CHAPTER I

INTRODUCTION AND AIMS

During hyperthyroidism or hypothyroidism many bodily functions are altered, including cardiovascular and renal functions. In both man and animals, changes in renal functions during hyperthyroidism have been reported (Pronina, 1971, Chaiyabutr, 1981, Williams, 1981), including increases in renal blood flow (RBF), glomerular filtration rate (GFR), urine flow, tubular reabsorption and secretion. In hyperthyroidism, cardiac output (CO), stroke volume (SV) and heart rate (HR) are increased but peripheral vascular resistance is decreased (Williams, 1981, Ridgway *et al*, 1982). On the other hand, in hypothyroidism, renal functions and cardiovascular functions are decreased (Chaiyabutr, 1981, Williams, 1981). The mechanism acting within the kidney to change the renal functions in either hyperthyroidism or hypothyroidism is unknown, although many studies on cellular activities, plasma renin activity, plasma angiotensinogen, B-adrenergic activity and renal failure in abnormal thyroid patients have been described (Katz and Epstein, 1967, Karunanidhi, 1979, Resnick and Laragh, 1982, Dzau and Herrman, 1982, Ganong, 1982).

Intrarenal arterial infusion of hypertonic sodium chloride in dogs indicated that an acute rise in renal arterial sodium concentration markedly suppressed the rate of renin secretion (Shade *et al*, 1972). A recent study has shown that intrarenal formation of

angiotensin II by infusion of angiotensin I into the renal artery can decrease GFR (Rosivall and Navar, 1983). However, the knowledge on the response of renal function in hyperthyroidism or hypothyroidism is limited. Much more work is necessary to clarify the full character of renal functions at rest and under varied loads of electrolytes during the development of thyroid overactivity or hypoactivity. Changes in renal functions with the infusion of hypertonic or hypotonic saline may be due to intrarenal or extrarenal factors. More information is needed to determine which factors are important in hypothyroidism and hyperthyroidism.