Characterization Of Exosomes Originating From Macrophages İnfected With Brucella Or Exposed To İnactive Brucella And Examining İts Effect On Macrophage Polarization

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- ✓ Infectious diseases
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- ✓ THP-1 cell line

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THESIS ABSTRACT

Brucella has the ability to hide itself in phagocytic cells, especially in macrophages. The formation of exosomes and bacterial membrane vesicles inside the cell may reduce or induce immune responses during infection. Such reasons cause chronic brucellosis. Within the scope of our study, the thp-1 monocytic cell line will be exposed to live brucella strains and inactivated *Brucella melitensis* and *Brucella abortus*. The aim here is to analyze the mediators secreted by the cell during the infection in macrophage cells, membrane vesicles (mv) and extracellular vesicles (ev) with different techniques. Recently, the role of exosomes and membrane vesicles in infectious diseases has started to attract attention. Therefore, a new condition was created with the exosomes obtained in the later stages of the project. THP-1 cells were exposed to bacterial exosomes and various surface markers were analyzed. At the same time, bacterial membrane vesicles and exosomes were characterized. Within the scope of the study, the immunological effects of the THP-1 macrophage cell line between *Brucella* and *Brucella* membrane vesicles were investigated on both cellular and exosomal basis.

APPLICATION AREAS OF THE THESIS RESULTS

As a result, the surface markers of *Brucella* species CD80, CD86, HLA-DR, CD163 CD169 and CD206 were analyzed in THP-1 monocytic cells. An increase in CD80 and CD86 levels was observed in cells infected with live *Brucella* species, exposed to inactive *Brucella*-derived THP-1 exosomes and exposed to live *Brucella* OMVs. It was shown that with the observed bacterial-induced increases, there was a significant increase in the surface markers of exosome and OMV structures, but this increase was generally less than the direct bacterial-induced increase. At the same time, a decrease in the ROS and NO levels of the cells was noted.

The studies conducted will help us understand the responses of immune cells to brucellosis. The results obtained will contribute to the completion of the missing information in the literature on *Brucella* infection. Considering the importance of vesicles in the progression of chronic disease, it becomes important to examine bacterial membrane vesicles and exosomes with immunological effects.

ACADEMIC ACTIVITIES

1. İnaktif *Brucella* ve İnaktif *Brucella*'ya Maruz Bırakılmış Makrofajlardan Köken Alan Eksozomlarin Makrofaj Polarizasyonuna Etkisi,
   Esen C., Bal H., Tüzemen Ü., Yöyen-Ermiş D., Özakın C., Oral B., 2024, Oral Presentation at the 5th International Vaccinology Congress
2. Doku Yerleşik/İnfiltre Makrofajların İzolasyonu ve Organ Nişleri Korunarak Gerçekleştirilen 3 Boyutlu Hücre Kültürü Ortamında Büyütülmesi,
   Dündar F., Etgü O., **Esen C.**, Yağcıoğlu B., Özalp E., Oral B., Yöyen Ermiş D., 2023, XXVI. Ulusal immünoloji kongresi Poster Sunumu
3. Can Exosomes Isolated from Erythrocyte Suspensions Lead to Suppression of T Lymphocyte Proliferation?
   Bal H., Yöyen-Ermiş D., Arslan G., **Esen C.**, Aydın Y., Aytoğu G., Yeşilbağ K., Heper Y., Oral B., 2024, Extracellular Vesicle Conference Poster Presentation
4. Eritrosit Süspansiyonlarından Elde edilen Eksozomların T lenfosit Proliferasyonu üzerindeki etkisinde lökoredüksiyonun rolü.
   Bal H., Yöyen-Ermiş D., Arslan G., **Esen C.**, Aydın Y., Aytoğu G., Yeşilbağ K., Heper Y., Oral B., 2024, XVII National Blood Centers and Transfusion Medicine Congress Oral Presentation (Best 1st Oral Presentation Award)
5. Development of Ara-C Loaded Exosomes: Next-Generation Nanotherapeutic Approaches in AML Therapy.
   Atmaca S., Muçaj S., **Esen C.**, Özküçük Y., Demir E. T., Eylem C., Nemutlu E., Yöyen-Ermiş D., Esendağlı G., Timür S. S., 2025, JOINT EUFEPS – ÖPhG MEETING Oral Presentation