

Brief Communication

THE FAILURE OF PENTAGASTRIN TO INCREASE PLASMA
CALCITONIN CONCENTRATION IN THE COW

A possible role of gastrin in postprandial calcium homeostasis in monogastric animals was suggested by *Cooper et al.* (1972). The suggestion was based on the facts that gastrin acts as a calcitonin (CT) secretagogue in some species, e.g. swine, and that feeding was shown to increase the plasma concentration of both gastrin and CT. In cows it was shown that intravenous infusion of pentagastrin caused a significant reduction of serum calcium in intact but not in thyroidectomized animals (*Luthman et al.* 1975). The result favored the hypothesis that gastrin-induced hypocalcemia was mediated by CT. Similar results were obtained in sheep after electric stimulation of the vagus nerve (*Barlet* 1972). There are, however, several reports which present evidence for the hypothesis that gastrin causes hypocalcemia independent of the thyroid gland (*Schulak & Kaplan* 1974, *Krishnamra & Limlomwongse* 1978), and the present preliminary experiments were undertaken to further study the role of CT in gastrin-induced hypocalcemia in the cow.

Pentagastrin (Peptavlon®, ICI) was injected intravenously to 2 cows, 5 and 6 years old. The dosage given was 2 µg/kg of body weight.

The CT levels were determined by radioimmunoassay (RIA) according to *Forslund & Stridsberg* (1980). All hormone data represent the mean of triplicate determination.

There was no elevation of the plasma CT caused by the pentagastrin injection (Fig. 1). Still there was a decrease in the plasma Ca level 20—30 min after injection (Fig. 1). The plasma inorg. phosphate did also decrease 1 h after pentagastrin injection (Fig. 1).

The CT levels are closely related to the changes in blood Ca (Fig. 1). The increase of 0.22 µg/l in plasma CT after 5 min in 1 of the cows cannot be considered as a genuine CT discharge. Generally a Ca⁺⁺-stimulated CT release should at least exceed 2 µg/l to be considered as significant. In man and pig there is often a similar elevation of CT due to pentagastrin injection and Ca infusion (*Cooper et al.*).

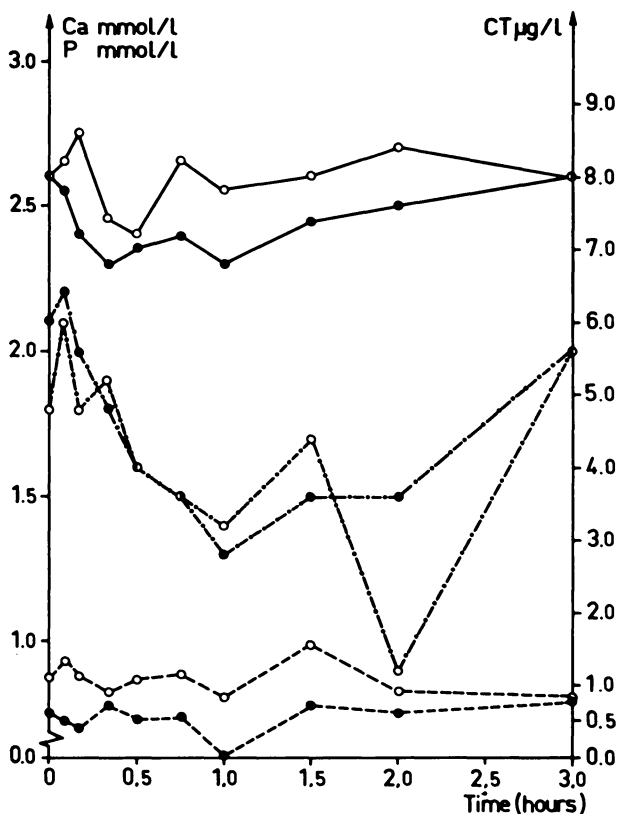


Figure 1. Blood levels of calcium (Ca) ———, inorg. phosphate (P) - - - - and calcitonin (CT) - - - - - after a pentagastrin injection for cows No. 1 (○) and No. 2 (●).

Thus, the decrease in plasma Ca and inorg. phosphate cannot be explained by a CT release. According to the results obtained in the present study gastrin has the ability to depress plasma Ca without increasing CT secretion as was suggested by *Schulak & Kaplan* and *Krishnamra & Limlomwongse*. The results obtained by *Luthman et al.* and *Barlet* may be explained by the hypothesis that some other factor(s) of thyroid origin may be involved in the ruminants.

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(Received February 5, 1980).

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