

Staphylococcus aureus induced Bone Destruction in Chronic Osteomyelitis: Novel Anti-Inflammatory Therapeutic Approaches

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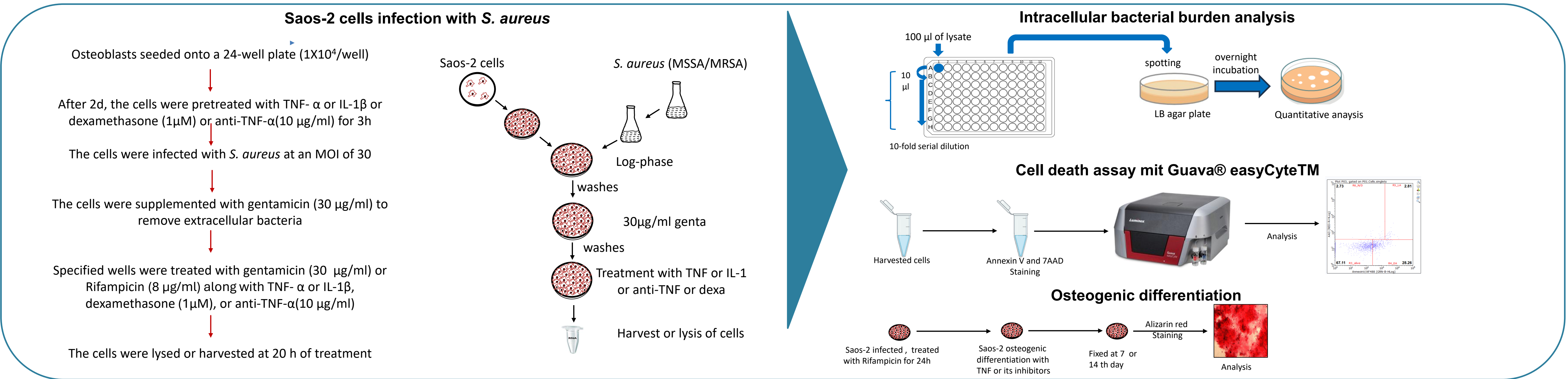
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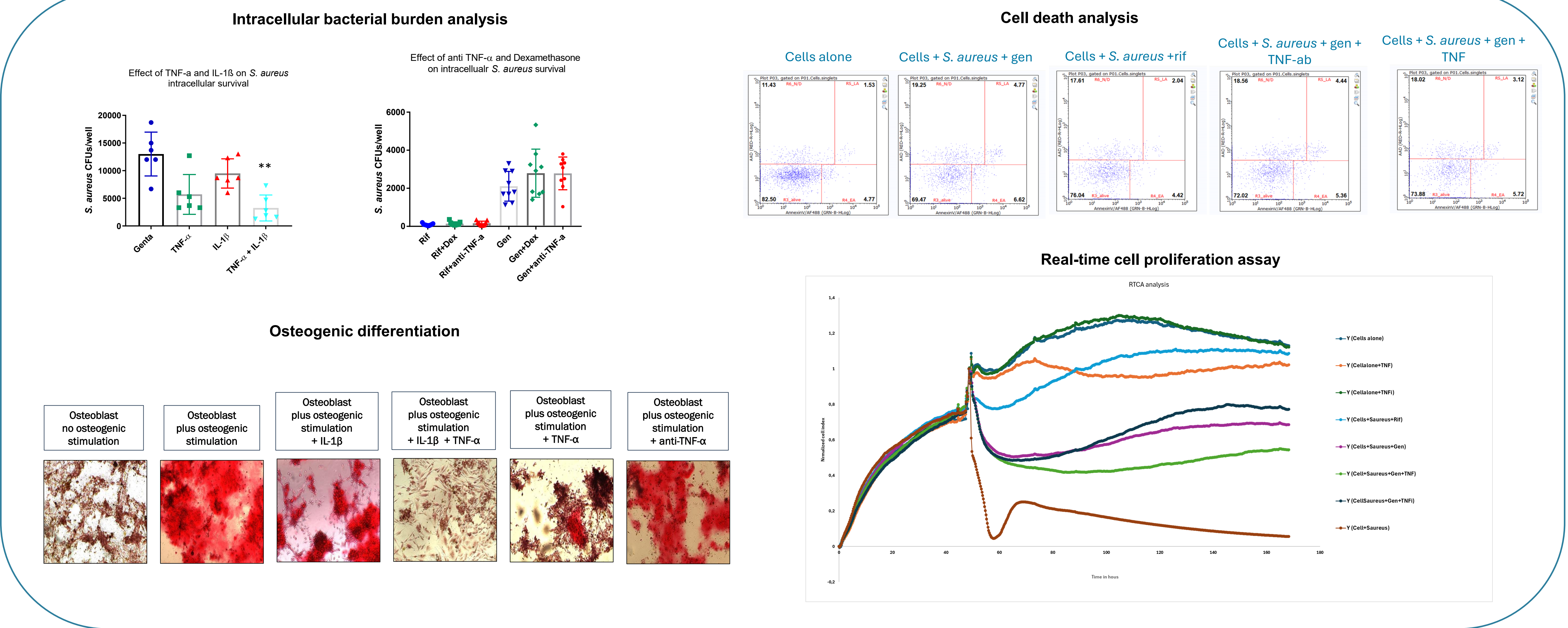
INTRODUCTION

- ❖ Osteomyelitis is one of the most frequent musculoskeletal infections and results from bacterial inoculation during surgery, open fractures, or hematogenous spread.
- ❖ Several studies have reported elevated levels of tumor necrosis factor (TNF), interleukin-1 (IL-1), and IL-6 in patients with bone infections.
- ❖ Interestingly, the use of TNF inhibitors (TNFi) has recently been shown to be beneficial in patients with non-bacterial osteomyelitis, leading to reduced bone loss. However, in bacterial osteomyelitis, TNF receptor-1 (TNF-R1), as well as downstream effector molecules, play important roles in the eradication of intracellular bacteria.
- ❖ Therefore, the question arises whether TNFi could also be useful in bacterial osteomyelitis to reduce bone destruction, provided that the bacterial infection is adequately controlled by surgery and concomitant antibiotic therapy.

MATERIALS AND METHODS



RESULTS



CONCLUSIONS AND PERSPECTIVES

- ❖ TNF- α and IL-1 β reduce intracellular survival of *S. aureus* in osteoblasts.
- ❖ Rifampicin achieves almost full eradication of intracellular *S. aureus* in osteoblasts.
- ❖ The addition of anti-TNF- α or dexamethasone does not increase the number of intracellular bacteria, either in combination with rifampicin or gentamicin.
- ❖ TNF- α treatment of *S. aureus* infected osteoblasts impairs bone formation, despite rifampicin treatment, whereas anti-TNF- α treatment maintains osteogenic differentiation.
- ❖ Further cell death analysis and Real-time cell analysis showed that the anti-TNF- α antibody did not affect cell viability.
- ❖ A combination of antibiotic therapy, including rifampicin, with anti-TNF- α antibody might improve bone regeneration and outcomes in chronic osteomyelitis.

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