

Issues with anti-Gr1 antibody-mediated myeloid-derived suppressor cell depletion

We read with great interest the article ‘Myeloid-derived suppressor cells have a proinflammatory role in the pathogenesis of autoimmune arthritis’ by Chunqing Guo *et al.*¹ In this paper, the authors used anti-Gr1 antibody to deplete myeloid-derived suppressor cells (MDSCs) in arthritic mice and they found that it reduced disease severity and Th17 response. However, they did not report the efficiency of MDSC depletion.

Anti-Gr1 antibody (RB6-8C5) was widely used and considered to be effective in eliminating MDSC. Srivastava *et al.*² found that anti-Gr1 antibody led to a reduction in Gr1⁺ cells in tumour, blood, spleen and bone marrow (BM). Vincent Hurez used anti-Gr1 monoclonal antibody, which reduced MDSCs by 50%–75% in the spleen of tumour bearing (TB) mice, without reporting the results in BM and tumour.³ Zhang *et al.*⁴ found that anti-Gr1 antibody reduced MDSC by one-third in tumour. Thomas Condamine *et al.* determined that anti-Gr1 antibody eliminated about 95% of MDSCs in spleen and blood of TB mice; however, it raised the immature myeloid cell (IMC) levels in the BM.⁵ Ma *et al.*⁶ and Kumar *et al.*⁷ believed that anti-Gr1 antibody could not eliminate Ly6C^{high} MDSCs. Besides, Ma *et al.*⁶ first identified that anti-Gr1 antibody failed to reduce MDSCs in the liver. The liver might generate a more favourable environment for MDSCs.⁵ The present study did not present the efficacy of depletion at disease sites, spleen and BM.

The efficacy of anti-Gr1 antibody was controversial. In the field of cancer, Srivastava *et al.*, Zhang *et al.* and many other researchers found that depletion of MDSCs by anti-Gr1 antibody led to the inhibition of tumour volume and tumour weight.^{2–4} The results of Hurez *et al.*³ were different. Anti-Gr1-mediated depletion of MDSCs resulted in significantly slower tumour growth in the aged but not the young B16-bearing mice. The study by Kumar *et al.*⁷ did not find the anti-tumour efficacy of anti-Gr1 antibody. This inconsistency might influence other modes, such as arthritic mice in the present study.

In summary, anti-Gr1 antibody (RB6-8C5) is widely used as an efficient agent for eliminating MDSCs in mice; however, its efficacy on each subtype of MDSCs, polymorphonuclear neutrophil MDSC (PMN-MDSC) and monocyte MDSC (M-MDSC) is still controversial. Meanwhile, there are more debates ongoing about its efficacy in disease control. Using novel methods to deplete MDSCs shall be an acceptable choice.⁸

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REFERENCES

- Guo C, Hu F, Yi H, *et al.* Myeloid-derived suppressor cells have a proinflammatory role in the pathogenesis of autoimmune arthritis. *Ann Rheum Dis* 2016;**75**:278–85.
- Srivastava MK, Zhu L, Harris-White M, *et al.* Myeloid suppressor cell depletion augments antitumor activity in lung cancer. *PLoS ONE* 2012;**7**: e40677.
- Hurez V, Daniel BJ, Sun L, *et al.* Mitigating age-related immune dysfunction heightens the efficacy of tumor immunotherapy in aged mice. *Cancer Res* 2012;**72**:2089–99.
- Zhang Y, Liu Q, Zhang M, *et al.* Fas signal promotes lung cancer growth by recruiting myeloid-derived suppressor cells via cancer cell-derived PGE2. *J Immunol* 2009;**182**:3801–8.
- Condamine T, Kumar V, Ramachandran IR, *et al.* ER stress regulates myeloid-derived suppressor cell fate through TRAIL-R-mediated apoptosis. *J Clin Invest* 2014;**124**:2626–39.
- Ma C, Kapanadze T, Gamrekashvili J, *et al.* Anti-Gr-1 antibody depletion fails to eliminate hepatic myeloid-derived suppressor cells in tumor-bearing mice. *J Leukoc Biol* 2012;**92**:1199–206.
- Kumar V, Cheng P, Condamine T, *et al.* CD45 phosphatase inhibits STAT3 transcription factor activity in myeloid cells and promotes tumor-associated macrophage differentiation. *Immunity* 2016;**44**:303–15.
- Qin H, Lerman B, Sakamaki I, *et al.* Generation of a new therapeutic peptide that depletes myeloid-derived suppressor cells in tumor-bearing mice. *Nat Med* 2014;**20**:676–81.