Leishmaniasis Background

Leishmaniasis is a disease caused by parasites of the genus Leishmania that is carried by female phlebotomine sandflies.

Statistics:
- 30 species of this parasite affect mammals, and 21 of these infect humans.
- 30,000 deaths per year
- 3.3 million DNA-disabling ulcers per year
- 1.3 million new cases per year
- In the absence of treatment, >50% will have a 100% disability rate
  - Leishmania is cutaneous, visceral, or mucocutaneous.

Similar diseases are sandfly fever, malaria, andRocky Mountain spotted fever.

Vaccine Background

First Generation Vaccines
- First generation vaccines composed of whole killed parasites that can be considered as both prophylactic and therapeutic vaccines.
- While prophylactic-focused vaccines prevent the outbreak of disease, therapeutic vaccines treat it after it has spread. The therapeutic approach may be important in cases of a drug-resistant disease. Theoretically, these vaccines should be easy to produce at a low cost.

Second Generation Vaccines
- Second generation vaccines consist of recombinant proteins, polypeptides, DNA vaccines, and antigen-presenting cells. These result from the antigens of the parasite, virus, or bacteria.
- There were many positive findings in the animal model that used the gp63 gene in Leishmania with a large immunogen registration; however, these studies were overshadowed by the negative findings in these studies.

Subunit Vaccine Development

What is a Subunit Vaccine?
- Vaccines that use only part of the disease-causing virus

Testing
- The subunit vaccines tested so far did not lead to development of long-term immunity, and the whole cell killed vaccines have performed disappointingly in the field trials.

Advantages:
- Subunit vaccines can be given to people with weakened immune systems.
- These vaccines appear to give long-lived immunity.
- Since only parts of the virus are used for these vaccines, the risks of reactions are very low.

Disadvantages:
- Several doses must be given for proper life-long immunity.

Other methods of prevention against Leishmaniasis include the use of drugs but are often associated with problems such as cost, toxicity, length, duration of treatment, route of injection, and the development of parasite drug resistance.

Development of Parasite Drug Resistance
- Insecticides or other organisms that transmits a pathogenic fungus, virus, bacterium, etc.

Vector Control helps to reduce the transmission of a disease by controlling sandflies

Leishmaniasis FAQs

1. What is Leishmaniasis?
2. How can the parasites enter the human body?
3. What are the symptoms of the disease?
4. How is the disease transmitted?
5. Why are preventive measures important?
6. What is the difference between cutaneous leishmaniasis, mucocutaneous leishmaniasis, and visceral leishmaniasis?
7. How is Leishmaniasis diagnosed?
8. How is Leishmaniasis treated?
9. How can I prevent Leishmaniasis?
10. Where is Leishmaniasis common?
11. How is the disease spread?
12. What is visceral leishmaniasis?
13. What is mucocutaneous leishmaniasis?
14. What is cutaneous leishmaniasis?
15. What are the symptoms of the disease?
16. Which countries are affected by the disease?
17. How can people prevent themselves from getting infected?
18. What are the symptoms of the disease?
19. How is the disease diagnosed?
20. What are the many symptoms of the disease?
21. What are the causes of the disease?
22. What are the possible treatments?
23. Is there a cure for Leishmaniasis?
24. Is there a vaccine available for Leishmaniasis?

Infective Methods

Research Strategy

Significance:
- If the proposed aims are achieved, then the methodologies used to create vaccines for parasites and other vector-borne diseases will be based on the method that could be used to develop other vector-borne diseases for parasitic diseases.

Approach:
- How to make the Vaccine:
  1. Isolate the DNA from the Parasite
  2. The DNA will be inserted into the yeast cell
  3. The antigen produced by the yeast cell will be collected and isolated
  4. Antigens will be released into the human body

References


