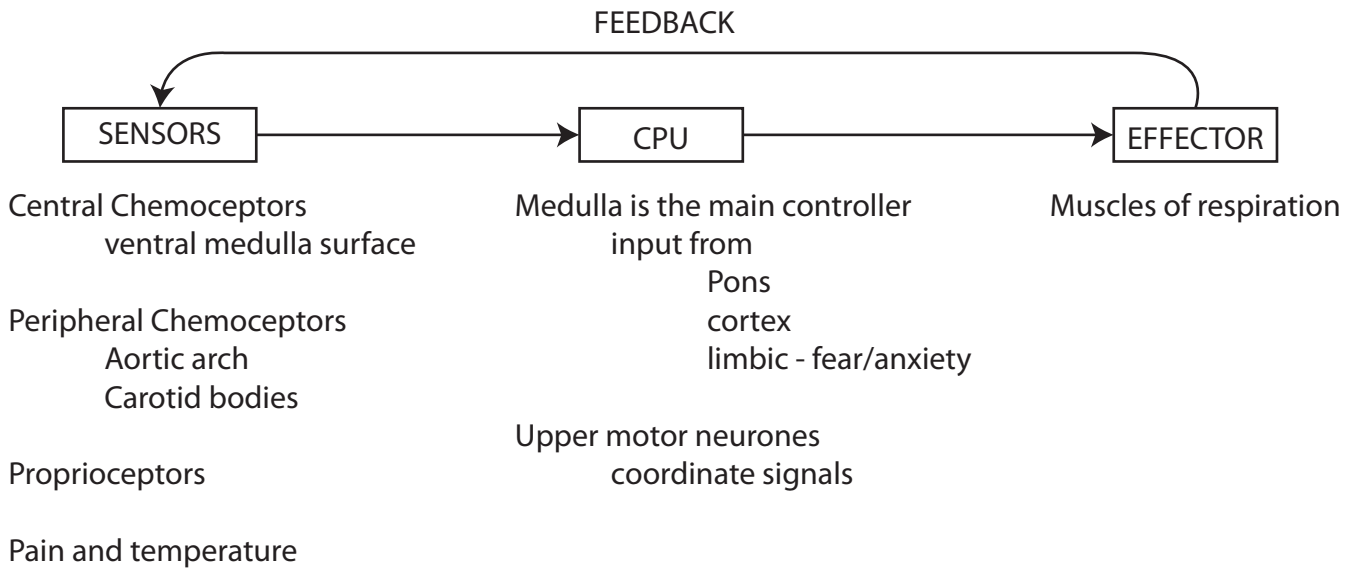


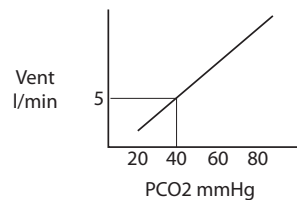
JULY 2008
QUESTION 10

List the physiological factors which increase respiratory rate. Include an explanation of the mechanism by which each achieves this increase



PCO₂

most important variable, normal value is 35 - 45 mmHg
demonstrates a near linear relationship with ventilation (RR x tidal volume)



changes in CO₂ sensed by central chemoceptors

CO₂ diffuses across the BBB and combines with H₂O to form carbonic acid
the central chemoceptor senses the change in H⁺ ion concentration
the medulla increases ventilation

pH

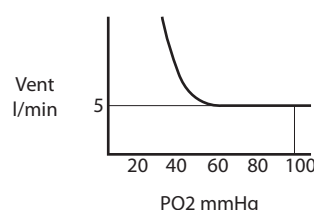
normal value is 7.4

sensed by peripheral chemoceptors (H⁺ is ionised therefore cannot cross BBB)

decreased pH increased ventilation - decreasing CO₂ which corrects/compensates underlying process
increased pH decreases ventilation - increasing CO₂ retention which corrects/compensates

PO₂

not related to ventilation within normal physiological ranges (normal value 90-100mmHg)
when below 60mmHg, peripheral chemoceptors increase ventilation rapidly (hypoxic drive)



Other

Proprioceptors in joint increase ventilation, although the mechanism is not completely clear
Fear via the limbic system increases ventilation, so too increased temp and pain