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**EFFECTS OF GROWTH AND OOPHORECTOMY ON CALCIUM  
BALANCE**

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## ABSTRACT

This thesis assesses calcium balance and its components, measured by metabolic balance studies, in ovary-intact (sham) and oophorectomised (oophx) young (1.5-4 month) and adult (7-14 month) rats.

In the young rat, calcium balance diminished with age as rats approached full size. The major factor leading to reduced balance with age was reduced true calcium absorption. The age-related reduction in calcium balance was more rapid in oophx rats, due mainly to a transient rise in intestinal calcium secretion and partly to a fall in true calcium absorption.

Oophorectomy in adult rats led to reduced calcium balance resulting from transient rises in intestinal calcium secretion and urine calcium excretion in the short term and in the long term reduced calcium balance was sustained by reduced intestinal calcium absorption. Although calcium balance and intestinal calcium absorption were lower in oophx rats, the magnitude of adaptation in balance and absorption to dietary calcium restriction (0.02% Ca) was unaffected by oophorectomy. Oophorectomy did not affect the slopes for the relationships between calcium consumption with calcium balance and intestinal calcium absorption, but the intercepts for both relationships were lower in oophx rats. However, circulating 1,25 dihydroxyvitamin D was not reduced in oophx rats. Administered 1,25 dihydroxyvitamin D stimulated intestinal calcium absorption in both sham and oophx rats but did not significantly increase calcium balance, whereas oestradiol stimulated intestinal calcium absorption in oophx rats (without affecting circulating 1,25 dihydroxyvitamin D) and increased calcium balance.

It is concluded from the findings of the study that oophorectomy reduces calcium balance regardless of age by transient rises in calcium excretion and prolonged reduction in intestinal calcium absorption. In adult rats the impairment to intestinal calcium absorption is not the result of reduced circulating 1,25 dihydroxyvitamin D or reduced intestinal responsiveness to 1,25 dihydroxyvitamin D. Oestradiol stimulates intestinal calcium absorption probably by a direct effect on the intestine in addition to its effects on bone.