

CD marker handbook for characterization of rat and mouse adipose stem cells via flow cytometry

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Abstract

In this study we reviewed published articles in which rat and mouse ADSCs^a were characterized via flow cytometry. Comparing the phenotypic characterization results of these studies, we seek to provide a comprehensive map of which CD^b markers are most common and effective for the characterization of rat and mouse ADSCs. This review may serve to establish minimal criteria for the characterization of rat and mouse ADSCs via flow cytometry.

Introduction

The considerable therapeutic potential of ADSCs has generated an increasing interest over the last few years. Flow cytometry has been used to characterize ADSCs in many studies. Although the CD nomenclature has only been established for human antigens¹, it is also applied to antigens from other species. Furthermore, adipose tissue may have different biochemical profiles among species² and may lead to various phenotypic results. Therefore, an extensive investigation of which CD Markers are suitable for each species, as well as a comparative CD Marker panel can both aide in the characterization of animal ADSCs via flow cytometry.

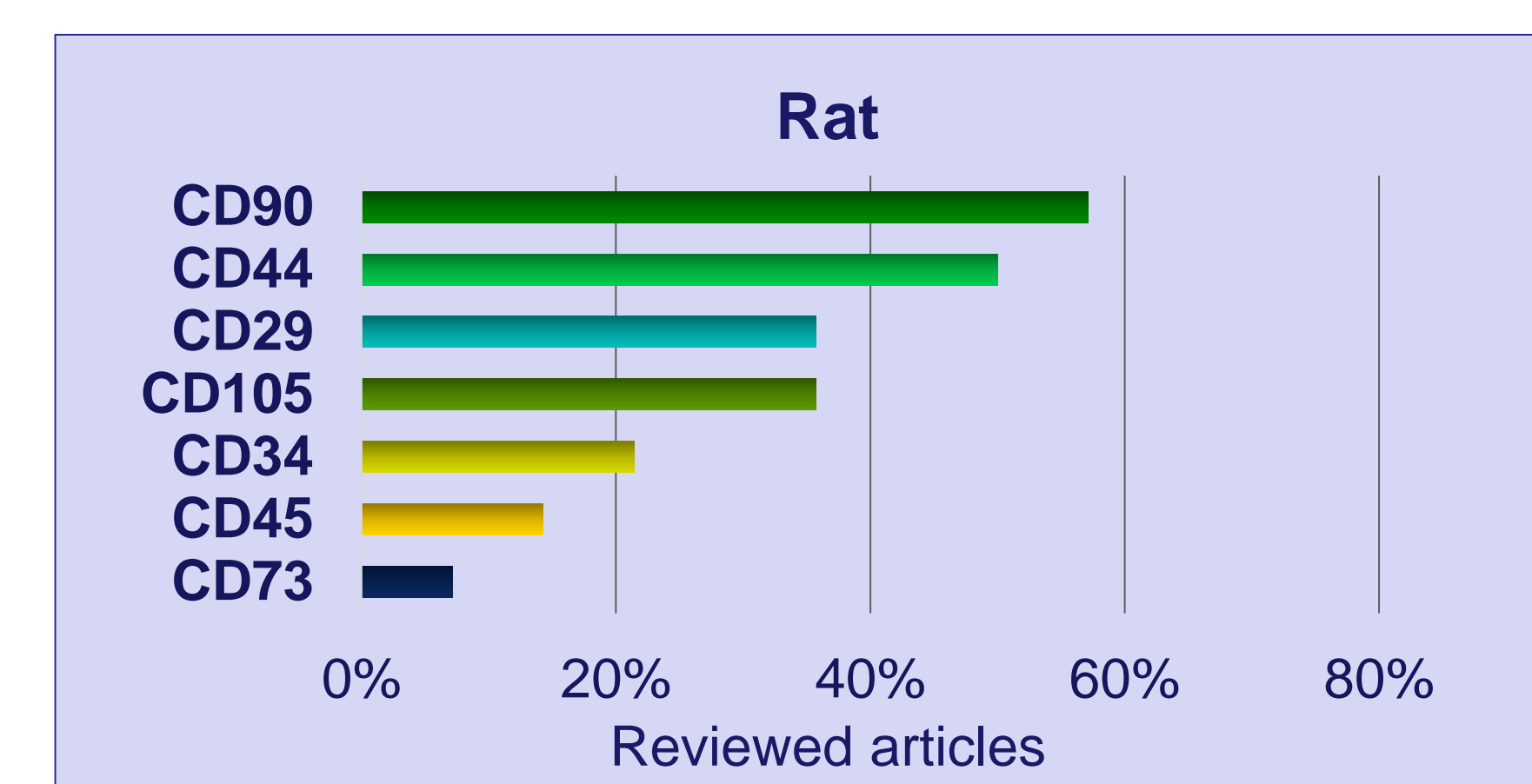
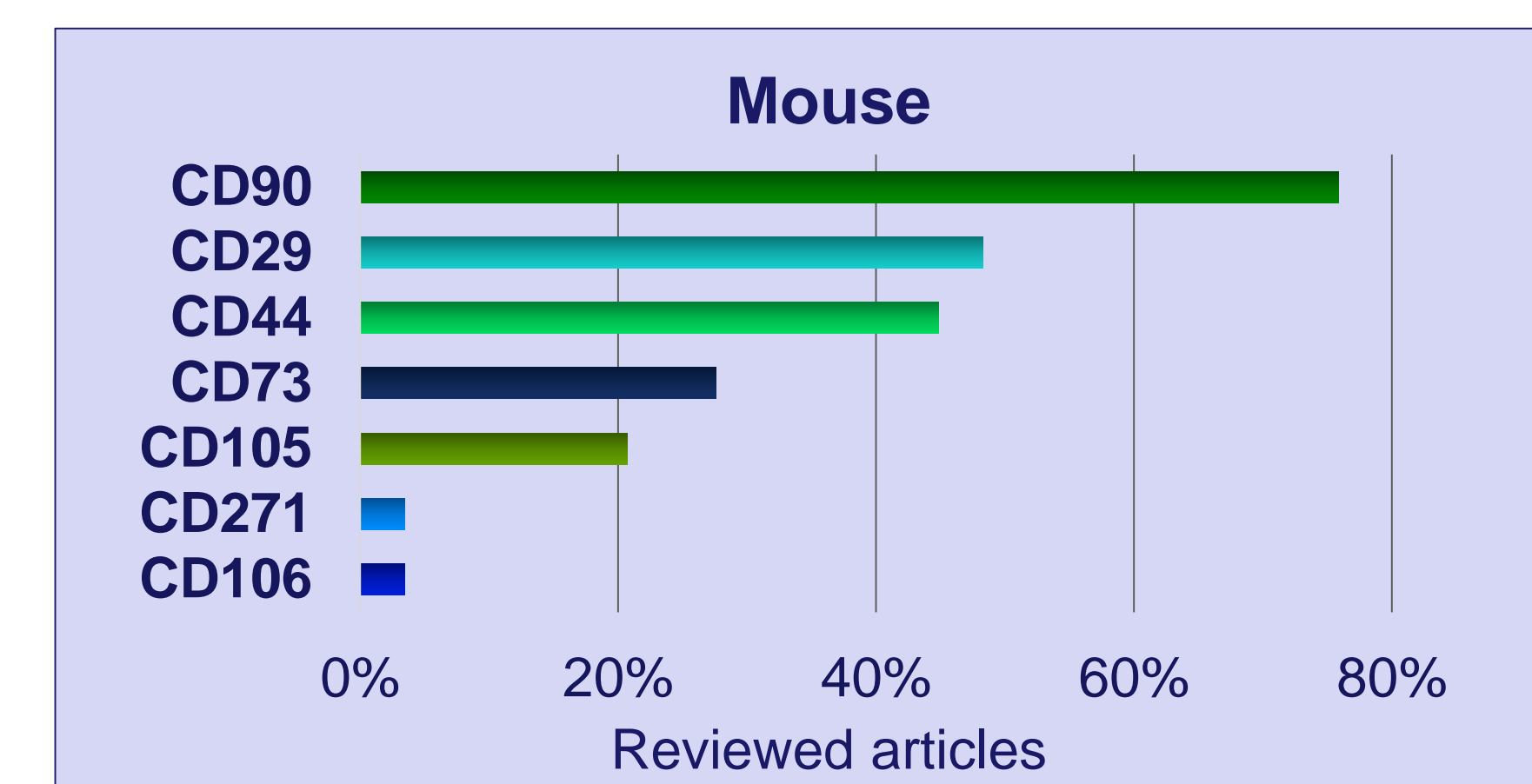
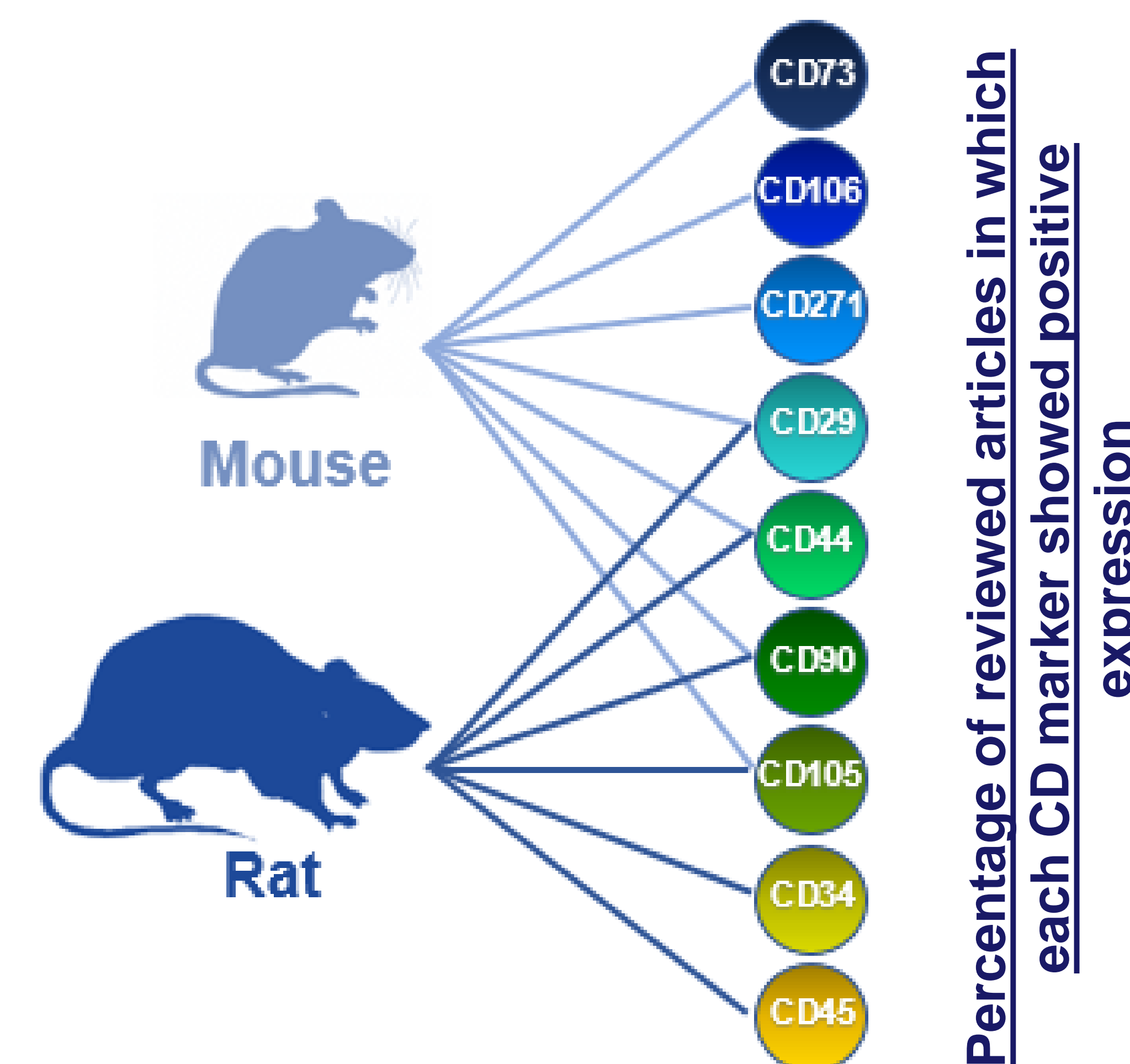
Results

Mouse	
Common CD Markers for Mouse ADSCs	
CD29	
CD44	
CD73	
CD90	
CD105	
CD106	
CD271	

Table 1. Most commonly used CD markers that showed positive expression in flow cytometric analysis of mouse ADSCs.

Rat	
Common CD Markers for Rat ADSCs	
CD29	
CD34	
CD44	
CD45	
CD90	
CD105	

Table 2. Most commonly used CD markers that showed positive expression in flow cytometric analysis of rat ADSCs.



Observations

- Various CD markers have been used across laboratories for the characterization of ADSCs via flow cytometry.
- Some CD markers were common in most of the reviewed articles, but not all of them.
- Essential differences in the biochemical profiles of ADSCs among species may lead to different phenotypic results when labelling with antibodies.

Conclusion

- Researchers have used various CD markers for the phenotypic characterization of ADSCs.
- The most common of these CD markers are summarized in this review as a comprehensive map.
- Although the accomplishment of a systematic review is not possible due to the absence of data (e.g. size, age, sex of the animals) in the relevant articles, we believe that this review will constitute the inception for the establishment of minimal criteria for the characterization of non-human ADSCs via flow cytometry.

Literature

¹Dominici, M. et al. 2006. "Minimal Criteria for Defining Multipotent Mesenchymal Stromal Cells. The International Society for Cellular Therapy Position Statement." *Cytotherapy* 8(4): 315-17.
²Cossarizza, Andrea et al. 2019. "Guidelines for the Use of Flow Cytometry and Cell Sorting in Immunological Studies (Second Edition)." *European Journal of Immunology* 49(10): 1457-1973.

Abbreviations

^aADSCs – Adipose Stem Cells
^bCD – Clusters of Differentiation

