## [Episode 20: pH Stat and Alpha Stat](http://accrac.com/episode-20-ph-stat-and-alpha-stat/)

On this episode: Dr. Jed Wolpaw

## Management of arterial blood content

* pH Stat vs Alpha Stat

## Radiolab fun ([link](http://www.radiolab.org/story/alpha-gal/))

* alpha-gal! sugar produced in non-human mammals – tick bite into animal → pick up sugar → bite human → human now susceptible to anaphylaxis!

## The blood gas analyzer of a cooled patient’s pH returns as 7.4 and pCO2 of 40. Are the values over or under stated?

* ABG when patient is cooled, such as in cardiac surgeries
  + Warmer fluid
    - ↑ vaporization → ↑ partial pressure of gas
  + Cooler patient
    - ↑ solubility → **↑ CO2 in blood**
    - ↓ dissociation of weak acid → alkaline shift in pH → **↑ pH**
* Because analyzer measures pCO2, in a cooler patient, ↑ CO2 dissolved in blood / ↓ as gas
* pH Stat and Alpha Stat - both blood gas analyzer @37°

|  |  |  |
| --- | --- | --- |
| **Sample Patient** | | |
|  | Machine | Patient |
| Temperature | 37° | 32° |
| pCO2 | 40 | 30 |
| pH | 7.4 | 7.5 |

* + If patient is colder than 37°**, pCO2 ↓** but machine warms so ↑ to normal but **pCO2 is still less** in patient. Refer to **sample patient**

## How does pH stat differ from alpha stat?

* pH Stat (‘temperature corrected’)
  + **back calculate from 37 to patient’s temp**
  + Refer to **sample patient**
  + This allows provider to correct by adding CO2 to bring pCO2 to normal
* Alpha Stat (‘not temperature corrected’)
  + Reports values @37°, not back corrected

## Which blood gas analyzer is more appropriate for a pediatric cardiac case?

* **p**H stat for **p**ediatrics
  + report values adjusted for patient’s temp give room for correction
    - hypothermic patient = ↓ pCO2 → give bicarb → ↑ pCO2 →↑ cerebral flow
    - Cerebral blood flow at pCO2 of 30 vs 40
      * pCO2 of 30 = less flow
      * correcting for low pCO2 will ↑ CO2 load → ↑ cerebral flow
        + Don’t use for adults because higher risk of embolic load due to higher likelihood of atherosclerosis
* **a**lpha stat for **a**dults

**Comments or suggestions?** Please email [accrac@accrac.com](mailto:accrac@accrac.com) or leave a comment on the [website](http://accrac.com/episode-20-ph-stat-and-alpha-stat/)  
**Fan of the show?** Please take a moment to leave a comment and a rating to help others find the show! **Want to support the show?** [Patreon.com/ACCRAC](https://www.patreon.com/accrac) to become a patron and support the making of the show. Notes by Brian Park.