Challenges and expectations: a journey to a syphilis vaccination

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Dear Editor,

Dr. Lorenzo Giacani provides the BJSTD readers with an excellent text pointing out good prospects for syphilis vaccine development in the near future. He presents a historical journey showing a timeline of challenges and discoveries since syphilis and *Treponema pallidum* subsp. *pallidum (T.pallidum)* have been described.

He emphasizes some important conditions to reach a vaccine development:

1. The recent success of in vitro cultivation of *T. pallidum* as described by Edmondson and Norris, 2021 (https://doi.org/10.1002/cpz1.44). That is an extremally important achievement, not just because the culture can replace the growth of *Syphilis spirochete* in the testis of rabbits, but also due to the perspectives to grow the *spirochete* directly from human tissue (human sample). However, in vitro cultivation of *T. pallidum* is not available in many laboratories because it still represents some technical and economic challenges;
2. The genetic variability of *T. pallidum* strains around the world must be known. The author argues about the importance of accumulating multiple genome sequences from all parts of the world, not only from the USA, Europe, and Australia. He considers that countries with high syphilis prevalence do not have whole genome sequencing (WGS) data from the strains in circulation; and
3. The accumulation of WGS provides the opportunity for in silico structural analyses of the putative vaccine candidates.

The "Strategies for Syphilis Vaccine Development" presented by Dr. Giacani brings perspectives for a scientific development in syphilis with the incorporation of modern genomic techniques and gives expectations for a future eradication of the disease through vaccination. Although it is a great joy to know the success of in vitro *T. pallidum* cultivation, my great hope is that an in silico modeling can reveal ways for the production of protective antibodies (neutralizing antibodies) capable of preventing infections and reinfections by the *spirochete*.

Furthermore, in countries such as Brazil, with high rates of acquired syphilis, syphilis in pregnant women, and congenital syphilis, it may be interesting to establish international partnerships to bring the in vitro culture technology for *T. pallidum*. Thus, the strains obtained from the cultures will have a subsequent WGS to be included in the international database for antigenicity studies.

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Received on: 12.06.2022
Approved on: 12.06.2022

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