(30) Leishmaniasis vaccine pipeline

30.1 KILLED VACCINES

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Full text

Cutaneous leishmaniasis (CL) has been well known for centuries in Latin America and some parts of Asia. As an example AbuBakr Muhammad ibn Zakariya al-Razi (854 CE – 925 CE), has explained the vector born nature of CL lesion. Recovery of CL lesion accompanies with protection against further lesion development. Development of Leishmania vaccine was initiated by using several species of Leishmania. In Brazil, first 5-strain of killed Leishmania braziliensis and mexicana complexes,and later a single strain of L.amazonensis and in Venezuela L. mexicana were tested for prophylaxis and therapy. In Ecuador first a trivalent vaccine and later along with Colombia a single strain of killed L.amazonensis was tested for prophylaxis. In old world single and multiple doses of killed L. major were tested in Iran against zoonotic and anthroponotic CL and in Sudan against visceral leishmaniasis. The results of phase 3 trials of different preparations of killed Leishmania vaccines alone or mixed with mainly BCG (as an adjuvant) which were tested in thousands of volunteers results showed that the vaccines are safe and induced immune responses (shown by in vitro and in vivo). The efficacy rate in different trials varies between -14 to 72%.

Leishmanization (LZ) is an inoculation of L. major at a predetermined site of the body which usually produces a self-healing lesion and upon healing the individual is protected against further CL lesion development. Historically and still LZ is the most effective control measure against CL. In 1980s more than 2 million soldiers and civilians were leishmanized and showed to be highly effective. Challenges and reasons for killed vaccine failure are partly as follow; lack of an appropriate adjuvant, evaluation of killed vaccines in the field is not precise due to nature of the disease. The only way to evaluate Leishmania vaccines is to use live challenge. Global attentions need to solve the problems of live challenge.