## [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

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