

## The current state of evidence regarding the use of MSCs in inflammatory and immune skin diseases

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### Background

Chronic inflammatory skin diseases have been considered as inappropriate inflammatory responses. Conventional treatments have limited efficacy for several patients. Mesenchymal stem cells (MSCs) and their derivatives have therapeutic benefits in regenerating tissues and addressing refractory skin disorders through self-renewal and differentiation capacities.

### Aim

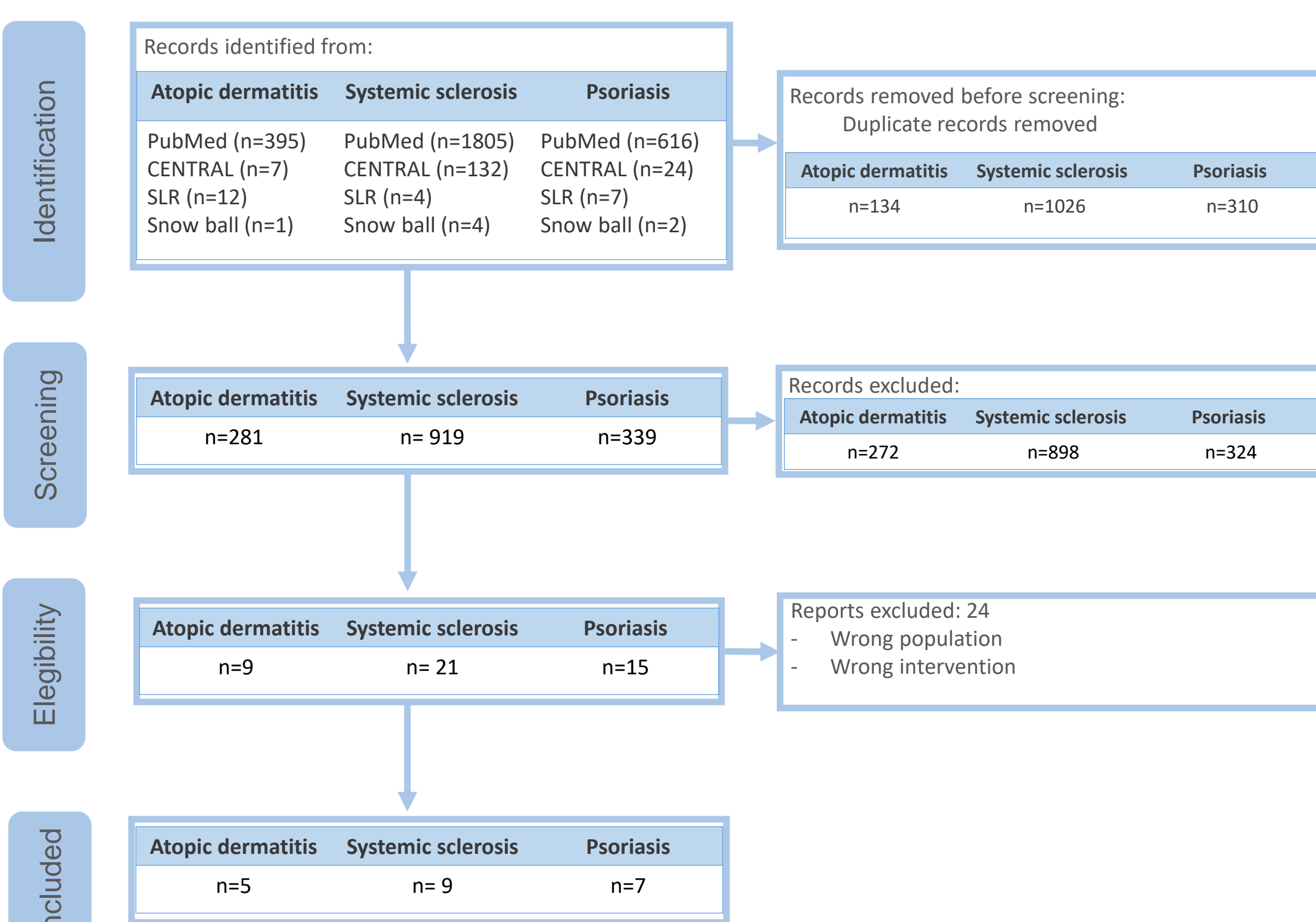
We aim to identify the knowledge gaps in research with MSC and derivative therapies in humans in chronic inflammatory dermatological diseases.

### Methods

Scoping review. The search was conducted in April 2023, in three indexed databases. Limited to clinical studies in patients with atopic dermatitis (AD), systemic sclerosis (SS), or psoriasis treated with MSC therapy. No language restrictions. The search strategy was composed of free terms and exploited controlled vocabulary. The review was conducted following the PRISMA-ScR and Joanna Briggs Institute (JBI) methodology. Two independent reviewers performed the screening, selection, and qualitative synthesis.

### Results

#### PRISMA-ScR flowchart

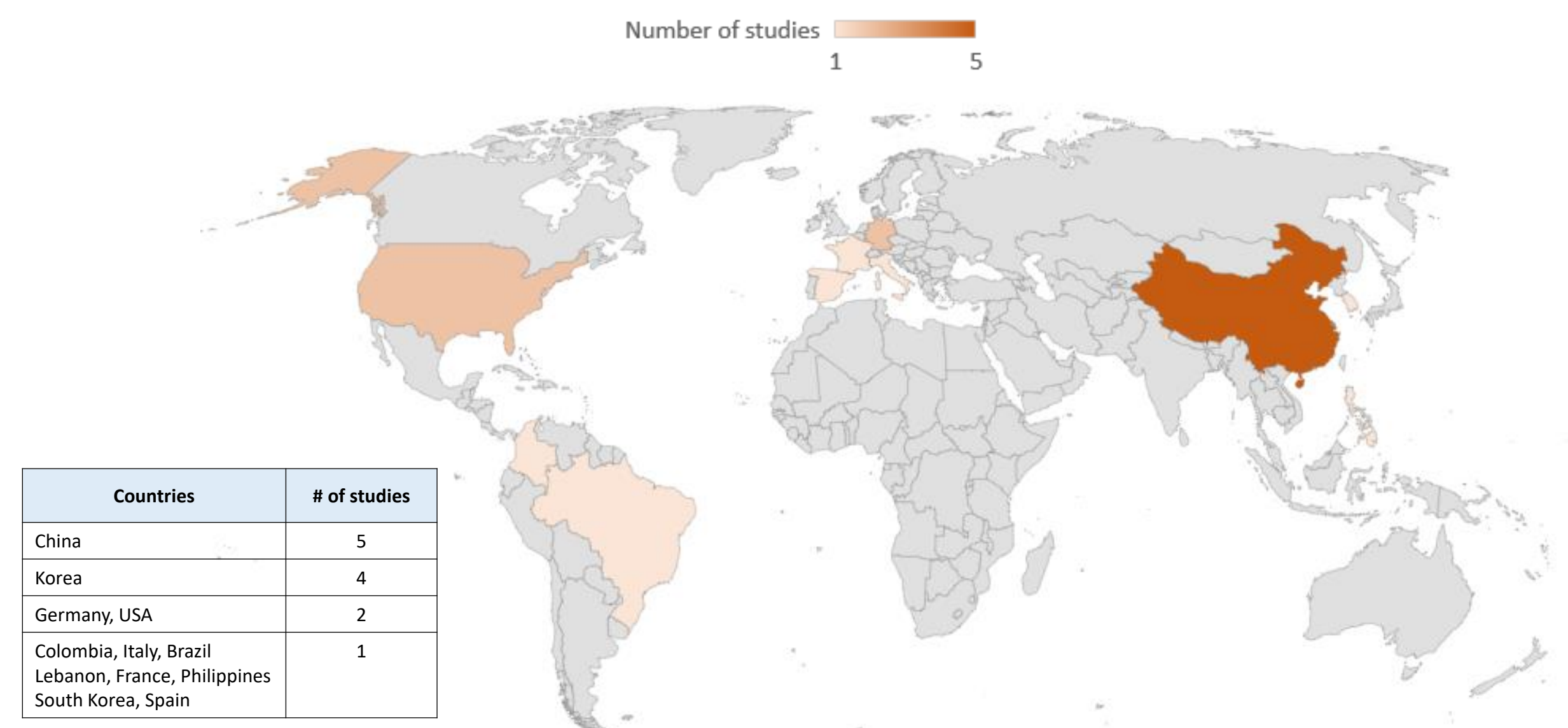


#### Synthesis

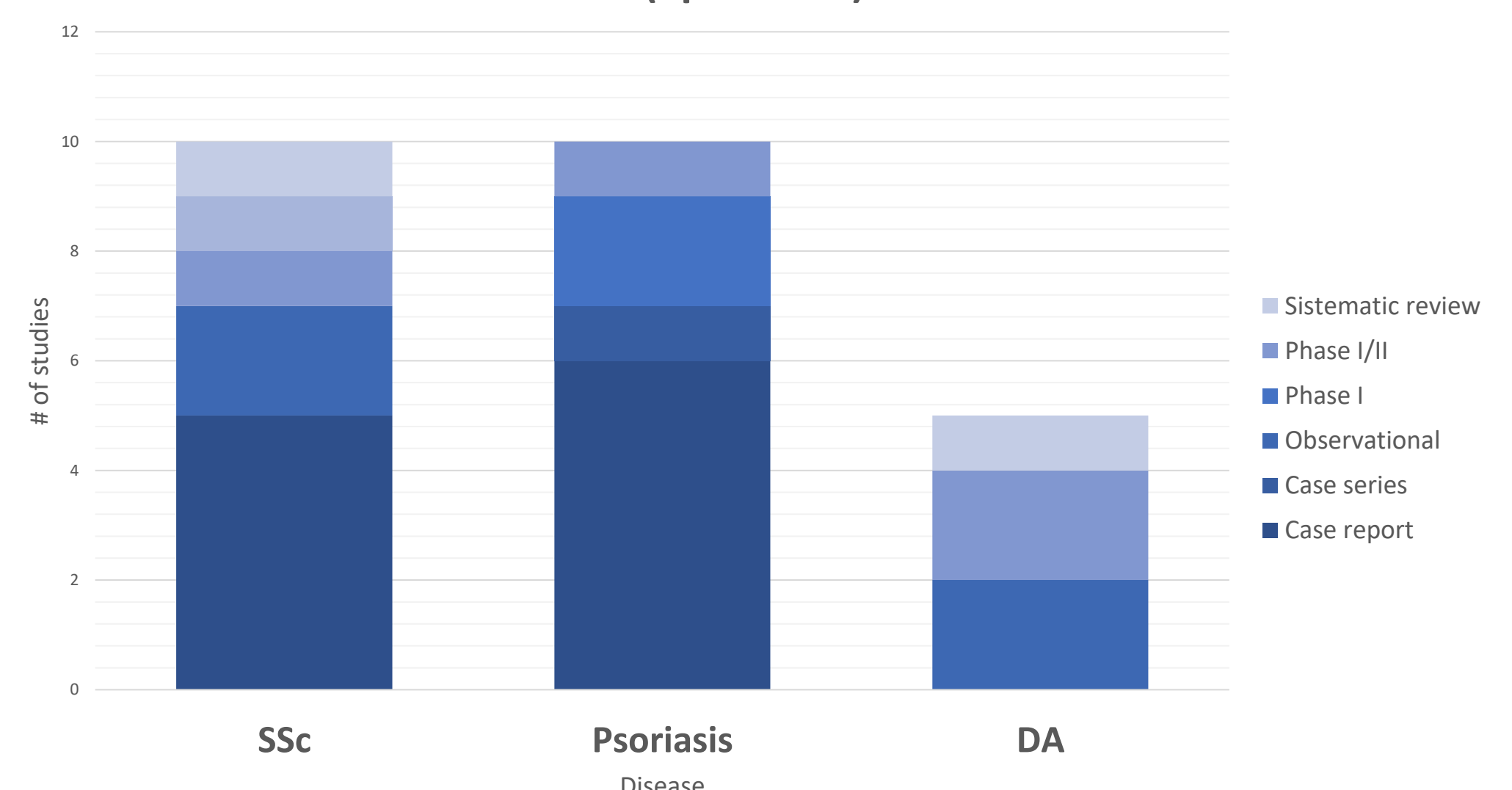
1945 records were identified for SS, 649 for psoriasis, and 315 for AD. Were screened and finally selected 9 articles for SS, 7 for psoriasis, and 5 for AD. The articles included in the scoping were published between 2008 and 2023. Most of the included articles came from China (28%) and South Korea (16%). For SS, the selected studies included a systematic literature review, four case reports, one case series, three observational cohorts, and one phase I/II clinical trial. For psoriasis, two phase I clinical trials, four case reports, one case series were included; finally for AD, one systematic literature review, two observational cohorts and two phase I/II clinical trials. 88% of the interventions were performed with MSCs and 12% used derived products.

### Evidence body and knowledge gap

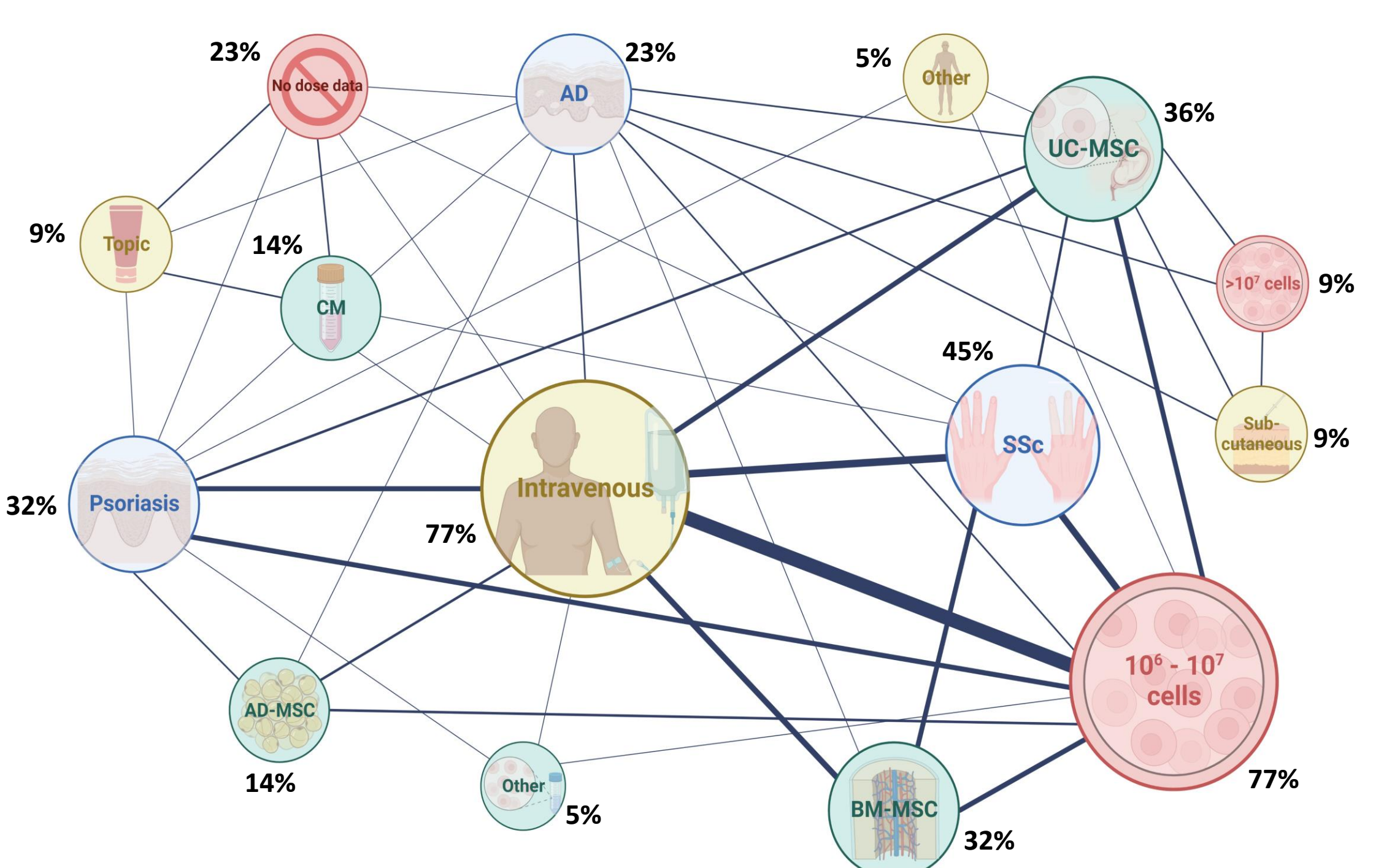
#### Countries and studies development



#### Types of clinical research by disease (april 2023)



#### Skin diseases, main sources, doses and routes of administration



\*The bubble sizes and lines thickness are proportional to the amount of information from identified primary studies

### Conclusion

Significative gaps in the body of evidence were identified including phase II and III well-designed RCTs to determine optimal routes, frequency, duration, and doses of MSCs and derived therapies; large trials to better test the efficacy of therapies; and studies to provide additional long-term safety data.

### References

- Montero-Vilchez, T., Sierra-Sánchez, Á., Sánchez-Díaz, M., Quiñones-Vico, M. I., Sanabria-de-la-Torre, R., Martínez-López, A., & Arias-Santiago, S. (2021). Mesenchymal Stromal Cell-Conditioned Medium for Skin Diseases: A Systematic Review. *Frontiers in Cell and Developmental Biology* (Vol. 9). Frontiers Media S.A. <https://doi.org/10.3389/fcell.2021.654210>
- Diatallavi, F., di Vincenzo, M., Martina, E., Radi, G., Lariccia, V., Offidani, A., Orciani, M., & Campanati, A. (2022). Mesenchymal Stem Cells and Psoriasis: Systematic Review. *International Journal of Molecular Sciences* (Vol. 23, Issue 23). MDPI. <https://doi.org/10.3390/ijms232315080>
- Shin, H. T., Lee, S. H., Yoon, H. S., Heo, J. H., Lee, S. B., Byun, J. W., Shin, J., Cho, Y. K., Chung, E., Jeon, M. S., Song, S. U., & Choi, G. S. (2021). Long-term efficacy and safety of intravenous injection of clonal mesenchymal stem cells derived from bone marrow in five adults with moderate to severe atopic dermatitis. *Journal of Dermatology*, 48(8), 1236-1242. <https://doi.org/10.1111/1346-8138.15928>
- Escobar-Soto, C. H., Mejía-Romero, R., Aguilera, N., Alzate-Granados, J. P., Mendoza-Pinto, C., Munguía-Realpozo, P., Méndez-Martínez, S., García-Carrasco, M., & Rojas-Villarraga, A. (2021). Human mesenchymal stem cells for the management of systemic sclerosis. Systematic review. *In Autoimmunity Reviews* (Vol. 20, Issue 6). Elsevier B.V. <https://doi.org/10.1016/j.autrev.2021.102831>
- Cui, J., Jin, L., Ding, M., He, J., Yang, L., Cui, S., Wang, X., Ma, J., & Liu, A. (2022). Efficacy and safety of mesenchymal stem cells in the treatment of systemic sclerosis: a systematic review and meta-analysis. *Stem Cell Research and Therapy*, 13(1). <https://doi.org/10.1186/s13287-022-02786-3>
- Sierra-Sánchez, Á., Montero-Vilchez, T., Quiñones-Vico, M. I., Sánchez-Díaz, M., & Arias-Santiago, S. (2021). Current Advanced Therapies Based on Human Mesenchymal Stem Cells for Skin Diseases. *Frontiers in Cell and Developmental Biology* (Vol. 9). Frontiers Media S.A. <https://doi.org/10.3389/fcell.2021.643125>