Screening the University of Wisconsin-Eau Claire Campus for Methicillin-Resistant *Staphylococcus* spp. Isolates Capable of Transferring Methicillin-Resistance

**UNIVERSITY OF WISCONSIN-EAU CLAIRE**
Alexandra Bunda, Courtney Schauer, Christina Vlahos, Stephanie Gilsdorf, and Sasha Showsh PhD | Biology Department

**ABSTRACT**
Methicillin-resistant *Staphylococcus aureus* (MRSA) is an antibiotic-resistant strain of the bacterium *Staphylococcus aureus* that is responsible for many community and hospital-acquired infections worldwide. A survey of the UW-Eau Claire campus was conducted to indicate the relative presence of Methicillin-Resistant *Staphylococcus* spp. (donor strains). We collected 125 oxacillin resistant samples. Of these, 35 samples displayed characteristics of MRSA and were designated as potential donors. Further testing determined none of these donors to be MRSA. The donors were used to determine their ability to transfer the resistance gene (mecA) to *Staphylococcus aureus* recipients (SAS 850 and SAS B10). To determine the ability of isolates to transfer the mecA gene, a series of conjugation experiments were conducted with potential donors and recipients. The resulting transconjugants (products of the donor and recipient matings) were plated on CBA plates containing streptomycin, spectinomycin (donor sensitive), and oxacillin (recipient sensitive). Colonies capable of growth on all three antibiotics were screened against the donors, recipients, and a positive MRSA control using polymerase chain reaction (PCR) and the coagulase test to genotypically distinguish the presence of mecA. To date, all 35 donor strains have been tested and none successfully transferred methicillin resistance to the recipient.

**CONJUGATION EXPERIMENT**
- 125 samples were identified as possible *Staphylococcus* species. 35 possible methicillin resistant donors were selected for subsequent conjugation experiments.
- Conjugation procedure:

**METHODS**
- Swabs were collected from general student and athlete-only access areas on campus.
- The samples were screened using cultural isolation techniques to determine presumptive *Staphylococcus* spp. isolates.
  - Growth on mannitol salt agar (Figure 1).
  - Gram staining (Figure 2).
  - Testing for the presence of catalase (Figure 3).
  - Agglutination testing for protein A associated with *Staphylococcus aureus* strains (Figure 4).

**RESULTS**

**PREVALENCE OF METHICILLIN-RESISTANT *STAPHYLOCOCCUS* SPP. AT UW-EAU CLAIRE (TABLE 1)**

<table>
<thead>
<tr>
<th>Sample Source</th>
<th>Total Oxacillin Resistant Colonies</th>
<th>Potential S. aureus Colonies</th>
<th>Percent Potential S. aureus Colonies</th>
<th>Number of Oxacillin Resistant Donors</th>
<th>Number of Potential S. aureus Donors</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Student Access Area</td>
<td>102</td>
<td>26</td>
<td>25%</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Student-Athlete Access Area</td>
<td>23</td>
<td>9</td>
<td>39%</td>
<td>ND</td>
<td>ND</td>
</tr>
</tbody>
</table>

**CONJUGATION RESULTS**
- Thus far, potential methicillin donors have not been identified.

**ACKNOWLEDGEMENTS**
We would like to thank the UW-Eau Claire Office of Research and sponsored programs for their financial support in this project. In addition, we would like to thank LTS for their time and services.