

# Menstrual blood-derived stem cells (MenSCs)-as potential source of adult stem cells

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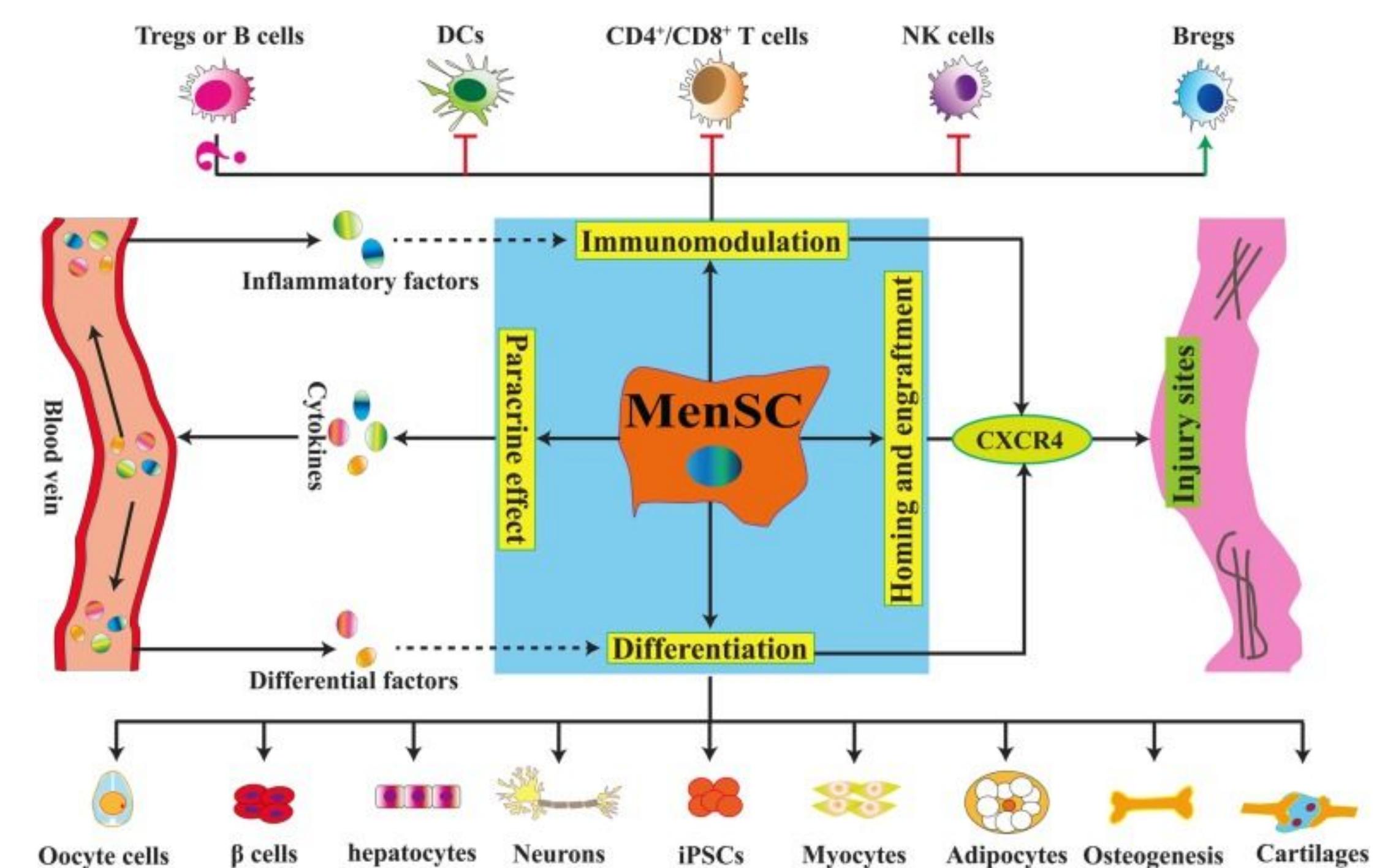
## INTRODUCTION

Stem cells are cells that have high proliferative capacity and self-renewal. Considering the ethical issues, immunogenicity and tumorigenicity of embryonic stem cells and genetic instability of induced pluripotent stem cells (iPSCs), adult stem cells are being applied to study and treat various diseases (1)(2). There are many sources for adult stem cells like bone marrow and endometrium etc., however, acquisition from these sources is invasive. A few years back it was discovered that mesenchymal stem cells (MSC) are also present in menstrual blood by Meng et al. (3). Compared to the other sources Menstrual blood-derived stem cells (MenSCs) have less ethical concerns because they can be easily extracted. They are tested positive for embryonic stem cell marker octamer binding transcription factor 4 (OCT-4), major histocompatibility complex

1 (MHC 1), and MSC surface markers like CD29, CD73, CD90 (4). In vitro analysis of MenSCs reveal that they are highly proliferative and genetically stable and also showed to treat diseases (4)(5). Ongoing research is now trying to find out their applications in regenerative medicine. MenSCs are proved to have mechanisms of repair and regeneration similar to the MSC's in bone marrow and endometrium. MenSCs are proved to have mechanisms of repair and regeneration similar to the MSC's in bone marrow and endometrium. A study on their therapeutic effects revealed that they are capable of differentiation and show immunomodulation via interaction with different immune cells (figure 1)(6).

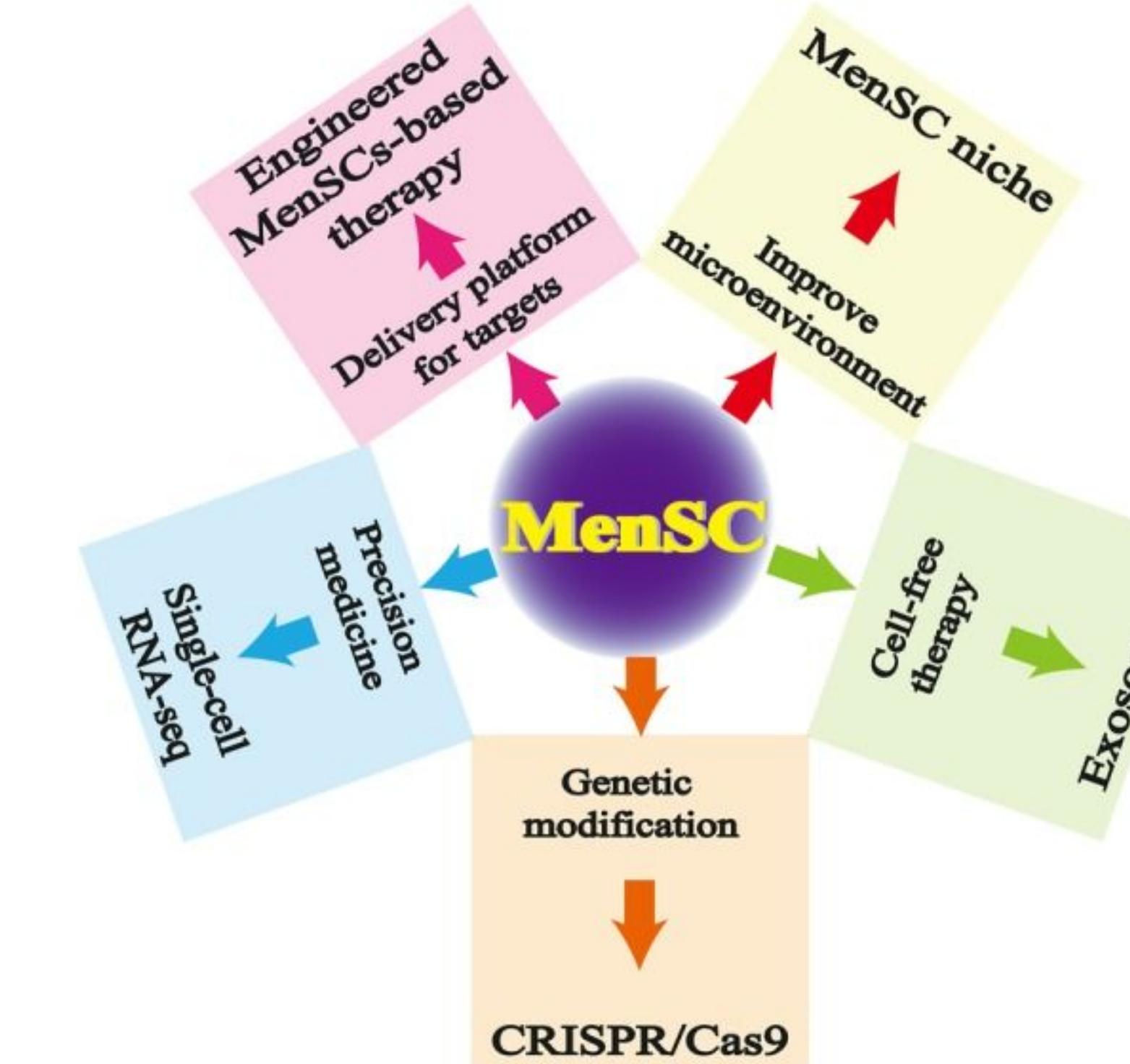
Irrespective of the vast research going in the stem cell field, when compared to others there is still a little data available on MenSCs in clinical reports as most of the studies being conducted are still in preclinical stages. This reveals that there is lot more to be discovered, and understanding their mode of action by designing new approaches and technologies is very much essential (figure 2)(6). By designing a novel approach to study their properties in detail we hypothesize to increase the potentiality of MenSCs to be useful to develop new therapies and treatment methods.

Chen et al. 2019



**Figure 1.** Schematic diagram showing therapeutic effects of MenSCs (1) differentiation into cells (2) immunomodulation interaction with immune cells.

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**Figure 2.** Novel strategies being designed by applying new technologies to MenSCs to treat wide range of diseases.

## FUTURE DIRECTIONS.

1. Understanding the effects of vaginal microbiome on menstrual cycle.
2. understanding cellular pathways for improving MenSCs microenvironment.
3. Analysing the properties of MenSCs in detail through comparative studies from various samples collected.
4. Applying techniques and tools to study their mode of action for clinical applications.
5. Increasing the potentiality of MenSCs.
6. Designing new therapies and treatments.

## REFERENCES

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