

## Oxygen Transport by the Blood

### Given the following:

For an HCT = 40 bound  $O_2$  at saturation = 20 ml/dl

$P_{aO_2}$  = 100 torr

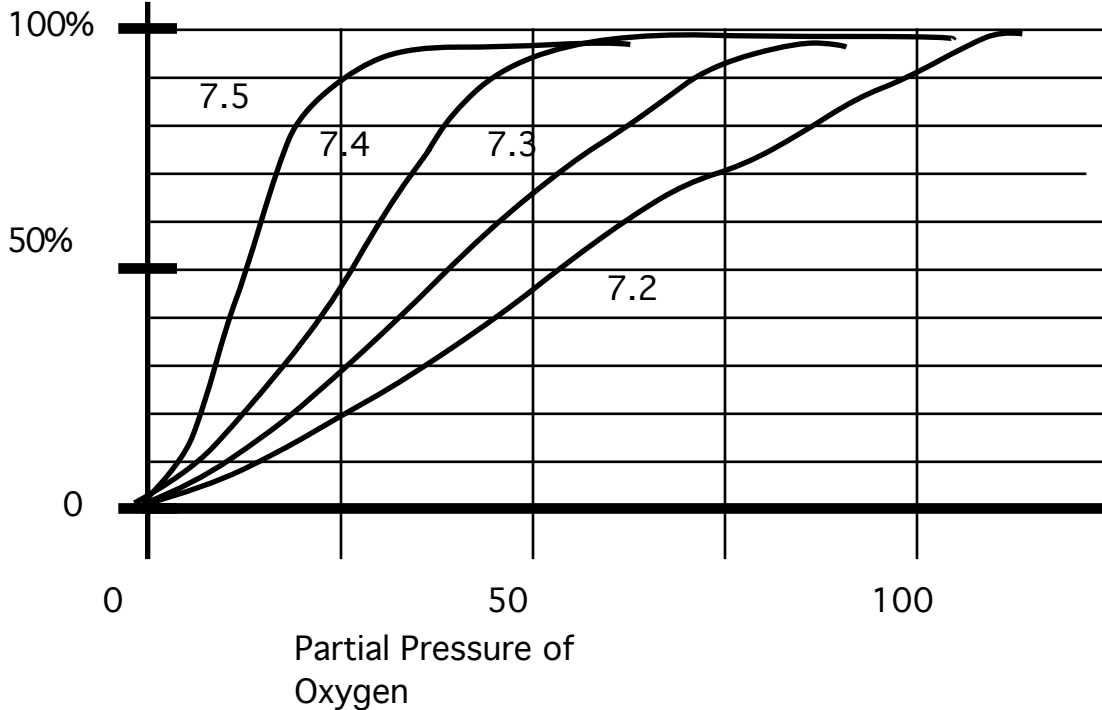
$P_{vO_2}$  = 25 torr

Solubility of  $O_2$  = 0.01 ml  $O_2$  /torr \* dl blood

HCT = 50

arterial pH = 7.4

RA pH = 7.2



- Find the oxygen content of arterial blood.
- Find the total oxygen content of mixed venous (RA) blood. Why is RA blood termed "mixed venous"?
- Find the total AV (arterial to venous) difference in oxygen content in ml  $O_2$  per 100 ml blood.
- Compare the value you found for (c) with what would have happened in the absence of a Bohr effect -- *i.e.*, if there had been no change in affinity due to a decrease in pH.
- Write a general mathematical expression that would allow you to solve for AV difference in oxygen content using the variables you used in parts (a) to (d) above.
- Assume that the person lost 50% of her/his ability to carry oxygen bound to hemoglobin. If the person still needs the same amount of  $O_2$  to live, what would happen to the following (make qualitative predictions (up, down, no change) only).
  - A-V saturation
  - A-V Dissolved  $O_2$
  - Cardiac Output
  - Anything else?