GAS virulence factors

Somatic components
- Protein F
- **M-protein**
- Capsule

Extracellular components
- C5a peptidase
- Streptolysin O
- Streptolysin S
- **Streptococcal pyrogenic exotoxins**
- Streptokinase
M-type
Background of the study

- Mid 1980s: world-wide increase of severe invasive GAS infections
- 1987: Description of StrepTSS (Cone et al. NEJM)
- 1993: Definition of StrepTSS (The Working group. JAMA)

Hypothesis
- world-wide dispersed M1 clone
- SPE A causative role in StrepTSS

- Increasing incidence of macrolide-R
GAS strains studied

1720 GAS isolates

Non-invasive

Throat (n=1322)

Non-throat (n=326)

Invasive

Sterile body sites (n=72)

Category 1

Category 2

Category 3

Molecular techniques

102

326

72
Methods used

- Pulsed-field gel electrophoresis
- *emm*-genotyping (PCR+ reversed line blot)
- Superantigen and resistance genes detection (PCR)
  - *speA*, *speB*, *speC*, *speF*, *ssa*
  - *ermB*, *mef A/E*
- Disk diffusion and agar dilution
### Results PFGE-analysis (SmaI)

500 invasive and non-invasive isolates analysed

<table>
<thead>
<tr>
<th>Clone</th>
<th>Percentage</th>
<th>M-Type</th>
<th>speA</th>
<th>speC</th>
<th>ssa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clone 001</td>
<td>13.2%</td>
<td>M1</td>
<td>pos</td>
<td>pos</td>
<td>neg</td>
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<tr>
<td>Clone 002</td>
<td>8.8%</td>
<td>M12</td>
<td>neg</td>
<td>pos</td>
<td>neg</td>
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<tr>
<td>Clone 003</td>
<td>&lt;5%</td>
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<td>Clone 170</td>
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- Different M-types and superantigen genes

Superantigen gene detections

## Superantigen gene detections

<table>
<thead>
<tr>
<th>Superantigen gene detection</th>
<th>Category</th>
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<tbody>
<tr>
<td>spe A</td>
<td>spe C</td>
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<tr>
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<tr>
<td>total number of strains</td>
<td>102</td>
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</table>

Conclusions (GAS)

- Two world-wide dispersed genotypes are also highly prevalent in Belgium.
- Not a single genetic clone, M-type, nor superantigen profile is exclusively correlated with invasive disease.
- The clinical outcome of a GAS infection is probably due to an interaction between strain and host factors. Study of host factors
Definitie STSS

I. Isolation of a group A streptococcus (*S. pyogenes*)
   - A. From a normally sterile site (e.g. blood, cerebrospinal, pleural, or peritoneal fluid, tissue biopsy, surgical wound, etc.)
   - B. From a non-sterile site (e.g. throat, sputum, vagina, superficial skin lesion, etc.)

II. Clinical signs of severity.
   - A. Hypotension and
   - B. \( \geq 2 \) of the following signs
     - 1. Renal impairment
     - 2. Coagulopathy
     - 3. Liver involvement
     - 4. Adult respiratory distress syndrome
     - 5. Generalised erythematous macular rash that may desquamate
     - 6. Soft-tissue necrosis, including necrotising fasciitis or myositis, or gangrene