Bacterial Therapy for future non-antibiotic treatment and prevention of infectious disease

Robert Read
Infectious Diseases
Bacterial Therapy
Bacterial Therapy
Bacterial Therapy

Manipulation of the Quorum Sensing Signal AI-2 Affects the Antibiotic-Treated Gut Microbiota

Thomson JA et al; Cell Reports; 2015
The nasopharynx…the root of all…..

- Pneumonia
- Otitis Media
- Sinusitis
- Chronic Bronchial Sepsis
- Meningitis
Neisseria lactamica and natural immunity

% of Individuals Colonised with N. lactamica Following Live Intranasal Challenge (n=41)

Challenged, n=41, Control (PBS) n=20
Evans C et al CID 2011

Y92 1009
(Gorringe et al 2009)
Neisseria lactamica and natural immunity

% of Individuals Colonised with *N. lactamica* Following Live Intranasal Challenge (n=41)

![Graph showing % of individuals colonised over time](image)

Mean Fold Rise Data of Salivary IgA following Live Challenge with *N. lactamica*

![Graph showing mean fold rise data](image)

Y92 1009

(Gorringe et al 2009)
Neisseria lactamica and natural immunity

% of Individuals Colonised with *N. lactamica* Following Live Intranasal Challenge (n=41)

Mean Fold Rise Data of Salivary IgA following Live Challenge with *N. lactamica*

Mean Fold Rise of Total Serum IgG following Live Challenge with *N. lactamica*

Evans C et al CID 2011

Y92 1009

(Gorringe et al 2009)
**N. lactamica carriage**

- **Challenge Group**
- **Control Group**

Percentage of volunteers positive for *N. lactamica*:

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Challenge Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Weeks</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2 Weeks</td>
<td>30%</td>
<td>5%</td>
</tr>
<tr>
<td>4 Weeks</td>
<td>30%</td>
<td>5%</td>
</tr>
<tr>
<td>8 Weeks</td>
<td>30%</td>
<td>5%</td>
</tr>
<tr>
<td>16 Weeks</td>
<td>30%</td>
<td>5%</td>
</tr>
<tr>
<td>26 Weeks</td>
<td>30%</td>
<td>5%</td>
</tr>
<tr>
<td>28 Weeks</td>
<td>30%</td>
<td>5%</td>
</tr>
<tr>
<td>32 Weeks</td>
<td>40%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Rechallenge at 26 Weeks.
N. meningitidis carriage

<table>
<thead>
<tr>
<th>Week post inoculation</th>
<th>Challenge Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Week 4</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>Week 8</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>Week 16</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Week 26</td>
<td>ns</td>
<td>-6.8%</td>
</tr>
<tr>
<td>Week 28</td>
<td>ns</td>
<td>-5.7%</td>
</tr>
</tbody>
</table>

Percentage volunteers positive for N. meningitidis

* = p < 0.05
** = p < 0.005
ns

Fisher’s Exact Test

Rechallenge

-9.5%
$N. meningitidis$ carriage

Fisher’s Exact Test

- * = $p < 0.05$
- ** = $p < 0.005$

**Challenge Group**: Nlac Detected

**Challenge Group**: Nlac not Detected

**Control Group**

Week 0 to Week 28 post inoculation
NHCIS1::HAEC4:nadA-lacZ
6703 bp

NHCIS1::HAEC4:opcA-lacZ
6433 bp
Apply in 2016:
DEFRA
NRES
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