

vScience Bites Radio

small bites you can remember to bite them in the behind

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TETANUS, part 1

VACCINEU.COM → Has a course module on Tetanus

1. What is tetanus?

Tetanus is a condition caused by a toxin released by the bacterium *Clostridium tetani*. Widely distributed in the environment, *Clostridium tetani* is found in the intestinal flora of domestic animals, horses, chickens, and man.

What we refer to as tetanus are a collective list of symptoms that happened when spores germinate under **anaerobic conditions** within a cut or a deep wound.

The symptoms are caused by the tetanus toxin, called **tetanospasmin**, the second most potent toxin known to humans, surpassed only by botulism toxin. Once released tetanospasmin **is transported slowly** through the tissues or the bloodstream until it reaches a synapse nerve junction.

Note I said **SLOWLY**. On average, this transfer takes about 10 days, but it can be even longer – *YOU HAVE TIME!* There's no reason to panic and rush off to the ER for a tetanus shot!

The illness is characterized by rigidity and spasms of skeletal muscles, specifically the muscles of the face and neck. Slight movement can cause a sudden and severe spasm, called trismus, causing a hard clamp of the masseter muscles (lockjaw.) The spasms are excruciatingly painful and if not controlled, can **SOMETIMES** lead to respiratory arrest and death.

Once the toxin has done damage to the nerve cell, it can take weeks or even months for the synapse to **FULLY RECOVER**. In one study, patients took from one to seven months to RECOVER, depending on the severity of

symptoms. WHEN they FULLY RECOVERED and were able to return to work..... **YES – FULLY RECOVER.**

But wait.... Isn't tetanus 100% fatal?

>Feb 2017 – Tetanus Vaccines – WHO position paper – full text

http://www.who.int/immunization/policy/position_papers/pp_tetanus_2017_presentation.pdf?ua=1

The death rate can range from **10 to 70%** - and is **highest in infants (neonatal tetanus) in Third World countries and the elderly.**

In many African and Indian cultures, the umbilical stump is covered with clay, mud or even cow dung. Because tetanus spores often reside in dirt and animal feces, the spores can literally pass directly into the infant's bloodstream through this unclean procedure. Infants can die from neonatal tetanus – and many of you have probably seen the ONE picture that seems to be available of an infant who has advanced tetanus.

It is because of these unsterile conditions in THIRD WORLD COUNTRIES, that we give our babies in the US and other First world nations, **three tetanus shots to our babies** - which also contain diphtheria and pertussis toxoid, formaldehyde and aluminum – by six months of age.

>February 2, 1980 – British Medical Journal – “Long-term recovery from tetanus: A Study of 50 survivors” Abstract.

<https://www.ncbi.nlm.nih.gov/pubmed/7357352>

In 1980, a study was published of **50 survivors from tetanus infection**, 29 patients said they had regained normal health and 45 of the 50 had returned to full employment.

Additionally, 9 of the 50 said they were still improving and **12 considered** that their health permanently impaired, **mostly due psychological memories of the seriousness of the illness.**

2. The history of the vaccine

The tetanus vaccine was one of the earliest developed.

- 1914: the first tetanus toxoid was introduced – It was used during WWI
- 1924: A better, **more completely inactivated** tetanus toxoid was produced
- 1937: the first tetanus vaccination.

It was absorbed onto aluminum and given to military members during WWII.

The antibody level that is “generally accepted” to be protective is a titer of ≥ 0.015 IU/mL. This value is an arbitrary level was **set in 1937** when the toxoid was injected **into ferrets**. When they were exposed to tetanus spores the ferrets that had a titer level of ≥ 0.015 IU/mL “seemed” to be immune. Since that the time, an antibody titer of >0.015 has been the accepted “standard” for being protected.

Do protective antibodies protect?

>April 2011 - MMWR - Tetanus from 2001 to 2008 – full text

<https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6012a1.htm>

233 reported cases of tetanus – 141 had unknown tetanus status – reasonable that many had had at least one dose

24 had >4 doses of tetanus vaccines = 10.3%

Can you be naturally immune to tetanus? YES!

> February, 1983 – Journal of Infectious Diseases – “Naturally Acquired Antibodies to Tetanus Toxin in Humans and Animals from the Galapagos Islands.”

Abstract:

<https://academic.oup.com/jid/article-abstract/147/2/308/967143?redirectedFrom=fulltext>

Full text: sci-hub.tw/10.1093/infdis/147.2.308

“57 people who were never vaccinated against tetanus were found to have antibodies. One individual has a titer level of >12.5 IU/ml...The most probable mechanism by which humans and animals acquire NATURAL ANTIBODY to tetanus toxin is by swallowing tetanus spores....”

“However, it is important to point out that the detection of antibody to tetanus toxin in the blood does NOT imply total protection against clinical tetanus because **clinical illness may occur in spite of the presence of circulating antibody titers of more than 0.5 IU/ml** (protective is supposed to be >0.015 IU/ml)

What about tetanus 10-year boosters?

> **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>

“Protective levels of antibodies were observed in 99% of subjects under 60 years. Vaccine-induced antibody responses declined with estimated half-lives of 14 years for tetanus and 27 years for diphtheria....

If a more conservative antibody half-life is used [for the calculations], we find that 95% of the subjects [who have had 1 or 2 boosters] will remain sero-protected against tetanus **for 64 years without further vaccination.**

Although tetanus is [can be] highly lethal in unvaccinated patients, disease severity is sharply reduced in fully vaccinated individuals. Of 124 cases of tetanus, 14 deaths (16%) occurred in patients who had received <3 doses of vaccine or had unknown vaccination status, whereas all **110 patients (100%) who received ≥4 doses survived.**

Want more information on tetanus? Go to
www.VaccineU.com for full module.

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