

# Global summit on Agriculture & Organic farming

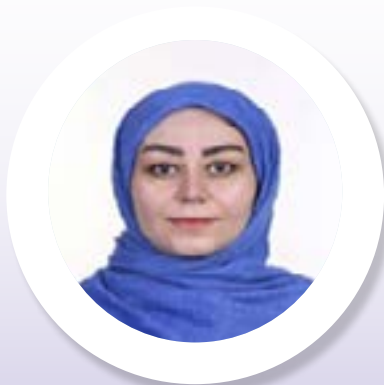
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## In silico analysis and in planta production of recombinant ccl21/IL1 $\beta$ protein and characterization of its in vitro anti-tumor and immunogenic activity

**Background:** CCL21 has an essential role in anti-tumor immune activity. Epitopes of IL1 $\beta$  have adjuvant activity without causing inflammatory responses. CCR7 and its ligands play a vital role in the immune balance; specifically, in transport of T lymphocytes and antigen-presenting cells such as dendritic cells to the lymph nodes. This study aimed to produce epitopes of CCL21 and IL1 $\beta$  as a recombinant protein and characterize its in vitro anti-tumor and immunogenic activity. A codon-optimized ccl21/IL1 $\beta$  gene was designed and synthesized from human genes. Stability and binding affinity of CCL21/IL1 $\beta$  protein and CCR7 receptor were examined through in silico analyses. The construct was introduced into *N. tabacum* to produce this recombinant protein and the structure and function of CCL21/IL1 $\beta$  were examined. Purified protein from transgenic leaves generated a strong signal in SDS PAGE and western blotting assays. FTIR measurement and MALDI-TOF/TOF mass spectrography showed that ccl21/IL-1 $\beta$  was correctly expressed in tobacco plants. Potential activity of purified CCL21/IL1 $\beta$  in stimulating the proliferation and migration of MCF7 cancer cell line was investigated using the wound healing method. The results demonstrated a decrease in survival rate and metastasization of cancer cells in the presence of CCL21/IL1 $\beta$ , and IC50 of CCL21 on MCF7 cells was less than that of non-recombinant protein. Agarose assay on PBMCsCCR7+ showed that CCL21/IL1 $\beta$  has biological activity and there is a distinguishable difference between chemokinetic (CCL21) and chemotactic (FBS) movements. Overall, the results suggest that CCL21/IL1 $\beta$  could be considered an effective adjuvant in future in vivo and clinical tests. is recommended for grassland restoration given its environmental impact, cost, and hay quality.

**Keywords:** CCL21/IL1 $\beta$ , Coronavirus disease, molecular dynamics simulation, FTIR, Scratch assay, Chemotaxis assay.



**Maria Beihaghi**

Kavian Institute of Higher Education,  
Mashhad, Iran

### Biography

Maria Beihaghi is an Assistant Professor, Department of Biology, Kavian Institute of Higher education, Mashhad, Mashhad, Iran. Invited lecturer of School of Science and Technology, The University of Georgia, Tbilisi, Georgia, Research adviser, Department of Biology, Faculty of Science, Ferdowsi University of Mashhad, Mashhad, Iran. She did her M. Sc. and Ph. D. degrees in Plant Biotechnology from the Ferdowsi University of Mashhad, Iran, and Postdoctoral Research Associate in drug design, Ferdowsi University of Mashhad, Iran. She is an inventor member of IFIA 2022 and She has gotten a Gold medal in the second international invention and innovation competition for IFIA inventor members. She is working currently in the area of genetic engineering science like the production of recombinant proteins she invented several recombinant proteins, that have been patented. Her research focuses on cancer, s biomarkers, and exosome medicinal production.

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