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Application of biotechnology on malaria transmission blocking vaccines in Iran

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A malaria transmission Blocking Vaccine (TBV), Altruistic Vaccines, would work in combination with drugs and insecticides by blocking the transmission of the Plasmodium parasite from human to human. These vaccines are targeting the parasite's sexual stages in the mosquito body. A large reduction in the burden of malaria has recently been achieved in Iran following the scaling up of effective treatment and vector control programmes. These achievements need for a partially effective malaria vaccine targeted at disease elimination. The problem is that most of Plasmodium parasites are not continues cultivable in laboratory especially to study sexual stages. Therefore biotechnology helps researchers to obtain sexual stages proteins for evaluation their role in transmission. Different type of epitopes from several parts of the life cycle of Iranian malaria parasites and their Anopheles vectors are already characterized and also have been challenged or in challenging process which contain immunogens from the disease life cycle. This presentation will discuss different malaria vaccine candidate genes studies from Iran with the focus on PvWARP, Plasmodium vivax Transmission Blocking Vaccine candidate gene. The details will be discussed in presentation time.

Keywords: Biotechnology, Malaria, Transmission Blocking Vaccine, Iran.

Biography

Saber Gholizadeh, Medical Entomologist (Biotechnology), graduated from Medical Entomology Department, Tehran University of Medical Sciences in 2010. He worked on Transmission Blocking Vaccine in Malaria. He was research staff and Co-PhD student in Pasteur Institute of Iran (PII), Biotechnology Research Center (BRC), Malaria and Vector Research Group (MVRG) since 2000. He is Assistant Prof. in Urmia University of Medical Sciences now. He has published more than 10 papers in reputed journals and serving as an editorial board member of Journal of Bacteriology and Parasitology.

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Rapid antibody production in CHO cells using human glutamine synthetase gene as selection marker

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The production of foreign proteins especially therapeutic antibodies in mammalian cells is pivotal to the biotechnology industry. Advances in the field have resulted in enhanced cellular growth and production characteristics. With increasing flux of therapeutic candidates in the industry's product pipelines, platform approach that could potentially be applied for the wide array of products is highly desirable. In this study we describe a cell line development platform referred here as CHO-GS^{HT} to produce high levels of antibody in CHO cells using a human Glutamine Synthetase gene as a selection marker. PEImax was used to make stable transfections. Integration of an automated colony picker allowed high throughput detection and rapid isolation of the high secreting clones. CHO-GS^{HT} platform does not use serum or animal-derived components at any step. It was successfully used to generate high expressing chimeric heavy-chain antibody (cHCAB) and immunoglobins (IgG1) clones with 14 days batch titers of > 200mg/L achieved for the top clone. Starting with transfection step, high producing clones were generated in a time span of 7-8 weeks. Generic fed-batch strategies including temperature shift were able to enhance the productivities by ~ 4-fold achieving antibody titers of ~ 824 mg/L. To this end, increase in cellular GS expression level and the improvements in the antibody productivities were studied by selection at higher MSX concentration.

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