

# The secretome of mesenchymal stromal cells: Role of extracellular vesicles in immunomodulation

Stefania Bruno <sup>a</sup>, Maria Chiara Deregibus <sup>b</sup>, Giovanni Camussi <sup>b</sup>  

Show more 

+ Add to Mendeley  Share  Cite

<https://doi.org/10.1016/j.imlet.2015.06.007>

[Get rights and content](#)

## Highlights

- Mesenchymal stromal cells influence the cells of the immune system.
- This influence is mainly due to the release of paracrine factors.
- Extracellular vesicles are emerging as new tool for cell-to-cell communication.

## Abstract

Mesenchymal stromal cells (MSCs) inhibit natural killer cell proliferation and activity, suppress T lymphocyte proliferation, dendritic cells maturation and B lymphocyte proliferation and activation. Moreover, MSCs may induce regulatory T cells. Several factors released from MSCs have been implicated in their immunomodulatory properties. These include soluble factors such as interleukins 6 and 10, prostaglandin E2, hepatocyte growth factor, indoleamine 2,3-dioxygenase, nitric oxide, transforming growth factor  $\beta$ 1, human leukocyte antigen and extracellular vesicles. These vesicles released from cells have been characterized as a new mechanism of cell-to-cell communication and emerged as mediators of the MSC-immune-modulatory effects. In this review we focused our attention on the extracellular vesicles as paracrine mediators of MSC immune-modulation.