2 Scientific Basis of Acupuncture

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In this chapter some of the modern scientific studies on acupuncture are outlined. A more detailed review appears in Acupuncture Textbook and Atlas by Stux and Pomeranz [179a] and Scientific Bases of Acupuncture by Pomeranz and Stux [151a].

2.1 Acupuncture Analgesia (Basic Research)

In recent years in the west, acupuncture analgesia (AA) has been restricted mainly to the treatment of chronic pain and has not been used for surgical procedures except for demonstration purposes. In some Western countries, however, AA is used in combination with nitrous oxide (sufficient N₂O being given to render the patient unconscious, but not enough for analgesia) [76] or with fentanyl [83b]. However, even for the treatment of chronic pain, many Western physicians were sceptical at first, despite a vast body of anecdotal evidence from both China and Europe.

How could a needle in the hand possibly relieve a toothache? Because such phenomena did not conform to physiological concepts, scientists were puzzled and sceptical. Many explained it by the well-known placebo effect which works through suggestion, distraction, or even hypnosis [199, 200]. In 1945 Beecher [11] had shown that morphine relieved pain in 70% of patients, while sugar injections (placebo) reduced pain in 35% of patients who believed they were receiving morphine. Thus, many medical scientists in the early 1970s assumed that AA worked by the placebo (psycho-
logical) effect. However, there were several problems with this idea. How does one explain the use of AA in veterinary medicine over the past 1000 years in China and for approximately 100 years in Europe, and its growing use on animals in America? Animals are not suggestible, and only a very few species are capable of the still reaction (so-called animal hypnosis). Similarly, small children respond to AA. Moreover, several studies in which patients were given psychological tests for suggestibility did not show a good correlation between AA and suggestibility \[98\]. Hypnosis has also been ruled out as an explanation, as there have been two studies \[7, 61\] showing that hypnosis and AA respond differently to naloxone, AA being blocked and hypnosis being unaffected by this endorphin antagonist.

Up to 1973 the evidence for AA was mainly anecdotal, with a huge collection of case histories from one-quarter of the world's population. Unfortunately, there were few scientifically controlled experiments to convince the sceptics. In the past 17 years, however, the situation has changed considerably. Scientists have been asking two important questions. First, does AA really work (that is by a physiological rather than a placebo/psychological effect)? Second, if it does work, what is the mechanism?

The first question (does it work?) had to be approached by way of controlled experiments to remove placebo effects, spontaneous remissions, etc. These have been carried out in clinical practice on patients with chronic pain (see Sect. 2.2), in the laboratory on humans, studying acute laboratory-induced pain (see Sect. 2.5), and on animals (see Sect. 2.5). From these numerous studies it can be concluded that AA works much better than placebo.

Hence AA must have some physiological basis. But what are the possible mechanisms? Only the answer to the second question (how does AA work?) could possibly dispel the deep scepticism toward acupuncture.

### 2.1.1 Neural Mechanisms of Acupuncture Analgesia

Ten years of research in my laboratory, coupled with over a hundred papers from the western scientific literature led to a compell-