



Professor Sedigheh Zakeri, **B.Sc., M.Sc., Ph.D.**,

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Background

Sedigheh Zakeri graduated with a first class honors degree in Biological Science from the University of Mashhad in 1989, and obtained her M.Sc. and PhD in Parasite Immunology from Liverpool School of Tropical Medicine in 1994 and 1998, respectively. She joined Parasitology Department in Pasteur Institute of Iran in 1999 and a year later moved to Biotechnology Department, where initiated immune-molecular research on malaria through her re-entry grant awarded by WHO/TDR. Malaria and Vector Research Group (MVRG) was co-established by Prof Zakeri and Prof. Navid Dinparast Djadid as an independent research group in Biotechnology Research Center (BRC) since 2005.

Areas of Interest & Research Activities:

- Malaria Vaccine Development
- Molecular-Immunology of Malaria Parasites
- Molecular Surveillance and Epidemiology of Malaria Drug Resistance
- Sero-Epidemiology of Malaria
- Molecular Diagnosis
- Anti-Malarial Drug Discovery

Her Current Main Activity is “Malaria Vaccine Development”

Vaccines could be a crucial component of efforts to eradicate malaria. Continued support for these efforts is essential, but if malaria vaccines are to be used as part of a repertoire of tools for elimination or eradication of malaria, they will need to have an impact on malaria transmission. Our interest is on "vaccines that interrupt malaria transmission" (**VIMT**), which includes not only "classical" transmission-blocking vaccines that target the sexual and mosquito stages but also pre-erythrocytic and asexual stage vaccines that have an effect on transmission. VIMT may also include vaccines that target the vector to disrupt parasite development in the mosquito. Thus, the VIMT may also prevent the spread of drug-resistant parasites or parasite mutants that have developed resistance to other malaria vaccines. In addition, our malaria vaccine development continue to work on fishing good antigen for VIMT, establishment of continuous

in vitro culture of *P. vivax*, set up related test for functional assays, establishment of primate research unit in PII, as well as improvement of our target vaccine by expression systems (such *chlamydomonas reinhardtii*), delivery systems (*chlamydomonas reinhardtii*), human compatible adjuvants and different prime/boost strategies.

Field Activities:

In synergy with laboratory-based methods, fieldwork is an essential aspect of her work and often undertaken in remote, rural areas of Iran.



Teaching Experiences:

- Lecturer, Basic and advanced Immunology
- Lecturer, Molecular Biology
- Lecturer, Malaria Vaccine

Supervision of M. Sc. and PhD thesis

- Supervisor of more than 60 M.Sc. and PhD thesis
- Advisor of more than 25 M.Sc. and PhD thesis

Administrative & Experiences:

- Head of Malaria and Vector Research Group (MVRG), BRC, PII (2014-2017)
- Member, Education Council, Pasteur Institute of Iran (2012-2017)
- Member, Research Council, Pasteur Institute of Iran (2007-2012)

International and National Advisory Committees and Training:

- Acting as Temporary Advisor to WHO/EMRO since 2007
- Advisor, Malaria Treatment Advisory Committee, National Malaria Control Program, CDC, Iran



Teaching & Training



National & International Grants:

- Since 2000 Prof. Zakeri awarded about \$500,000 grant through WHO/TDR/EMRO, Joint Iran-Karolinska project, Iranian Ministry of Health and Pasteur Institute of Iran.

Recent Publications (Since 2015):

Nazeri S, **Zakeri S**, Mehrizi AA, Djadid ND, SnounouG, Andolina C, Nosten F (2018). Vaccine adjuvants CpG (oligodeoxynucleotides ODNs), MPL (3-O-decylated monophosphoryl lipid A) and naloxone enhanced Th1 immune response to the *Plasmodium vivax* recombinant thrombospondin-related adhesive protein (TRAP) in mice. Med Microbiol Immunol (in press).

Gholizadeh S, Karimi NN, **Zakeri S**, Djadid ND (2018). The Role of Molecular Techniques on Malaria Control and Elimination Programs in Iran: Systematic Review. Iranian Journal of Parasitology. In press 2018

- Bakhshi H., Raz AA, Failloux A, Zakeri S, Djadid ND (2018). Mosquito-borne Viral Diseases and Potential Transmission Blocking Vaccine Candidates. *Infection, Genetics and Evolution* (in press).
- Rami A, Raz AA, Djadid ND, Zakeri S. (2018). Isolation and identification of *Anopheles* spp. Mosquitoes collected from Iranian malaria settings: steps toward applying paratransgenic tools against malaria. *Parasites & Vectors* (in press).
- Pirahmadi S, **Zakeri S**, Mehrizi AA, Djadid ND (2018). Analysis of genetic diversity and population structure of gene encoding cell-traversal protein for ookinetes and sporozoites (CelTOS) vaccine candidate antigen in global *Plasmodium falciparum* populations. *Infect Genet Evol.* 59:113-125. doi: 10.1016/j.meegid.
- Mehrizi AA, Rezvani N, **Zakeri S**, Gholami A, Babaeekhou L. (2018). Poly(I:C) adjuvant strongly enhances parasite-inhibitory antibodies and Th1 response against *Plasmodium falciparum* merozoite surface protein-1 (42-kDa fragment) in BALB/c mice. *Med Microbiol Immunol.* 207(2):151-166. doi: 10.1007/s00430-018-0535-4.
- Afrouzan H, Tahghighi A, **Zakeri S**, Es-haghi A (2018). Chemical Composition and Antimicrobial Activities of Iranian Propolis. *Iran Biomed J.* 1;22(1):50-65 .
- Nazeri S, **Zakeri S**, Mehrizi AA, Djadid ND (2017). Naturally acquired immune responses to thrombospondin-related adhesion protein (TRAP) of *Plasmodium vivax* in patients from areas of unstable malaria transmission. *Acta Trop.* 173:45-54. doi: 10.1016/j.actatropica.
- Afrouzan H, **Zakeri S**, Abouie Mehrizi A, Molasalehi S, Tahghighi A, Shokrgozar MA, Es-Haghi A, Dinparast Djadid N. (2017). Anti-Plasmodial Assessment of Four Different Iranian Propolis Extracts. *Arch Iran Med.* 20(5):270-281. doi: 0172005/AIM.004.
- Hoosh-Deghati H, Dinparast-Djadid N, Moin-Vaziri V, Atta H, Raz AA, Seyyed-Tabaei SJ, Maleki-Ravasan N, Alipour H, **Zakeri S**, Azar-Gashb E (2017). Composition of *Anopheles* Species Collected from Selected Malarious Areas of Afghanistan and Iran. *J Arthropod Borne Dis.* 8;11(3):354-362 .
- Shabani SH, **Zakeri S**, Salmanian AH, Amani J, Mehrizi AA, Snounou G, Nosten F, Andolina C, Mourtazavi Y, Djadid ND (2017). Biological, immunological and functional properties of two novel multi-variant chimeric recombinant proteins of CSP antigens for vaccine development against *Plasmodium vivax* infection. *Mol Immunol.* 90:158-171. doi: 10.1016/j.molimm .
- Mehrizi AA, Torabi F, **Zakeri S**, Djadid ND. (2017). Limited genetic diversity in the global *Plasmodium vivax* Cell traversal protein of Ookinetes and Sporozoites (CelTOS) sequences; implications for PvCelTOS-based vaccine development. *Infect Genet Evol.* 53:239-247. doi: 10.1016/j.meegid.2017.06.005 .

- Afrouzan H, **Zakeri S**, Abouie Mehrizi A, Molasalehi S, Tahghighi A, Shokrgozar MA, Es-Haghi A, Dinparast Djadid N. (2017). Anti-Plasmodial Assessment of Four Different Iranian Propolis Extracts. *Arch Iran Med.* 20(5):270-281. doi: 0172005/AIM.004.
- Pirahmadi S, **Zakeri S**, Raeisi A. (2017). Absence of Asymptomatic Malaria Infection in a Cross-sectional Study in Iranshahr District, Iran under Elimination Programmes. *Iran J Parasitol.* 12(1):90-100.
- Zakeri S**, van den Hoogen LL, Mehrizi AA, Karimi F, Raeisi A, Drakeley C (2016). Anti-malarial seroprevalence assessment during an elimination programme in Chabahar District, south-eastern Iran. *Malar J.* 22;15(1):382. doi: 10.1186/s12936-016-1432-1.
- Didier Ménard, Ph.D., NimolKhim, Ph.D., Johann Beghain, M.Sc., AyolaAkimAdegnika, M.D., M.Sc., Ph.D., Mohammad ShafiulAlam, Ph.D., OlukemiAmodu, Ph.D., Ghulam Rahim Awab, Ph.D., Céline Barnadas, Ph.D., Antoine Berry, M.D., Ph.D.,**SedighehZakeri, Ph.D.**, Saorin Kim, B.S., RothaEam, B.S., Laura Berne, M.Sc., ChanraKhean, B.S., SophyChy, B.S., Malen Ken, B.S., Kaknika Loch, B.S., LydieCanier, M.Sc., Valentine Duru, M.Sc., Eric Legrand, Ph.D., Jean Christophe Barale, Ph.D., Barbara Stokes, B.Sc., Judith Straimer, Ph.D., Benoit Witkowski, Ph.D., David A. Fidock, Ph.D., Christophe Rogier, M.D., Ph.D., Pr., Pascal Ringwald, M.D., Frederic Ariey, M.D., Ph.D., OdileMercereau-Puijalon, Ph.DA. (2016). Worldwide Map of *Plasmodium falciparum* K13-Propeller Polymorphism. *N Engl J Med.* 23;374(25):2453-64. doi: 10.1056/NEJMoa1513137.
- Shabani SH, **Zakeri S**, Mehrizi AA, Mortazavi Y, Djadid ND (2016). Population genetics structure of *Plasmodium vivax* circumsporozoite protein during the elimination process in low and unstable malaria transmission areas, southeast of Iran. *Acta Trop.* 160:23-34. doi: 10.1016/j.actatropica.2016.04.006 .
- Mehrizi AA, Dodangeh F, **Zakeri S**, Djadid ND (2016). Worldwide population genetic analysis and natural selection in the *Plasmodium vivax* Generative Cell Specific 1 (PvGCS1) as a transmission-blocking vaccine candidate. *Infect Genet Evol.* 43:50-7. doi: 10.1016/j.meegid.2016.05.015 .
- Nazeri S, Mehrizi AA, Djadid ND, **Zakeri S** (2015). A comparative study on worldwide genetic diversity and population structure analysis of *Plasmodium vivax* thrombospondin-related adhesive protein (PvTRAP) and its implications for the vivax vaccine design. *Infect Genet Evol.* 36:410-23.
- Rouhani M, **Zakeri S**, Mehrizi AA, Raeisi A, Djadid ND (2015). Comparative analysis of IgG subclass-specific responses profiles to *Plasmodium falciparum* apical membrane antigen-1 and (AMA-1) and merozoite surface protein 1 (MSP-1) in naturally exposed individuals living in malaria hypoendemic settings, Iran. *Malar J.* 5;14(1):58.

- Rouhani M, **Zakeri S**, Pirahmadi S, Raeisi A, Djadid ND (2015). High prevalence of *pfdhfr-pfdhps* triple mutations associated with anti-malarial drugs resistance in *Plasmodium falciparum* isolates seven years after the adoption of sulfadoxine-pyrimethamine in combination with artesunate as first-line treatment in Iran. *Infect Genet Evol.* 31;31C:183-189.
- Valizadeh V, **Zakeri S**, Mehrizi AA, Mirkazemi S, Djadid ND (2015). Natural acquired inhibitory antibodies to *Plasmodium vivax* Duffy binding protein (PvDBP-II) equally block erythrocyte binding of homologous and heterologous expressed PvDBP-II on the surface of COS-7 cells. *Med Microbiol Immunol.* 5:1-11 DOI 10.1007/s00430-015-0429-7
- Someabozorg MA, Mirkazemi S, Mehrizi AA, Shokri F, Djadid ND, **Zakeri S** (2015). Administration of naloxone in combination with recombinant *Plasmodium vivax* AMA-1 in BALB/c mice induces mixed Th1/Th2 immune responses. *Parasite Immunol.* 37, 521-532
- Salavatifar M, Zakeri S, Mehrizi AA, Mirkazemi S, Djadid ND (2015). Evaluation of the Naturally Acquired Antibody Responses to Two Variant Forms of *Plasmodium vivax* Apical Membrane Antigen-1 in Individuals Living in Areas of Low and Unstable Malaria Transmission of Iran. *Arch Iran Med.* 18(12):834-43.
- Salavatifar M, Zakeri S, Roodbari NH, Djadid ND (2015). High-level Expression, Purification and Characterization of a Recombinant *Plasmodium vivax* Apical Membrane Antigen 1: Implication for vivax Malaria Vaccine Development. *Cell J.* 17(3):520-31.
- Talha BA, Pirahmadi S, Mehrizi AA, Djadid ND, Nour BYM, Zakeri S (2015). Molecular genetic analysis of *Plasmodium vivax* isolates from Eastern and Central Sudan using *pvmsp* and *pvmsp-3a* genes as molecular markers. *Infect Genet Evol.* 32:12-22