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Research advances in vaccines of *Toxoplasma gondii* based on microneme proteins (MICs): a systematic review

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Background: *Toxoplasma gondii* is an intracellular parasite infecting almost all warm-blooded animals including human. During the last years large number of research on vaccination have been performed and in this regard Micronemal proteins (MICs) are of crucial importance. The current review aims to reveal the efficiency of MICs based vaccines to prevent and control *toxoplasma* infection.
Methods: A comprehensive literature search was performed in all known databases and 26 articles were selected published from 2003.
Results: About 46% of the studies are focused on MIC3 and its epitopes, as well as studies on multiple molecules, such as MIC1, MIC2, Perforin-like protein, MIC4, MIC6, MIC8, α-chain of MIC11, MIC13, M2AP, and AMA have been discovered. This review summarizes the latest results of MICs based vaccines and covers numerous aspects, such as DNA vaccination with different genes (MICs), use of adjuvants, ways of vaccination and injection, use of different mice models, challenge with different *T. gondii* strains.
Conclusion: The results of our survey can serve as a basis for further studies to develop more efficient and novel vaccines against *T. gondii* for animals and humans.
Keywords: Toxoplasmosis, Microneme proteins, DNA vaccine, recombinant vaccine