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QUESTION 03
Anaes. Pharm

What is the mechanism of action of Beta adrenoceptor antagonists? Outline the therapeutic uses and side effects of these drugs

Beta adrenoceptors are seven transmembrane domain protiens coupled to Gs protiens.

- located post synaptically in the sympathetic nervous system
- respond to catecholamines adrenaline > noradrenaline.
- three subtypes (b1, b2, and b3)
- mechanism -
  - couple to Gs, activate adenylyl cyclase, increase cyclic AMP leading to biological effects
  - Gs can enhance directly the activation of voltage-sensitive Ca2+ channels
- function-
  - cardiac muscle function and conduction
  - smooth muscle function throughout the body,
  - metabolic control of BSL and lipid metabolism,
  - endocrine functions including peripheral thyroxine conversion
  - occular pressures via production of aqueus humour

Beta receptor anatagonists

- mostly competitive antagonists, there is some evidence of partial agonist activity (Labetalol)
- variable specificity for beta 1 versus beta 2 receptors
  - important clinically due to different effects
  - often dose related, may be B1 selective at low doses but non selective at higher doses
- lipid solubility determines speed of onset
- most resemble isoproterenol

Beta 1 selective antagonists

- example - metoprolol, esmolol
- is used for rate control in tachycardia and hypertension management
- side effects: hypotension, heart block, bronchoconstriction at higher doses

Non selective antagonists

- example - propanalol
- is used for hypertension, to reduce bleeding risk in oesophageal varacies, tremor, and as migraine prophylaxis. It is the treatment of choice in thyrotoxicosis as it stops coversion of T4 to T3, reduce occular pressure in glaucoma
- side effects: rapid withdrawal may precipitate tachycardia, can cause bronchoconstiction and is not recommended in patients with obstructive respiratory disease, issues with hypoglycaemia