

## Acid - Base Disturbances<sup>i</sup>

Bio390

1. The reported data are normal values for a healthy individual breathing room air at sea level.

arterial pH: 7.40

[HCO<sub>3</sub><sup>-</sup>]<sub>plasma</sub>: 24 mM

P<sub>a</sub>CO<sub>2</sub>: 40 mm Hg

α for CO<sub>2</sub>:  $\frac{0.03 \text{ mmols}}{L \text{ mmHg}}$

apparent pK<sub>a</sub> for carbonic acid-bicarbonate buffer = 6.10

The plasma of an individual exhibiting **hyperpnea** (hyperventilation) was analyzed and the following data obtained:

[HCO<sub>3</sub><sup>-</sup>]: 8 mM pH: 7.22      P<sub>a</sub>CO<sub>2</sub>: 20 mm Hg

Are these results consistent with the interpretation that the hyperpnea is the result of respiratory acidosis or metabolic acidosis? What is the basis for your answer?

2. The data in the table refer to plasma measurements of individuals exhibiting various acid-base disturbances.

INDIVIDUAL	P <sub>a</sub> CO <sub>2</sub> (mm Hg)	[HCO <sub>3</sub> <sup>-</sup> ] mM	pH	$\frac{[H^+]}{L}$ <i>nanomol</i>
A	29	22.0	7.50	31.6
B	33	32.0	7.61	24.8
C	35	17.5	7.32	48.0
D	60	37.5	7.42	38.0

Identify the specific type of acid-base disturbance for each individual (A ->D).

<sup>i</sup> thanks to Dr. J.F. Anderson, Dept Zoology, Univ of Florida, Gainesville for the original idea for this problem