



Percorso ragionato per l'interpretazione delle alterazioni dell'equilibrio acido base

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Equazione di Kassirer-Bleich

The Henderson Equation, which is derived from the Law of Mass Action, can be modified with respect to the bicarbonate buffering system to yield a simpler equation that provides a quick approximation of the H^+ or HCO_3^- concentration without the need to calculate logarithms.

$$[\text{H}^+] = 24 \times \frac{\text{pCO}_2}{[\text{HCO}_3^-]}$$

Adattamenti attesi nei disordini acido-base metabolici

acidosi

$\text{HCO}_3^- \downarrow 1 \text{ mEq/L}$, $\text{pCO}_2 \downarrow 1.2 \text{ mmHg}$

alcalosi

$\text{HCO}_3^- \uparrow 1 \text{ mEq/L}$, $\text{pCO}_2 \uparrow 0.7 \text{ mmHg}$
(limite 55 mmHg)

Adattamenti attesi nei disordini acido-base respiratori

acidosi

acuta: \uparrow $p\text{CO}_2$ 1 mmHg, \uparrow HCO_3^- 0.1 mEq/L

cronica: \uparrow $p\text{CO}_2$ 1 mmHg, \uparrow HCO_3^- 0.35 mEq/L

alcalosi

acuta: \downarrow $p\text{CO}_2$ 1 mmHg, \downarrow HCO_3^- 0.2 mEq/L

cronica: \downarrow $p\text{CO}_2$ 1 mmHg, \downarrow HCO_3^- 0.4 mEq/L

Adattamenti attesi

acidosi metabolica

- ❖ *dim. HCO_3^- 1 mEq/L / dim. pCO_2 1.2 mmHg*

alcalosi metabolica

- ❖ *aum. HCO_3^- 1 mEq/L / aum. pCO_2 0.7 mmHg*

acidosi respiratoria

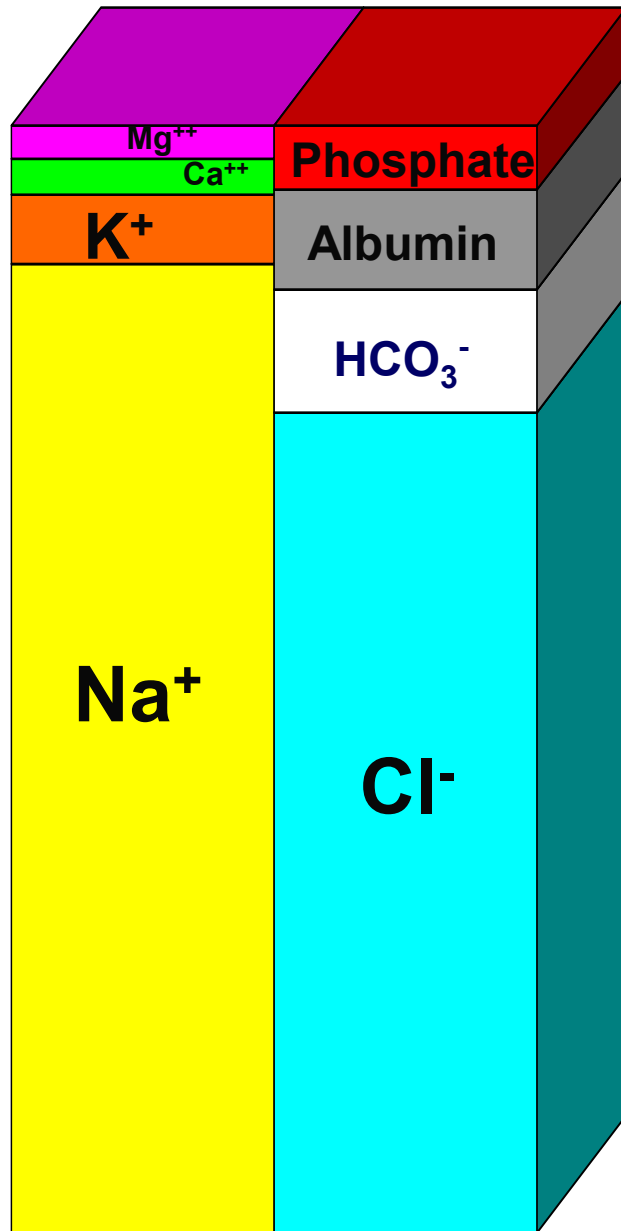
- ❖ *acuta : aum pCO_2 1 mmHg / aum. HCO_3^- 0.1 mEq/L*
- ❖ *cronica : aum. pCO_2 1 mmHg / aum. HCO_3^- 0.3,5 mEq/L*

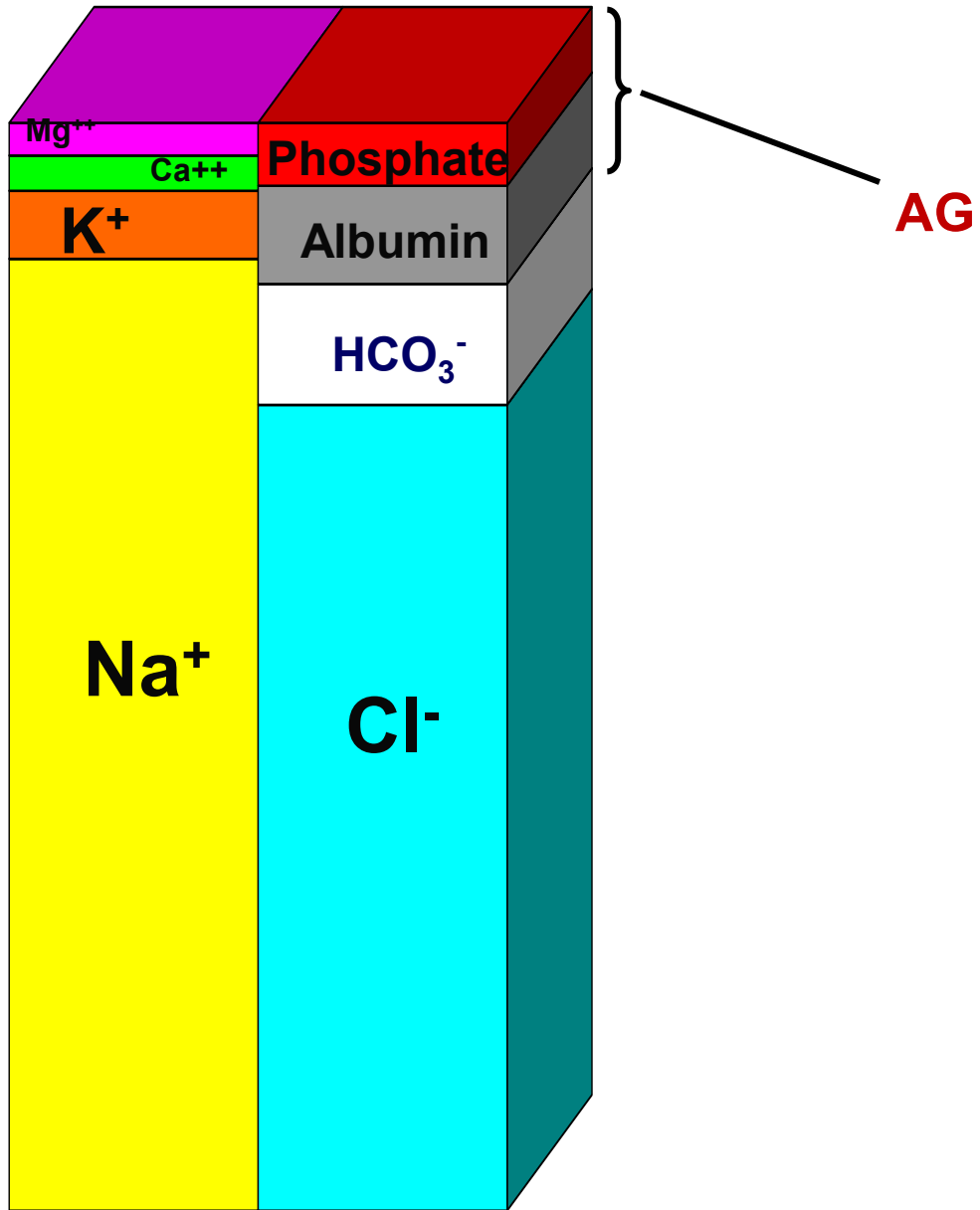
alcalosi respiratoria

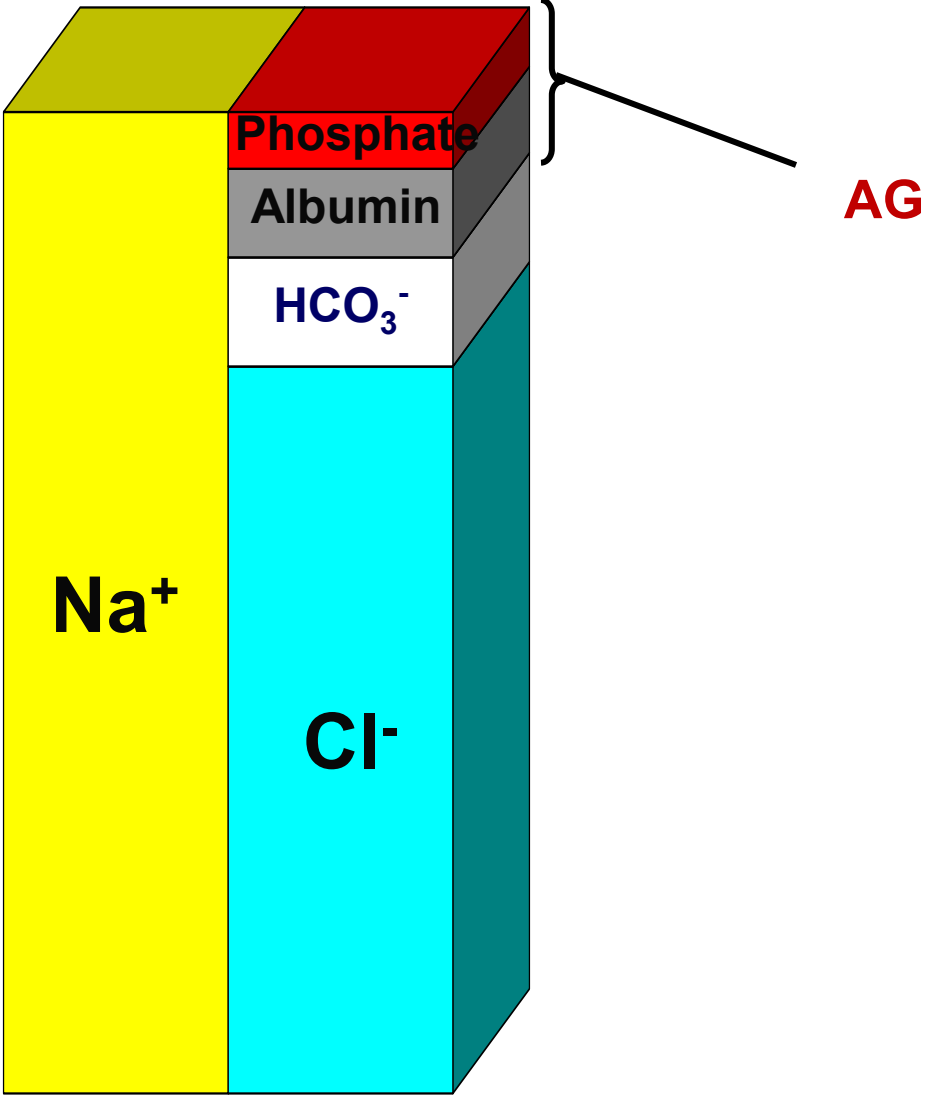
- ❖ *acuta: dim. pCO_2 1 mmHg / dim. HCO_3^- 0.2 mEq/L*
- ❖ *cronica: dim. pCO_2 1 mmHg / dim. HCO_3^- 0.4 mEq/L*

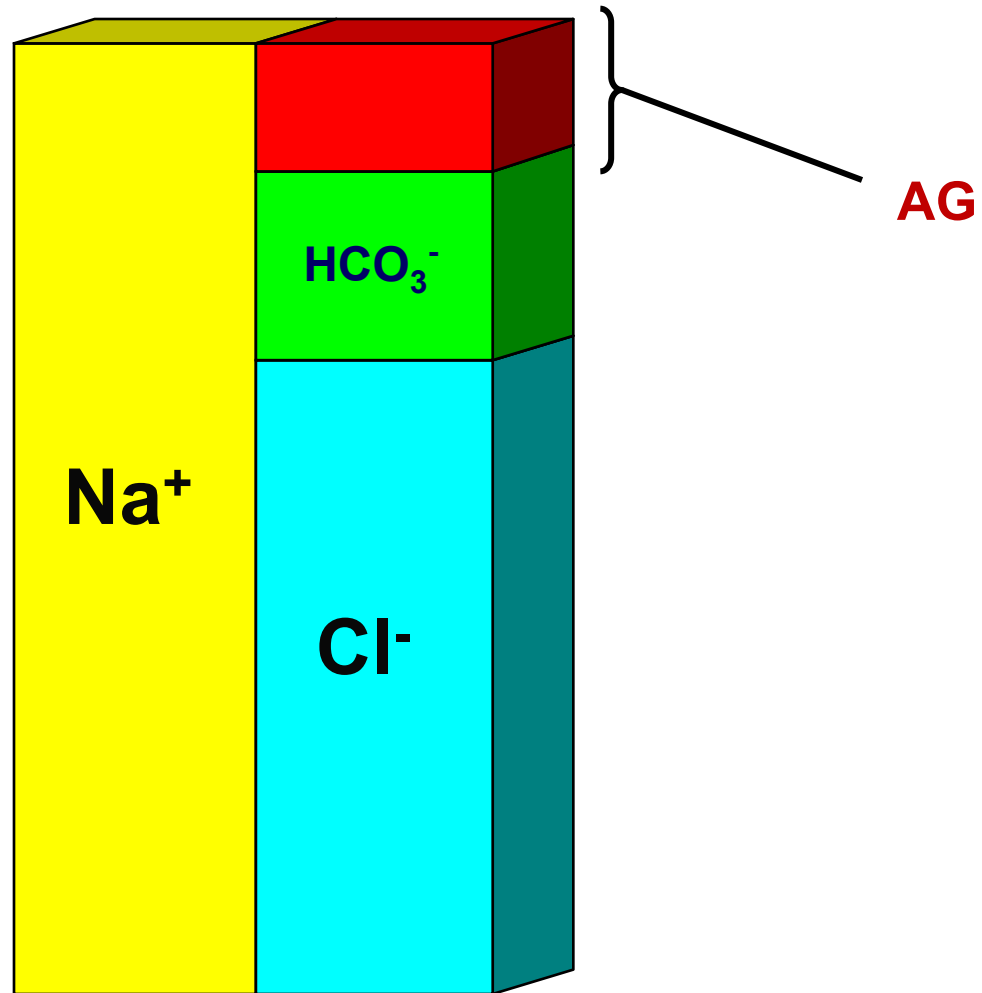
Principio di elettroneutralità

Tutte le soluzioni devono rispettare il principio di elettroneutralità globale: il numero di cariche positive nella soluzione deve corrispondere al numero di cariche negative.









$$\text{AG} = \text{Na}^+ - (\text{Cl}^- + \text{HCO}_3^-) \text{ v.n. } 12 \pm 4 \text{ mEq/L}$$



In summary

The AG is a mathematical “virtual” construct because a true anion gap cannot exist in any solution.

Nonetheless, this artificial construct is a very helpful clinical tool for assessing acid base disorders and for categorizing the metabolic acidoses. The metabolic acidoses are readily subdivided into those with a large AG (HAGMA) and those with a normal AG (by definition the hyperchloremic metabolic acidoses).

When HAGMA exists, the reciprocal relationship between the amount of increase of $[AG]$ and decrease in $[HCO_3^-]$ (designated as the $\Delta[AG]/\Delta[HCO_3^-]$) can be a very helpful indicator of certain forms of mixed acid-base disorders.

The AG should be calculated whenever electrolyte results are reported. A high, low, or negative AG is demands a clinical explanation.

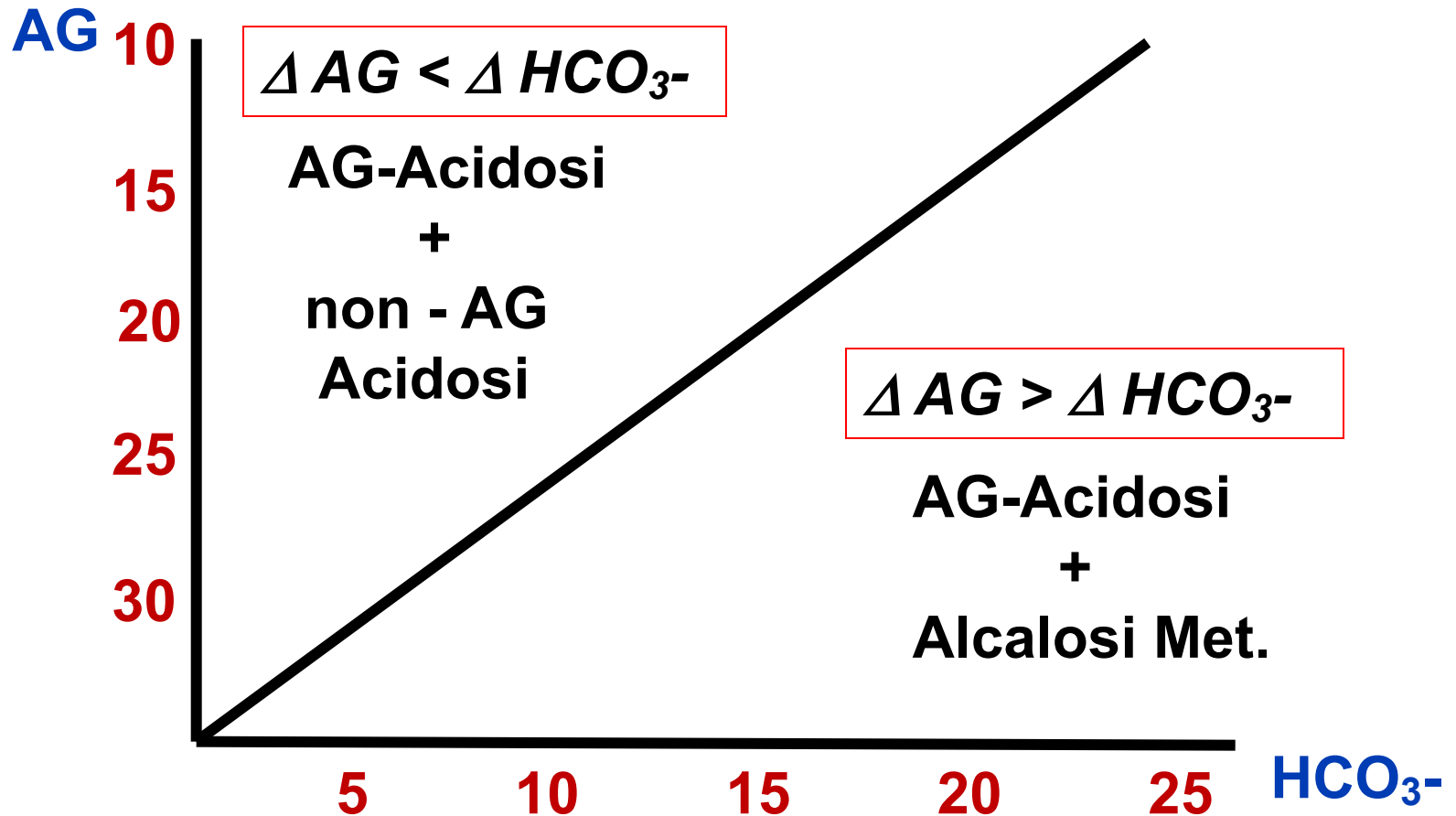
Fenves AZ and Emmett M. AJKD 2021;78(4): 590-600.



Gap del bicarbonato

Delta gap is essentially a tool to determine whether or not there is also a normal anion gap metabolic acidosis present or metabolic alkalosis

Gap del bicarbonato



Valori decisionali del rapporto $\Delta\text{AG}/\Delta\text{HCO}_3^-$

< 0.4

AM ipercloremica

0.4 – 0.8

AM ipercloremica + AM-Ag

> 0.8 – 2

AM-Ag

> 2

AM-Ag + Alcalosi metabolica



edra

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Mario Tarantino

ACQUA E SALE

**INTERPRETAZIONE DEI DISORDINI ACIDO-BASE
E IDROELETTRolitICI ATTRAVERSO I CASI CLINICI**

In collaborazione con
Rodolfo Sbrojavacca, Michele Santoro





Ivo Casagrande
Mario Tarantino

CLINICAL INTERPRETATION OF ACID-BASE AND ELECTROLYTE DISORDERS

CASE STUDIES

In collaboration with
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ABG report interpretation

What need I for a correct interpretation of the report ?

- Are history and clinical approach important ?
- Are pH, PCO_2 , HCO_3 enough ?
- Normal pH = normal ABG's?
- BE = 0 no metabolic acidosis ?
- Normal or reduced AG: no AG acidosis ?