

VAC_19 - Vaccines against neglected tropical diseases based on mRNA technology: a scientific and patent landscape

Alice Fusaro Faioli¹; Bruna de Paula Fonseca¹; Claudia Chamas¹.

¹Fiocruz/CDTS

Introduction: The successful launch of mRNA-based COVID-19 vaccines revealed the potential of this platform for other maladies, including Neglected Tropical Diseases (NTDs).

Objectives: The current work aimed to identify research and innovation efforts related to mRNA vaccine technology and its application to NTDs by analyzing scientific articles and patent data, generating a comprehensive mapping helpful in informing policymakers, managers, and researchers.

Methodology: Scientific publications and patent data on NTD RNA vaccine development were retrieved from Scopus and Orbit Intelligence databases, respectively. Documents were individually analyzed, screened for relevance and classified. Documents describing the use of RNA as adjuvant, veterinary vaccines or that did not include experimental evidence with NTDs were excluded.

Results: Searches on Scopus and Questel Orbit Intelligence databases resulted in the retrieval of 422 scientific publications and 1,508 patent families. After manual screening for relevance, 37 articles and 38 patent families remained. Scientific publications focused on rabies, chikungunya, dengue, leishmaniasis, Buruli ulcer and trachoma, whereas patent documents targeted rabies, chikungunya, and dengue. Rabies is the main NTD target (46% of scientific publications and 71% of patent documents). Leading contributors were the United States, Germany, and China. Whereas academic institutions were the main drivers of scientific publications, mostly in collaboration within the academia or with corporations, single corporations were the main patent drivers. Overall, R&D in this field was still in preliminary stage. Interestingly, documents classified under most advanced stages were associated with corporations (jointly with the academia or alone). In respect to formulation repertoire, an array of delivery vehicles was employed, most of which were lipid-based structures.

Conclusion: Our findings point to the urgent need to bolster scientific and technological capabilities for the development of mRNA vaccines for NTDs by amplifying investments, particularly in countries with a high disease burden, which, according to our data, have made modest contributions to patented inventions. In the context of low-, middle- and upper-middle-income nations, fostering networks and partnerships, specifically between academia and companies, could accelerate their integration into the sphere of mRNA platforms. Facilitating technology transfer could prove essential for speeding up technology catch-up.

Keywords: Neglected diseases; mRNA vaccines