

## **vScience Bites Radio**

*small bites you can remember to bite them in the behind*

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### **TETANUS, part 2**

[VACCINEU.COM](http://VACCINEU.COM) → Has a course module on Tetanus

#### In Week 1 Summary:

1. The Illness – caused by a tetanus toxin, which is transported slowly – 10 days or more – to nerve junctions. You have time!
  - a. Not 100% fatal, as taught to believe. Most completely recover
  - b. Humans can develop natural immunity
2. The History of the Vaccine
  - a. One of very first vaccines (1914)
  - b. “Protective antibody” level -  $>0.015$  IU/ml, established in 1937 – never retested and always just assumed
3. Vaccine Failures
  - a. You can have 4+ tetanus shots and still contract tetanus
  - b. if you’ve had 1-2 tetanus shots, the “antibodies” can last for up to 65 years; routine 10 year shots should be avoided

#### In Week 2:

4. The Vaccine ingredients – see table

# Tetanus Vaccine Studies

## 1 >July 1973 – J of Allergy and Clinical Immunology “Hypersensitivity to tetanus toxoid.” FULL TEXT

[https://www.jacionline.org/article/0091-6749\(73\)90115-2/pdf](https://www.jacionline.org/article/0091-6749(73)90115-2/pdf)

This study was originally designed to obtain data with regard to the incidence of delayed hypersensitivity skin reactions to tetanus toxoid in normal individuals who had previously received tetanus immunization without remarkable symptoms. **The observed high incidence of not only delayed but also immediate and Arthus type skin reactions was unexpected.**

The presence of high circulating tetanus antibody in the present study and the relatively high incidence of immediate and Arthus type responses **within 5 years** of the last toxoid booster lend additional support to those advocating tetanus boosters spaced 10 years apart in previously vaccinated individuals.

## 2 >Jan. 10, 2012 – Lupus – “Vaccine model of antiphospholipid syndrome induced by tetanus vaccine.” Abstract

<https://journals.sagepub.com/doi/abs/10.1177/0961203311429816>

“Successful induction of antiphospholipid syndrome (APS) in two different non-autoimmune prone mouse strains, BALB/c and C57BL/6, was achieved by tetanus toxoid (TTd) hyperimmunization using different adjuvants (glycerol or aluminum hydroxide),

Anti-phospholipid syndrome (APS) is a disorder in which the immune system produces antibodies against certain normal proteins in your blood. The syndrome can cause blood clots in arteries, organs, such as your kidneys or lungs, or in veins, a condition known as deep vein thrombosis (DVT). APS can also caused pregnancy complications, such as miscarriages and stillbirths. This study documents that a tetanus shot can cause this syndrome in mice. Tetanus shots are routinely administered to women in 3rd World countries while they are pregnant.

**The Mayo Clinic reports, “no cure for antiphospholipid syndrome, but medications can be effective in reducing your risk of blood clots.” No Cure? Don’t do things – like get a tetanus shot – to cause it in the first place.**

## 3 >March 24,2006 – MMWR – ACIP on the Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccines – FULL TEXT

<https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5503a1.htm>

Arthus reactions (type III hypersensitivity reactions) can occur after TT or DT vaccines. An Arthus reaction is a local vasculitis characterized by severe pain, swelling, induration, edema, hemorrhage, and **occasionally by necrosis**. These symptoms and signs usually occur 4–12 hours after vaccination. ACIP has recommended that persons who experienced an Arthus reaction after a dose of tetanus toxoid-containing vaccine **should not receive Td more frequently than every 10 years**, even for tetanus prophylaxis as part of wound management.

#### 4 > June 5, 2017 – VACCINE – “Polysaccharide conjugate vaccine protein carriers as a “neglected valency” – Potential and limitations.” - FULL TEXT

<https://www.sciencedirect.com/science/article/pii/S0264410X17305790>

Most vaccine antigens, if injected alone, do not generate an antibody response and must be conjugated with a carrier. Often, the carrier is tetanus toxoid. “Although it is well documented that protein carriers additionally induce an immune response against themselves, this potential “additional valency” has so far not been recognized....The carrier protein also induces an immune response to itself....This phenomenon has largely been overlooked.

Vaccines approved for use in the US that gives EXTRA doses of TT:

- Hiberix, ActHIB – 4 doses each
- ProHIBIT – 4 doses

Example: Administration of ONE dose of conjugated Hib resulted in an increase in tetanus antibodies in monkeys with high preexisting TT antibodies (**from 17 to 121–193 units/mL**)

#### 5 > March 2016 – Clinical Infectious Diseases – “Durability of Vaccine-Induced Immunity Against Tetanus and Diphtheria Toxins: A Cross-Sectional Analysis (Hammerlund et al.) – FULL TEXT

<http://www.idchula.org/wp-content/uploads/2016/04/Clin-Infect-Dis.-2016-Hammarlund-1111-8.pdf>

**Revisit: (easier to understand)**

<https://news.ohsu.edu/2016/03/22/study-shows-tetanus-shots-needed-every-30-years-not-every-10>

The idea of changing our vaccination schedule to every 30-years is not as radical as it sounds, the authors note. Other countries, including the United Kingdom, **recommend no adult booster shots** – and the World Health Organization recommends **only a single adult booster** vaccination at the time of first pregnancy or during military service.

In other words, if the U.S. switched from a 10-year schedule to a 30-year schedule, this approach would still be more conservative than other countries while reducing the number of potentially unnecessary vaccinations – and hypersensitivity reactions.