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Introduction:
Mechanical stretch could change the paracrine function of mesenchymal stem cells (MSCs), and possibly change the damage of endothelial cell induced by LPS. Although previous studies have focused intensively on the effects of chemical signals that regulate MSC commitment, the effects of physical/mechanical cues of the microenvironment on MSC fate determination have long been neglected.

Methods:
Human bone marrow MSCs proliferation was measured using CCK-8 assays after treatments with different time duration and stretch magnitude. To uncover the effect of stretch on MSC pro- and anti-inflammation, we measured the inflammation factors after been stimulated with the stretch. Additionally, we employed the morphological examination through Wright-Giemsa staining method to investigate the role of stretch on hMSCs. The VE-cadherin protein activities were assessed by using immunofluorescence.

Results:
Cyclic mechanical stretch could significantly change the morphological and paracrine function of hMSCs, but do not alter the surface markers expression. Furthermore, stretched hMSCs deteriorate the endothelial permeability.

Conclusion:
Our results showed that cyclic mechanical stretch significantly regulate human bone marrow MSC paracrine function. Therefore, more consideration would be took when MSCs engraftment in lung while breathing. This study provides insights into the mechanisms by which MSCs could be changed by the mechanical stretch.