



What are the Odds that Tetanus is an Endogenous Infection?

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ABSTRACT

Tetanus is an infection caused by *Clostridium tetani* characterized by fever, cramped-up jaw, muscle spasms, headache, seizures, sweating, and trouble swallowing 3-21 days following exposure. About 10% of cases prove to be fatal. *C. tetani* produce toxins that interfere with normal muscle contractions. Some infections seem to be both heritable and endogenous contradicting the traditional infection paradigm consistent with the germ theory-and contamination as the exclusive pathway of infection. **Objective:** To project the mathematical odds of "Tetanus is endogenous". **Method:** We applied the probability theory to relevant data to project, the mathematical odds of certainty that "Tetanus is endogenous". **Results:** Eight observations consistent with" tetanus is endogenous "and inconsistent with" tetanus is not endogenous" suggests the mathematical certainty that "tetanus is endogenous" is % 99.7. **Discussion:** Converging evidence suggest some tetanus infections may represent endogenous infections that are produced independent of contamination. At present we do not know the precise biological processes involved in causing tetanus. **Conclusion:** Some tetanus infections maybe endogenous. **Highlights:** Tetanus is caused by *Clostridium tetani* characterized by muscle spasms, fever and seizures. Endogenous infections may develop through pathways independent of contamination. Animals and humans harbor *clostridium tetani* without sickness. *Clostridium tetani* is almost always associated with traumatic injuries. Neonatal tetanus (trismus nascentium) occurs from healthy mothers(5). The dramatic difference of incidence of tetanus between developed and developing countries for neonatal tetanus but not for tetanus suggests immunity by vaccination against the toxin produced by *Clostridium tetani*. Mathematical certainty that tetanus is endogenous= % 99.9

INTRODUCTION

Tetanus is an infection caused by *Clostridium tetani* characterized by muscle spasms, fever, cramped-up jaw, headache, seizures, sweating, and trouble swallowing 3-21 days following exposure.

Clostridium Tetani: order = eubacteriales, family =clostidiaceae, genus = clostridium, species: *clostridium tetani* produce toxins that interfere with normal muscle contractions. About 10% of cases prove to be fatal.

Tetanus occurs in all parts of the world. In 2015, there were about 209,000 infections and about 59,000 deaths globally.

In the last two decades evidence has emerged to suggest that some infections are endogenous and pathways Independent of contamination may also cause infection.

OBJECTIVE

To project the mathematical odds of “Tetanus is Endogenous”.

METHOD

We applied the probability theory to relevant data to project, the mathematical odds of certainty that “Tetanus is endogenous”.

We reviewed the following:

1. "About Tetanus". Centers for Disease Control and Prevention. United States Government. 2019.
2. World Health Organization. "Current recommendations for treatment of tetanus during humanitarian emergencies". Disease Control in Humanitarian Emergencies (English). WHO.
3. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 10th Edition Editors : Martin J. Blaser & Jeffrey I. Cohen & Steven M. Holland.
4. Salerian AJ, Origin of Myiasis, International Journal of Scientific Research, 2022, volume 11, issue 09
5. Salerian AJ (2017) Human body may produce bacteria, Medical Hypotheses,103:131-132.
6. Salerian AJ.(2020) Burn wound infections and Pseudomonas aeruginosa. Burns. ; 46(1):257-258.
7. Salerian, AJ (2018) Gastric Ulcers May Result From Transformation of Human Tissue to H. pylori: Mathematical Evidence SSRN: <https://ssrn.com/abstract=3225494>
8. Salerian AJ, Pathways Independent of Contamination May Produce Burn Wound Infections. BJSTR MS.ID.001701.
9. Salerian AJ.(2021)Infections Independent of Contamination: From Organic Matter, Evolution or Stem Cells, APPLIED CELL BIOLOGY, November 2021
10. Salerian AJ, Do some infections develop independent of contamination? Medical Research Archives,2023 .11(7).2.4184.
11. Salerian AJ, What are the odds of tuberculosis being a heritable infection: %99.99, EJPMR,05/225

The probability of a physically possible observation to be correct exponentially increases by each supporting evidence and can be expressed as an equation $R = 1/2^x$. R representing the probability of random occurrence and x the number of diverse evidence consistent with the observation and inconsistent with the observation. This equation is based upon the premise that each supporting evidence is a hypothesis, a logical inference from observing facts from which consequences may be deduced with a 50% chance of being correct, and therefore the final outcome would be the same as the probability of random occurrence in flipping a coin. Hence it would be like heads coming up at consecutive times . For instance, the probability of random occurrence of heads coming up 9 consecutive times is $1/2^{256} = %03$.

Of significance, consistent with the framework of flipping a coin, potential flaws of statistical analysis, randomness and buys have no effect on the accuracy of final outcome. As long as it is fair play without tricks, it does not matter who flips the coin.

RESULTS

Seven observations consistent with" tetanus is endogenous "and inconsistent with" tetanus is not endogenous:

1. Animals and humans harbor clostridium tetani without developing tetanus (1).
2. Neonatal tetanus (trismus nascentium) occurs from healthy mothers(5).
3. The dramatic difference of incidence between developed and developing countries for "neonatal tetanus "but not for" tetanus "suggests immunity by vaccination against the toxin produced by Clostridium tetani (1).
4. Clostridium tetani is almost always associated with traumatic injuries (1).
5. No host to host transmission (1).
6. Most wound infections are endogenous (2,3,4).
7. Some infections are heritable (6,11).
8. In rare cases, no specific inoculation site is identified suggesting that under yet unknown and not easily observable conditions tetanus may emerge(1).

Mathematical certainty that tetanus is endogenous = % 99.7. Eight observations consistent with" tetanus is endogenous "and inconsistent with" tetanus is not endogenous" suggests the mathematical certainty that "tetanus is endogenous" is % 99.7.

DISCUSSION

Converging evidence suggest some tetanus infections may represent endogenous infections that are produced independent of contamination. At present we do not know the precise biological processes involved in the development of tetanus.

Our projection from limited data is a shortcoming of our study. Yet, indirect evidence to support our hypothesis that tetanus may be endogenous cannot be easily dismissed.

Of significance several observations.. e,g. Neonatal tetanus from healthy mothers. Dramatic difference of incidence between developed and developing countries for "neonatal tetanus "but not for" tetanus and animals harboring Clostridium tetani without developing tetanus support our hypothesis. Experimental studies are necessary to validate our findings.

Several aspects of this novel observation seem to be worthy of emphasis for they represent a paradigm shift in our understanding of and approach to various infectious disorders. They may also represent the complex dynamic processes involved in infectious disorders that suggest some infections may develop independent of contamination.

CONCLUSION

Some tetanus infections maybe endogenous.

References

1. "About Tetanus". Centers for Disease Control and Prevention. United States Government. 2019.
2. World Health Organization. "Current recommendations for treatment of tetanus during humanitarian emergencies". Disease Control in Humanitarian Emergencies (English). WHO.
3. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 10th Edition Editors : Martin J. Blaser & Jeffrey I. Cohen & Steven M. Holland.

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