Re: "Hot" tooth − Myths or Reality?

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- *From*: "letsconnect" <letsconnect@xxxxxxxxx>
- *Date*: 2 Aug 2005 09:29:11 −0700

Not too sure about the "as most junior high school students know" bit,
but this is the best explanation I've come across so far − thanks!

NOYB wrote:
> "Dr Steve" <nospam@xxxxxxxx> wrote in message
> news:BKJHe.230$646.52@xxxxxxxxxxxxxxxxxxxxxxxxxxxxx
> > Are you sure?
>
> Yes...sort of. Local anesthetics have pH's of approximately 7.9...making
> them a weak base. But hydrogen ions are added to make them acidic:
>
> " Local anesthetics are weak bases with pKa in the range of 7.9. This of
> course means that at a pH of 7.9 a population of local anesthetic molecules
> is equally divided between a charged and uncharged state. In order to keep
> the local anesthetic molecules in solution, hydrogen ions are added (that
> is, the solution is made acidic) or said another way, the pH of the solution
> is lowered. If the local anesthetic solution is made with epinephrine, the
> pH is made even lower.
>
> Lets turn our discussion now to a consideration of nerves. As most junior
> high school students know, nerve membranes are a lipid bilayer with protein
> channels. Local anesthetics act in the sodium channel, entering from the
> internal aspect. Now you may have noticed a bit of a problem. Positively
> charged local anesthetic molecules soluble in an aqueous solution will have
> trouble passing through a lipid membrane. This problem is overcome when the
> tissue surrounding the nerve accepts (or buffers) the hydrogen ion and the
> uncharged molecules are then free to pass through the axonal membrane. Once
> in the cell, the molecules must be recharged before they can effect a block
> of the sodium channel.
>
> OK, so what? What difference does this make clinically? Local anesthetics
> will not work in tissue that is unable to buffer the excess hydrogen ions.
> This is why local anesthetics injected into the acidic environment of an
> abscess will not cause numbness. Occasionally anesthesiologists will add
> NaHCO3 to local anesthetic to speed the onset of the drug effect. This
> additive is not a powerful enough base to overcome the acidity in abscessed
> tissue, however. "
>

> http://www.anesthesia.wisc.edu/med3/localanes/localhandout.html

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- ***References***:
  - ***"Hot" tooth − Myths or Reality?***
    - ◊ *From:* letsconnect
  - ***Re: "Hot" tooth − Myths or Reality?***
    - ◊ *From:* Stormin Mormon
  - ***Re: "Hot" tooth − Myths or Reality?***
    - ◊ *From:* Dr Steve
  - ***Re: "Hot" tooth − Myths or Reality?***
    - ◊ *From:* NOYB

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