



CHAPTER I

INTRODUCTION

In Thailand, it was found that distal renal tubular acidosis is not uncommon in the Northeastern (Sanga Nilwarangkur, 1987), representing one of the national health problems. The primary functional abnormality has been suggested an inability of distal tubule to secrete hydrogen ion and the kidney could not acidify urine inspite of severe metabolic acidosis (Feest and Wrong, 1982). This disease is often seen in summer among the people of low socioeconomic status with female preponderance (Vipada Chaovakul, Sanga Nilwarangkur and Sumalee Nimmannit, 1987). Whether this is due to genetic variation or environmental effects remains to be worked out. Gastric hypoacidity has been shown in patients with distal renal tubular acidosis (Visith Sitprija et al., 1988), so that distal renal tubular acidosis has been assumed to be a generalized disease with defect on hydrogen ion transport in both renal tubules and gastric parietal cells. The defect may reside in H^+-K^+ ATPase, an enzyme which is found in distal nephron segments and is inhibited by vanadate and omeprazole (Doucet and Marsy, 1987; Gary and Narang, 1988). Decreased urinary acidification was seen after

omeprazole administration in rabbits on low potassium diet (Wingo, 1989). Recent report has shown that there is high vanadium content in the soil, well water and urine of village people in Northeastern Thailand (Visith Sitprija et al., 1990).

Many studies *in vitro* have reported that vanadate that is a salt of vanadium compound may inhibit urinary acidification in turtle urinary bladder (Steinmetz, Husted, and Mueller, 1980; Arruda, Sabatini, and Westenfelder, 1981; Youmans and Brodsky, 1987; Youmans and Barry, 1989) and human kidney (Sallman et al., 1986) by inhibition of hydrogen ion transport. Thus, *in vivo* vanadate may do so. Additionally, if vanadate can exhibit this effect, it may be an occurrence of distal renal tubular acidosis in people of Northeastern Thailand.

The present investigation aims to elucidate the effects of vanadate on urinary acid excretion in normal and acute metabolic acidosis dogs following intrarenal arterial bolus injection of vanadate.