

MEDICINAL CHEMISTRY-I – BP402T

UNIT: 3

CLASS: 5

TOPIC: CHOLINERGIC RECEPTORS

MOA:-

Ach elicit its action on cholinergic receptors i.e muscarinic and nicotinic

At M_1 , M_3 & M_5 Ach directly bind and activate stimulatory protein G_s to release phospholipase-C which is responsible for hydrolyzing inositol-4,5-diphosphate (IP_2) to form inositol triphosphate (IP_3) and diacylglycerol (DAG)

IP_3 release intracellular Ca^{2+} and DAG. DAG activate protein kinase C.

Both active protein kinase C and Ca^{2+} stimulate the synthesis of nitric oxide (NO) from arginine, leads to vasodilation of blood vessels hence cause decrease in blood pressure.

At M_2 & M_4 Ach activate inhibitory protein G_i leads to opening of K^+ channel and inhibition of Adenylate cyclase enzyme (ACE) which cause decrease in cAMP formation leads to block Ca^{2+} channel hence Ca^{2+} level decrease which leads to negative chronotropic (decrease in heart rate) and negative inotropic (decrease in contraction) effect.

-At nicotinic receptor Ach increase permeability of Na^+ & K^+ ions cause depolarization (going out of positive ions) and excitation of skeletal muscle leads to their contraction.

Anticholine esterase are the drugs which binds to Ach esterase enzyme competitively due to structural similarity hence cause prevention of hydrolysis of Ach, leads to increase in concentration of Ach which further perform the action.