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**ACTIVATION OF NORADRENALINE RELEASE BY CALCIUM,
STRONTIUM AND BARIUM IONS AT THE ADRENERGIC
NEURONS OF THE GUINEA-PIG VAS DEFERENS**

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The present experiment was carried out to determine whether strontium and barium ions can substitute for calcium ion in the release of noradrenaline induced by high K from guinea-pig vas deferens.

1) In the presence of potassium 60 mM, either Ca^{++} , Sr^{++} or Ba^{++} ion was found to be effective in increasing the output of noradrenaline in a conventional concentration. The order of the potency was Ba^{++} , Ca^{++} and Sr^{++} .

2) Addition of 2.5 mM of each divalent cation to Ca-free Krebs solution was ineffective in increasing the output of noradrenaline, even after the preparation was exposed to a Ca-free medium for almost 2 hours. When the preparation was incubated for 1 hour with the medium containing Ba^{++} 2.5 or 5 mM (but not others), the noradrenaline output increased by a small amount which corresponded only a small percent of that induced by high K.

3) The release of noradrenaline induced by high K increased with an increase in the concentration of Ca^{++} , Sr^{++} and Ba^{++} until the release reached a maximum at 2.5 mM of each cation. A further increase in the concentration caused inhibition of the releasing response.

4) The interaction between Ca^{++} , Sr^{++} and Ba^{++} and the competitive antagonism between Mg^{++} and those of the releasing response may suggest that all these cations act on the same site.

5) Kinetic analysis on the releasing response of noradrenaline suggests that the affinity of Ca^{++} , Sr^{++} and Ba^{++} towards the active site is approximately equal, and therefore, the difference of the potency between them might be attributed to the effectiveness of the cation-active site complex.