brain's natural painkillers was on. The discovery of the endorphins grew out of the curiosity of two British pharmacologists, Hans Kosterlitz and John Hughes, who in 1975 isolated a substance from the brains of pigs that had the same actions as morphine; they named it enkephalin. Subsequently, other brain opioids were discovered. The group as a whole was named endorphins, and research has now indicated that these natural opiates are produced by the brain, the pituitary gland, and other tissues in response to pain, stress, and even vigorous exercise.

While pain is necessary to warn us of danger to our physical well-being, constant intense pain would eventually incapacitate us, and so endorphins help our bodies to control the degree of pain. Studies of laboratory rats have demonstrated that not only shock but even its anticipation can produce an increase in brain endorphins. For example, when rats were placed in a chamber where they had been shocked a week earlier, the level of the brain's natural opiates immediately increased.

Other investigators have shown that psychological stress also triggers the production of endorphins. In one study, pain was induced by a shock to the subject's foot. The degree of pain was not determined by measuring the reflex actions of the leg muscles, a test that has proved reliable in other studies. The experimenters, instead, induced stress by sounding a warning signal 2 minutes before a shock might or might not be delivered. The subjects were tested under three conditions. Some were given an injection of a painkiller, such as morphine; a second group was given an injection of naloxone (a drug that suppresses endorphin activity in the brain); and a third group was given nothing at all. Initial pain sensitivity was identical in all three conditions. Results showed that with repeated stress, pain sensitivity decreased in
both the no-injection and painkiller-injection conditions. This suggested that the subjects in the no-injection group had indeed produced natural opiates. Proof of this came from the fact that men and women who received the endorphin suppressor actually showed more sensitivity to pain and stress as testing proceeded.

As noted in the text, strenuous exercise also triggers the release of endorphins. Studies of seasoned runners, for example, show that during a long, difficult workout the nervous system can dip into its endorphin reserve and not only block pain messages but also produce the so-called runner's high. Perhaps of greatest interest to students will be some applications of this research. The endorphin system can be brought into action by neurostimulation therapy. In this pain-reducing technique, wires are pasted to the skin near an injury, and a slight electric current is delivered through electrodes. Low-frequency, high-intensity impulses stimulate endorphin release. Olympic athletes have used this method to ease various aches and pains. Steve Maslek reportedly played much of his final year of high school basketball with a battery-powered neurostimulator under his uniform (he later played for the University of Pittsburgh). The device helped the 6-foot-8-inch center participate despite a stress fracture in his backbone. More recently, Donovan McNabb, quarterback for the Philadelphia Eagles, threw four touchdown passes while playing with a broken ankle.
