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Activity :Abstract
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Title:
Vancomycin and Aptamer to *Staphylococcus aureus* are Synergistic *in vivo*

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Topic:
A04 Experimental and Clinical Pharmacology and Therapeutics ; D05 Models and Studies of Host-Pathogen Interactions

Keyword:
Methicillin-Resistant *Staphylococcus aureus* (MRSA) ; Aptamers ; Antibodies

Abstract:
Background: We present the results of an experiment to test if *Staphylococcus aureus* binding alpha-mers (-mer), aptamers bound to the gal-1,3-gal (-gal) epitope, can clear MRSA sepsis in mice. Humans, Old-World monkeys, and apes produce antibodies against -gal present in our diets from food or bacterial sources. If the -gal sugar is bound to a recognition molecule which binds a pathogen, like an aptamer, the pre-existing anti--gal Abs could be used to indirectly target the pathogen for removal by circulating anti--gal Abs; thereby, using the immune system to clear the infection.
Methods: BALB/c -1, 3-galactosyltransferase (-/-) knockout (GTKO) mice were infected with MRSA via tail vein IV and subsequently treated with SA31 (n=4), vancomycin (n=12), or SA31 plus vancomycin (n=12), with split doses in the morning and evening. The heart, lungs, liver, spleen, and kidneys were harvested upon necropsy for histological and qPCR analysis.
Results: Mice treated with SA31 alone died, whereas 5/12 mice treated with vancomycin alone and 7/12 mice treated with vancomycin plus SA31 survived the course of the experiment. Mice treated with vancomycin that died, had significantly higher CFU/mg lung ($p < 0.05$) and significantly lower CFU/mg spleen ($p<0.02$) (SF 5) compared to mice treated with vancomycin plus 10000 µg/kg/day SA31. Mice treated with vancomycin plus SA31 that survived the experiment had significantly less CFU/mg in the heart, lung, liver, and kidney (($p\leq0.05$), $p\leq0.02$, $p\leq0.05$, and $P<0.0004$ respectively) compared to mice treated with vancomycin alone.
Conclusions: The results indicate that use of -mers may be an effective antibiotic adjuvant to reduce MRSA

distribution and disease persistence.

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