sively applied to the mode of action of a number of different types of chemical agents. Handley and Abreu investigated the cortical and respiratory stimulating properties of benzedrine by injecting four groups of ten rabbits each with 10 mg. per Kg. of morphine sulphate, and ten minutes later the respiratory rate was determined and note made of the activity of the animal. The experiment was carried on for two periods, the first for seventy minutes and the second for seventy-five minutes. At the end of the first period a second injection of the analeptic agent was made and the animals were then examined at the same time intervals as in the first period.

In doses of 10 mg. per Kg. benzedrine sulphate and ephedrine sulphate significantly stimulate respiration during the first period of treatment with morphine, while caffeine sodio-benzoate in a dosage of 30 mg. per Kg. does not materially affect respiration. Motor activity is increased by all of the agents, but animals treated with ephedrine and caffeine soon return to their depressed, lethargic state. Benzedrine animals at the end of the first period became lethargic but still showed greater signs of activity by evincing an interest in movements about them. At the end of the second period, only animals which had received benzedrine remained active.

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NELSON, ERWIN E.: *The Action of the Opium Alkaloids on the Gastro-Intestinal Tract*, Internat. M. Digest **39**: 117–120 (Aug.) 1941.

The historical idea of the action of opium on the gastro-intestinal tract is that it is a sedative. Its classical use in diarrhea, peritonitis, postoperative ileus, gastric and intestinal hemorrhage, is based on this concept, and clinical results seem to support it. Further, the constipating action of morphine is well known. To the pharmacologist, however, morphine is a smooth muscle stimulant.

The initial effect on motility is that on the stomach, particularly the pyloric sphincter. Morphine causes a temporary spastic contraction and a prolonged increase in the general tone of the pyloric sphincter and duodenum. The response of the antrum is variable.

It has been shown by experimental evidence that morphine stimulates motor activity of the small intestine but there is an actual decrease in the propulsive activity. In other words, there is an increase in the so-called "mixing waves" but a decrease in the "peristaltic waves."

The large intestine is likewise stimulated by morphine. After morphine, there is found an increase in muscle tone and an increase in both propulsive and non-propulsive movements. The propulsive effects of greatest magnitude tend to occur in the period immediately after the injection, which is the period in which morphine in dogs is frequently followed by defecation. It is estimated that the various actions on the large intestine contribute about one-fourth of the total action of morphine. In the depression of attention to stimuli induced by morphine, the call to defecation is undoubtedly included. Perhaps this contributes to the constipating action of morphine.

Morphine inhibits gastric secretion in the fasting subject, stimulates the smooth muscles of the biliary tract, and decreases the fluidity of the intestinal contents by allowing increased time for absorption of water.

The other alkaloids resemble morphine qualitatively, though there are quantitative differences. Codeine is definitely less stimulating and less constipating than morphine. Dilaudid is more powerful than morphine.

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