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Vaccinomics approach for designing potential peptide vaccine by targeting pyruvate kinase of *Madurella mycetomatis*

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Background: Mycetoma is one of the neglected tropical diseases that considered as a public health problem with socio-economic impact in several developing countries. It is a chronic progressive destructive suppurative disease can affect any part of the body, caused by certain fungi (*Eumycetoma*) or bacteria (*Actinomycetoma*). Madurella mycetomatis(*M mycetomatis*) is the predominant isolated organism causing eumycetoma in Sudan. .There is no effective treatment or a vaccine for it, thus the aim of this study is to design a peptide-based vaccine against *M.mycetomatis* infection via in silico approaches, using the immunogenic site Pyruvate kinase (PK).

Material and Methods: In 26th September 2017 sequence of PK of *M. mycetomatis* protein was retrieved from the National Center for Biotechnology Information (NCBI). Immunoinformatics tools were used to predict B and T-cell epitopes and to calculate the population coverage.

Result and discussion: Two epitopes predicted for b cell (gsypseav, dftkv) as a peptide-based vaccine. for t-cell epitopes, four epitopes showed high affinity to mhc class i (amaavrsal, yrgvpflf, hlyrgvypf, yrpvcpiim) and high coverage against the whole world (58.35%, 57.91%, 54.01%, 52.73%) respectively. in mhc class ii, si\x epitopes that interact with the most frequent mhc class ii (fvlstsges, ivescamaa, lkaensipy, ikwglshai) with high coverage against the whole world (80.93%, 80.02%, 73.12%,70.55%) respectively. moreover, one shared epitope (lkaensipy) predicted in b-cell, mhc-i, and mhc-ii with high population coverage world combined mhc-i and mhc-ii (77.92%) and (57.78%) in sudan. also, four shared epitopes (yrgvypflf, lkaensipy, lyrgvypfl, ikwglshai) between mhc-i and mhc-ii with epitope set 94.62% worldwide and 92.38% in sudan. till now there is no study was done to predict peptide-based vaccine against mycetoma infection, so this study will provide a strong base for development of vaccine after *in vivo* and *in vitro* studies confirmation of all this candidate epitopes as effective peptide vaccine.

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