JULY 2007
QUESTION 8

Explain the role of baroreceptors in the control of blood pressure

Blood pressure is determined by the amount of blood in the arterial system at any time
- Volume entered (CO = SV x HR, SV determined by preload, afterload and contractility)
- Volume removed (Total peripheral resistance)

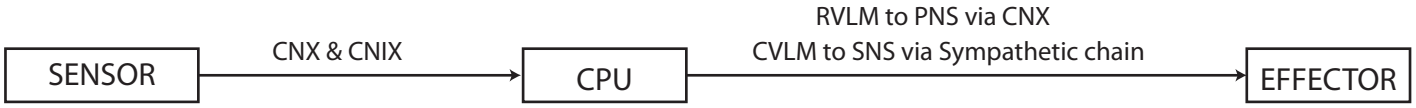
Regulation of blood pressure
- Fast neurally mediated with baroreceptor mechanism controlling CO and TPR
- Slower hormonal regulated RAAS with baroreceptor augmentation controlling total volume

Baroreceptors are stretch receptors (mechanoceptors) which respond to increases in pressure

High pressure receptors
- located in the carotid sinus and aortic arch
- increased pressure leads to increased firing
- detect both the average blood pressure and the rate of change
- information sent to vasomotor centre, compared to set point, effector response via SNS and PNS

Low pressure receptors (AKA volume receptors)
- located in the large systemic veins, right atria
- usually augments the response of the high pressure receptors
- information sent to vasomotor centre, compared to set point, effector response via SNS and PNS
- controls total volume via hormonal responses of the RAAS and ADH

Osmoreceptors
- Main locations are macula densa in kidneys and hypothalamus
- Are sensitive controllers of total fluid volume via RAAS, ADH and thirst
- Are less potent then barorecptors (low pressure > low osmolarity)



Baroreceptors
- High pressure
- Low pressure

Osmoreceptors

Vasomotor Centre
- Located NTS medulla
- Set point ~ 100mmHg
- may reset in chronic HTN

SNS HR, increased contractility
vasoconstriction
= increased afterload/TPR
increased return (preload)

PNS Mainly decreased HR
Also vasodilation & decreased contractility

Hormonal ADH, RAAS, ANP, thirst

Testing of the barorecpetors may be demonstrated by a valsalva manoever which measures the response of the baroreceptors to a transient increase in intrathoracic pressure.