CHAPTER - 2

INTRODUCTION

Adrenergic and cholinergic mechanisms have been extensively investigated in common laboratory animals (rat, mouse, rabbit, guinea-pig, cat, dog) and a considerable amount of information has been reported in the literature (Burn and Rand, 1959; Euler and Lishajko, 1963; Ahlquist and Levy, 1959; Iversen, 1963; Vane, 1960; Furchgott et al., 1963; Axelrod et al., 1961; Davidson and Innes, 1970; Allen et al., 1974; Clark and Payser, 1977; Giorgineff et al., 1977; Shah et al., 1974; Wakade et al., 1970; Arya and Gulati, 1968; Patel et al., 1978, 1979). The Indian goat is a domestic animal and its milk is consumed by a large number of poor people. As opposed to the popularity of beef and pork in western world, a majority of nonvegetarians in India consume goat meat. Todate there are very few well documented reports on the cholinergic and adrenergic mechanisms in goat tissues.

Spleen tissue of various laboratory and non-laboratory animals has been used to investigate adrenergic mechanisms. For example, Vairel (1933) showed that adrenaline (Adr) contracted the isolated spleen of dog, rabbit, tench and frog and reported that Adr-induced contraction of dog spleen strips was not reproducible. Saad (1935) showed that Adr caused a contraction of isolated strips of spleen obtained from man, cat, guinea-pig, rat and buffalo and further showed that Adr-induced contractions could be abolished by ergotoxine. Genazzani and Nito (1952) reported that isolated rabbit spleen was suitable for the assay of Adr and Bickerton et al. (1962) showed that Adr and noradrenaline (NA) caused reproducible contractions of isolated strips of cat spleen and demonstrated the use of this organ for the assay of alpha-adrenoceptor blocking agents. Innes (1962) has used the cat isolated spleen to show an action of

5-hydroxytryptamine (5-HT) on alpha-adrenoceptors. Ignarro and Titus (1968), Green and Fleming (1968) and Sheys and Green (1972) have used spleens from various laboratory animals to determine the pA_2 values of phentolamine.

Tracheal or bronchial smooth muscles of various species have often been employed in vitro for the study of effects of several types of agonists and antagonists. Castillo and De Beer (1947) introduced the guinea-pig isolated tracheal ring preparation for screening spasmogenic responses on respiratory smooth muscle and antagonists. Subsequently several other workers also used guinea-pig tracheal preparation (Macht and Ting, 1921; Ghosh, 1971) and bronchial muscle of ox (Trendelenburg, 1912) for similar type of work. The guinea-pig tracheal chain is a classical preparation but requires some skill to prepare and is not very sensitive for many agonists. Consequently Nagchaudhuri and Lahiri (1974) recently reported the concentration-response relationship for acetylcholine (ACh), histamine, 5-HT and bradykinin on goat tracheal chain. They found contractile potency in the following order: 5-HT > bradykinin > histamine > ACh. Chand et al. (1979) also observed contractile effects of histamine, carbachol and 2-pyridylethylamine (H_1-receptor agonist) and relaxant effect of isoprenaline (ISO), phenylephrine and 5-HT on goat tracheal chain contracted with carbachol or histamine. Furthermore, these workers showed (i) a relaxant response of goat trachea to 5-HT mediated via D-muscular tryptamine receptors, (ii) a small population of excitatory M-neuronal tryptamine and alpha-adrenoceptors and (iii) a predominance of H_1-excitatory and a scanty population of 'inhibitory' H_2-receptors in goat trachea.

Since goat spleen and trachea can be easily obtained from the Slaughter House, a project was drawn up to investigate some aspects of the adrenergic and cholinergic mechanisms (commensurate with economic feasibility) in these tissues. A few experiments were also performed with aorta and heart.