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THE EFFECT OF Na<sup>+</sup> REMOVAL ON CATECHOLAMINE SECRETION  
INDUCED BY MUSCARINE FROM PERFUSED ADRENAL GLAND  
OF THE GUINEA-PIG

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*(Summary of graduation thesis written under direction of Dr. Y. Nakazato)*

1. The effects of extracellular Na<sup>+</sup> deprivation on muscarine-induced catecholamine secretion compared with that evoked by caffeine were examined in perfused adrenal glands of the guinea-pig. The effects of ryanodine, thapsigargin and cyclopiazonic acid on the evoked secretory responses were also studied in the absence of extracellular Ca<sup>2+</sup> and Na<sup>+</sup>.

2. Muscarine was repeatedly applied for 1 min at 15-min intervals in the presence or absence of extracellular Ca<sup>2+</sup>. The amount of catecholamine released by muscarine gradually declined on repetition. The extent of the decrease was much greater in the absence of Ca<sup>2+</sup> than in its presence. On the other hand, when both Ca<sup>2+</sup> and Na<sup>+</sup> were removed, the secretory response to muscarine was significantly enhanced.

3. Under Na<sup>+</sup>-deficient conditions, the caffeine-induced secretory response, but not the muscarine-induced one, disappeared after the treatment with ryanodine, thapsigargin or cyclopiazonic acid. In the presence of extracellular Na<sup>+</sup>, however, thapsigargin abolished both responses to caffeine and muscarine.

4. These results suggest that the cytosolic Ca<sup>2+</sup> concentration responsible for catecholamine secretion is partly regulated by the Na<sup>+</sup>-Ca<sup>2+</sup> exchange mechanism, and that muscarine may mobilize Ca<sup>2+</sup> from intracellular stores, which are insensitive to ryanodine and Ca<sup>2+</sup>-ATPase blockers under Na<sup>+</sup>-free conditions.