

“a cow by any other name”

Kate Lim

Infectious Diseases Registrar

MONASH Infectious Diseases

+

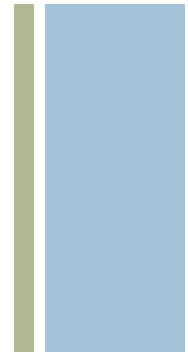
Case presentation

+ 67 year old female

2000 – acutely unwell, fever, profuse diarrhoea and vomiting

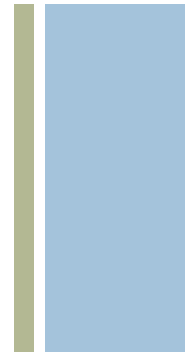
0200 - On arrival in ED

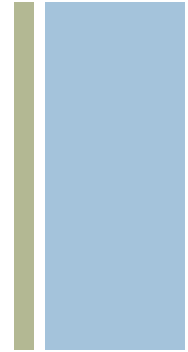
- Unrecordable BP
- GCS14, T= 38^o, HR 120, diffuse erythematous rash throughout
- No murmurs, chest clear, abdomen soft non tender, no obvious focal neurological deficit
- commenced inotropes, intubated



+ Further history

- Returned from holiday in Vietnam 2/52 ago
- Diarrhoeal illness while in Vietnam, resolved in the last week
- No travel vaccinations/prophylaxis





- **Rheumatoid Arthritis**

- Methotrexate (15mg weekly)
- Hydroxychloroquine (400mg d)
- Prednisolone (5mg d)

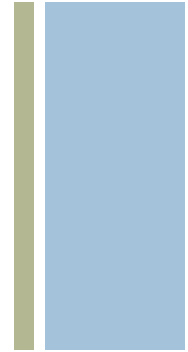
- **Ulcerative colitis, Primary Sclerosing Cholangitis**

- Ursodeoxycholic acid

- **Asthma**

- **Hypertension**

- **Cholecystectomy**



■ Asplenia

- Discovered incidentally on blood film in 2004
- ?Congenital ?Removed at previous laparotomy
- VSR. Recommended lifelong Amoxicillin
- Ceased antibiotics after 6 months. No emergency supply
- Vaccinations
 - Pneumococcal vaccination (2009)
 - Meningococcal Polysaccharide (2004)
 - Hib (2004)

+ Investigations

■ FBE

■ Hb 124, WCC 4.1, Plt 216

■ EUC

■ Na 143, ↓ K 3.1, ↓ HCO16, Urea 5.6 ↑ Cr 149, ↓ eGFR 30

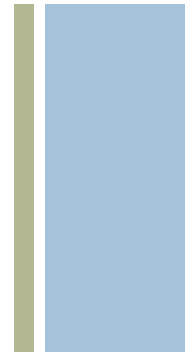
■ LFT

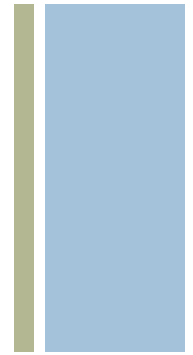
■ Bili 26, ↑ ALP 178, ↑ GGT 251, ALT 26

CRP 9

CXR normal

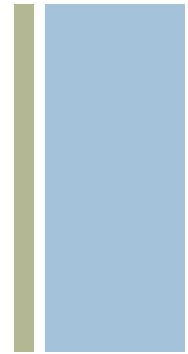
Malaria ICT negative



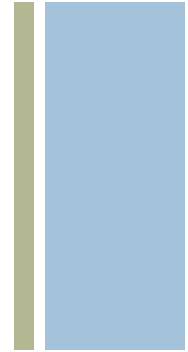


+ Day 1 ICU

- Profound shock: high dose inotropes (noradrenaline, adrenaline, vasopressin)
- Working diagnosis: septic shock with multiorgan failure Unclear source ?GI
- Empiric Vancomycin and Piperacillin/Tazobactam
- Rising lactate - ?ischaemic bowel
 - Exploratory laparotomy – nil significant findings



+ Day 2



- Blood cultures x 2
 - Gram stain: Gram positive cocci in chains resembling *Streptococcus*
- Broaden antibiotic cover ?toxic shock
 - Ceftriaxone, lincomycin, meropenem, vancomycin
- Worsening renal function, commenced haemofiltration

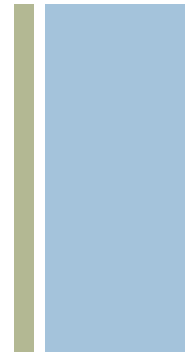
+ Day 3

- Blood culture: Group D Strep, PYR negative

■ Final ID

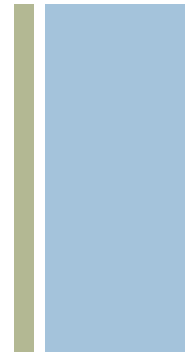
Streptococcus gallolyticus subsp *pasteurianus*
(formerly known as *Strep bovis* biotype II)

- Strep API (bioMerieux[®]), Vitek2[®]
- Sensitive Penicillin (MIC 0.125), Ceftriaxone (MIC 0.125)



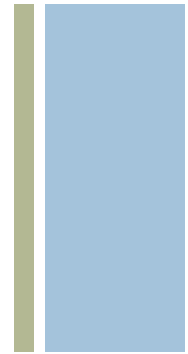
+ Day 4-14

- Single agent Piperacillin/Tazobactam
- TTE and TOE: no evidence of endocarditis



+ Day 15-68

- Prolonged respiratory wean
- Critical illness myopathy
- Haemodialysis via permacath (until day 45)
- Day 50: Colonoscopy: slight odematous ileocaecal valve, normal colonic mucosa
- Recommend lifelong amoxicillin
- Discharged to Rehab



+ Summary

- 67y.o female

- Septic shock secondary to *Streptococcus gallolyticus* subsp *pasteurianus* bacteremia complicated by multiorgan failure

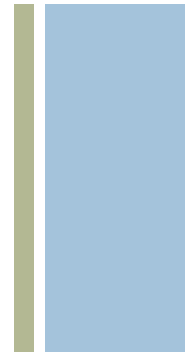
In setting of

Immunosuppression from long term corticosteroid, methotrexate

Asplenia

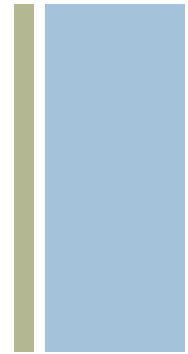
Inflammatory bowel Disease

Chronic liver disease



+ Points of interest

- Overwhelming sepsis in asplenic patients secondary to this organism not described
- Is this toxic shock syndrome?



+ CDC case definition toxic shock

■ **Fever**

- T>38.9°C

■ **Hypotension**

- Systolic BP <90mmHg

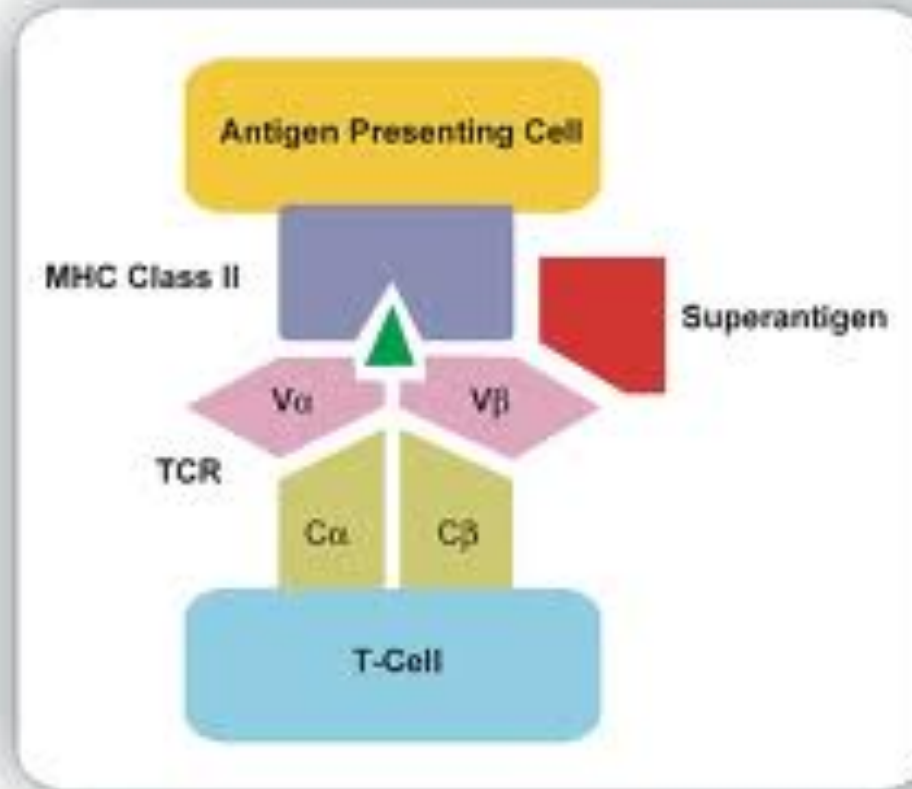
■ **Rash**

- Diffuse macular erythroderma

■ **Multisystem involvement (3 or more)**

- GI: Vomiting/diarrhea at onset
- Muscular: Severe myalgia or CL >2x ULN
- Mucous membranes: Vaginal, oropharyngeal, conjunctival hyperemia
- Renal: Creatinine > 2x ULN
- Hepatic: Bilirubin, ALT >2x ULN
- Hematologic: Platelets <100, 000/ μ L
- CNS: disorientation/altered conscious state

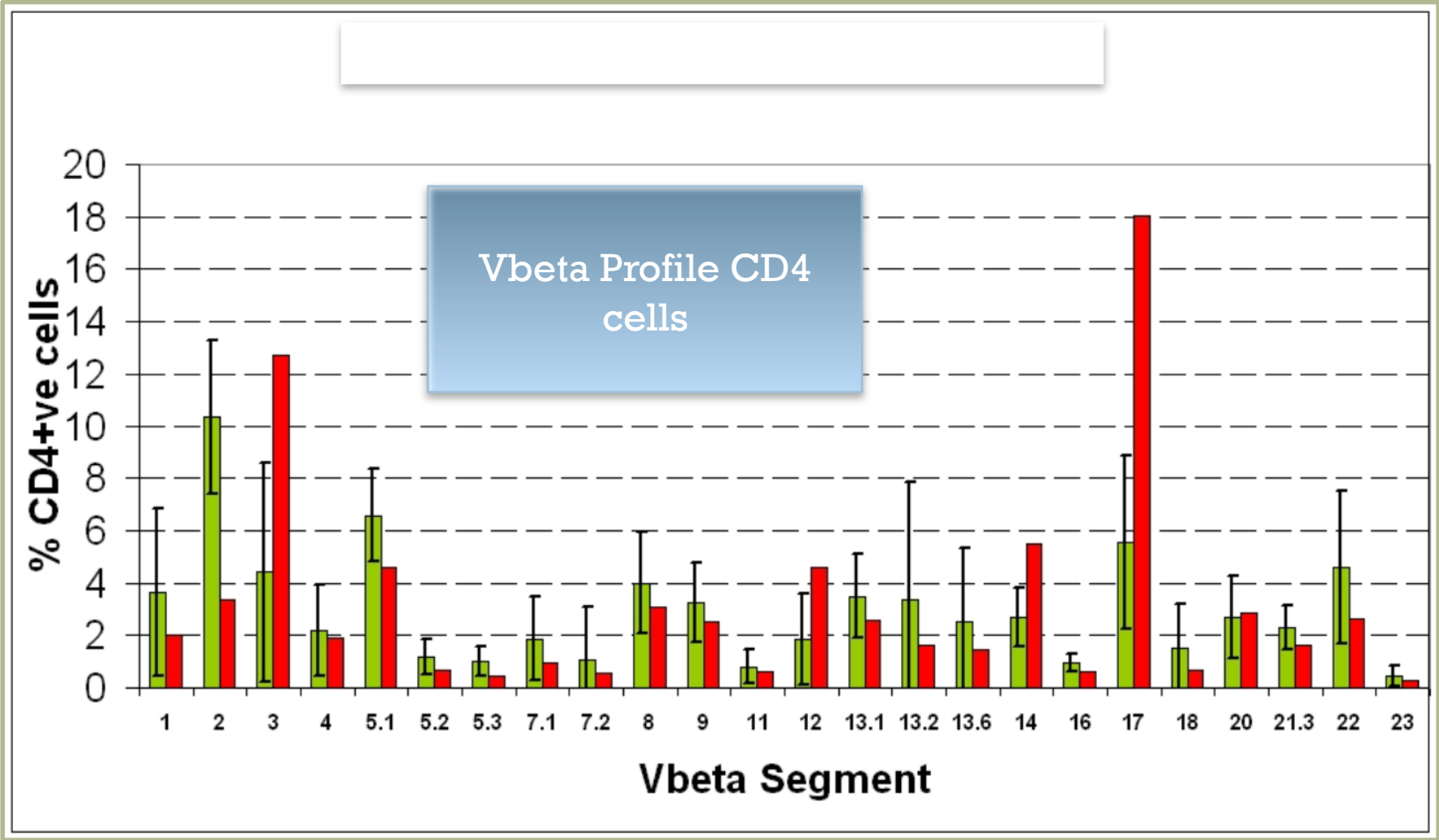
+ Immunoprofiling



Rapid analysis of the V β repertoire of CD4 and CD8 T lymphocytes in whole blood

Christopher MacIsaac^{a,b}, Nigel Curtis^{b,c,d}, John Cade^a, Kumar Visvanathan^{b,c,e,*}

J Immunol. Methods 283 (2003) 9-15



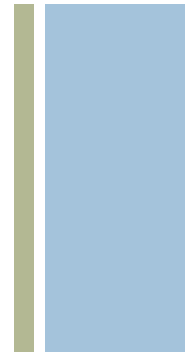


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Discussion

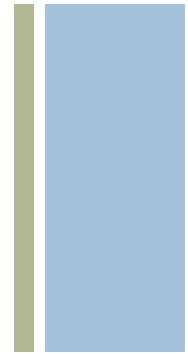
+ Overview

- Revision of Nomenclature – previously known as *Streptococcus bovis*
- Disease Associations
 - Colonic Carcinoma/Inflammatory bowel Disease
 - Chronic liver disease
- New insights into mechanism of disease
- Infections in hyposplenic/asplenic patients



+ Streptococcus Bovis

- Group D: Lancefield group
- Found in intestinal flora of 10% of healthy population
- 29%-55% of patients with inflammatory bowel diseases or colon ca



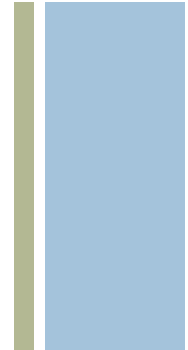
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ASSOCIATION OF *STREPTOCOCCUS BOVIS* WITH CARCINOMA OF THE COLON

**ROBERT S. KLEIN, M.D., ROSE A. RECCO, M.D., MICHELA T. CATALANO, M.D., STEPHEN C. EDBERG, PH.D.,
JOAN I. CASEY, M.D., AND NEAL H. STEIGBIGEL, M.D.**

+ Nomenclature



New Name	Old Name
<i>S. gallolyticus</i> subsp <i>gallolyticus</i>	<i>S. bovis</i> biotype 1
<i>S. infantarius</i> subsp <i>infantarius</i>	<i>S. bovis</i> biotype II.1
<i>S. infantarius</i> subsp <i>coli</i>	<i>S. bovis</i> biotype II.1
<i>S. gallolyticus</i> subsp <i>pasteurianus</i>	<i>S. bovis</i> biotype II.2
<i>S. gallolyticus</i> subsp <i>macedonicus</i>	<i>S. macedonicus</i>



Strep. gallolyticus *subsp gallolyticus* isolated in Koala Dung
Devriese et al. J.Clin Microbiol. 36: 3520-3523

***Streptococcus bovis* bacteraemia revisited: Clinical and microbiological correlates in a contemporary series of 59 patients**

Mario Fernández-Ruiz ^{a,*}, Julia Villar-Silva ^b, Jara Llenas-García ^a, Luis Caurcel-Díaz ^a, Juan Vila-Santos ^a, Francisca Sanz-Sanz ^b, Fernando Chaves ^b, Juan Manuel Guerra-Vales ^a

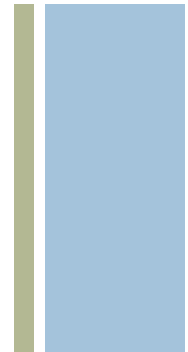
^a *Department of Internal Medicine, University Hospital 12 de Octubre, Madrid, Spain*

^b *Department of Microbiology, University Hospital 12 de Octubre, Madrid, Spain*

Journal of Infection (2010) 61, 307–313

+ Clinical associations

- 59 adult patients
- 33.9% Chronic liver disease
- 27.1% Infective endocarditis
- 23.7% Biliary source
- 55.9% (n=33) underwent colonoscopy
 - 18.2% (n=9) malignancy
- Biotype 1: associated with endocarditis
- Biotype 2: associated with biliary disease

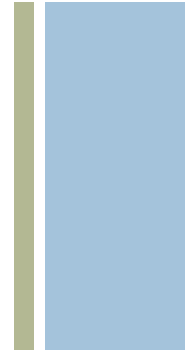


Streptococcus bovis Endocarditis and Its Association with Chronic Liver Disease: An Underestimated Risk Factor

M. F. Tripodi,^{1,4} L. E. Adinolfi,¹ E. Ragone,² E. Durante Mangoni,¹ R. Fortunato,¹ D. Iarussi,³ G. Ruggiero,¹ and R. Utili^{1,2,4}

¹Internal Medicine, Faculty of Medicine, ²Unit of Infectious and Transplant Medicine, and ³Cardiology Unit, Second University of Naples, and ⁴Research Center for Cardiovascular Sciences, Second University of Naples Medical School, Naples, Italy

CID 2004:38 (15 May)



- Prospective study: 199 patients with definite endocarditis

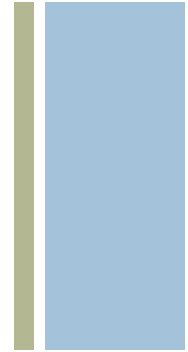
- N= 30 *Strep. bovis* endocarditis
 - Older (mean age, 58.6 +/- 12.4 vs 46 +/- 17)
 - Higher rates of bivalvular involvement (43.3% vs 7.7%)
 - Embolism (73.3% vs 40.2%)
 - Diskitis (23.3% vs 0.6%)
 - Colonic adenoma (46.7%)
 - Colonic carcinoma (0.03%)

- **Advanced liver disease (56.7% vs 15.3%)**
 - All biotype 1 (17/28)

Novel Clues on the Specific Association of *Streptococcus gallolyticus* subsp *gallolyticus* With Colorectal Cancer

Annemarie Boleij,^{1,2} Carla M. J. Muijtens,^{1,2} Sarah I. Bukhari,⁴ Nadège Cayet,⁵ Philippe Glaser,⁵ Peter W. M. Hermans,³
Dorine W. Swinkels,^{1,2} Albert Bolhuis,⁴ and Harold Tjalsma^{1,2}

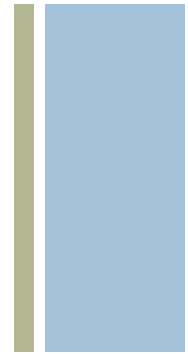
JID 2011;203 (15 April)

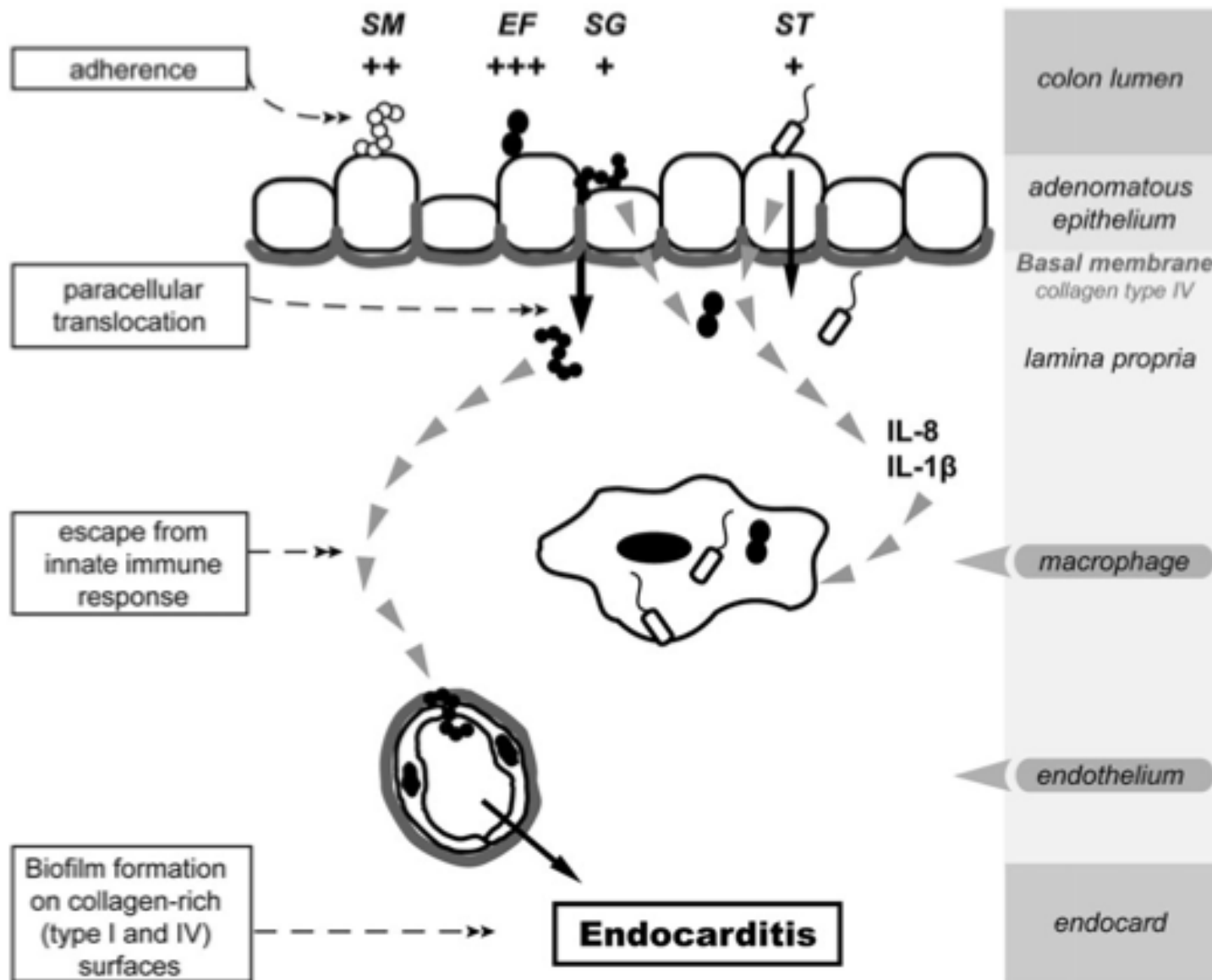


- Route of infection reconstructed in vitro with
 - adhesion, invasion and translocation assays
 - on differentiated colorectal adenocarcinoma cell lines
- Analysis of cellular immune response
- Analysis of bacterial biofilm formation

+ Findings

- Relative low adhesiveness
- Able to paracellularly cross a differentiated epithelium without inducing epithelial *IL 8* or *IL 1 β* responses
- Form biofilms on collagen rich surfaces (eg damaged heart valves and (pre) cancerous sites with a displaced epithelium)





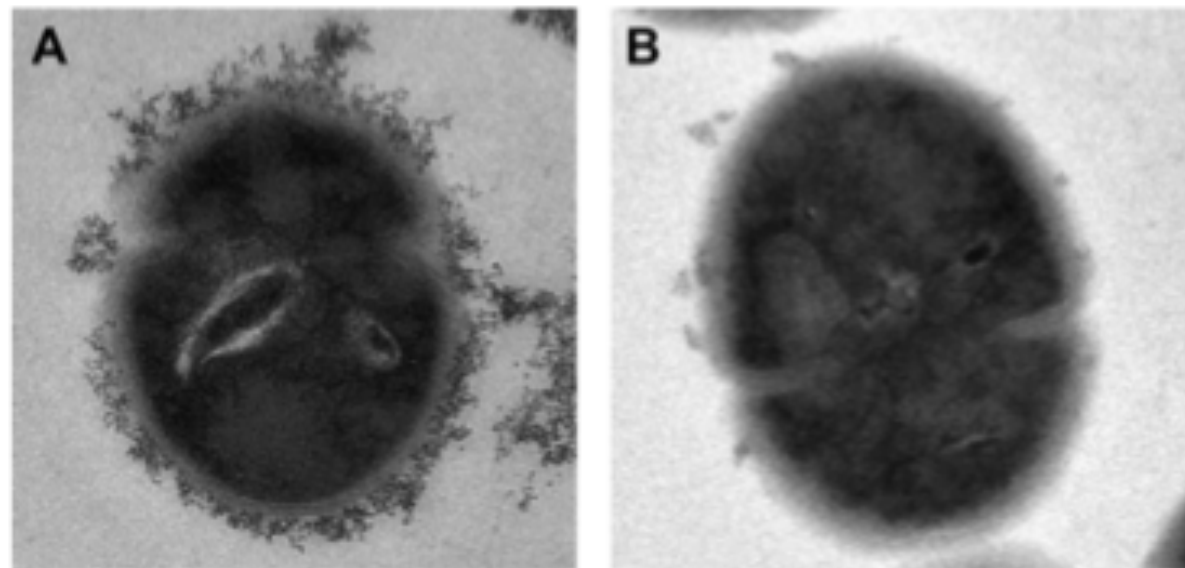


Figure 5. Distinct surface structure of *Streptococcus bovis* strains. Electron micrographic image of representative cells from the *Streptococcus gallolyticus* subsp *gallolyticus* UCN34 (A) and *S. gallolyticus* subsp *macedonicus* (B) strains, illustrating the different surface structures of these closely related strains.

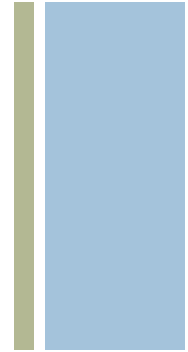
+ *S. gallolyticus subsp pasteurianus*

- Clinical spectrum
 - Bacteremia, meningitis, peritonitis, chorioamnionitis
- Association with hepatobiliary disease
- Chronic steroid use and compromised gastrointestinal tract integrity at risk for meningitis

Sturt, J Clin Microbiol. 2010 48:6, 2247-2249

Beck, J Clin Microbiol. 2008 46:9, 2966-2972

+ Infections in asplenic/
hyposplenic patients

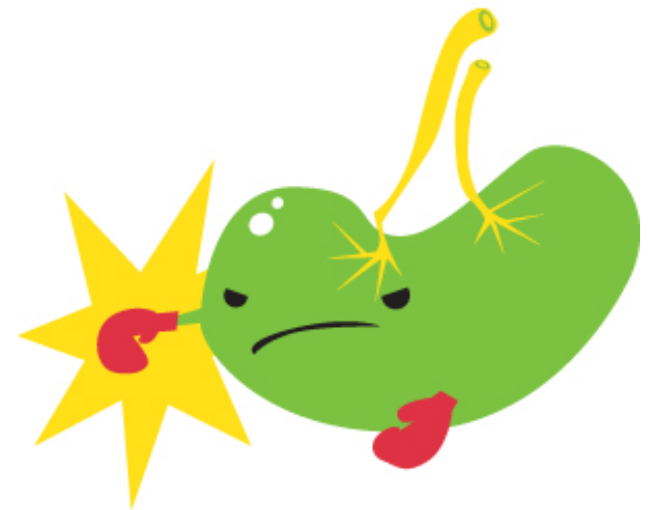


- ▣ Rapidly fatal bacterial infections due to encapsulated organisms
 - ▣ *Streptococcus pneumoniae*
 - ▣ *Neisseria meningitidis*
 - ▣ *Haemophilus influenzae*

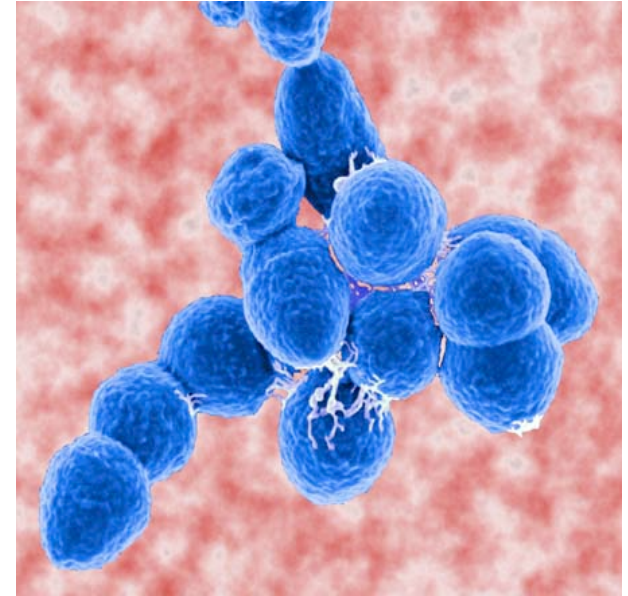
Less common organisms

- ▣ *Capnocytophaga*
- ▣ *Bordetella holmesii*

- ▣ Malaria, Babesiosis



+ Pneumococcal Sepsis



- Single most important pathogen
- Review of 349 cases of sepsis in asplenic patients

Streptococcus pneumoniae accounted for

- 57% infections
- 59% deaths

+ Risk of infection

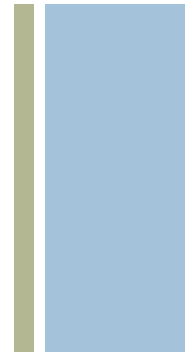
- Overall incidence rate: 7.7 per 100 person-years
- Highest risk 1st 90 days: 10.2% prevalence

Thomsen, Ann Intern Med 2009; 151:546-555

- Duration of risk: lifelong
 - 77 cases
 - 11% within 4 years, most cases occurred 10-30 years after splenectomy

Waghorn et al, J Clin Pathol 2001; 54: 214-18

- ?Recommendations for antibiotic prophylaxis beyond 1st 2 years post splenectomy in adults



+ Conclusions

- We report a case of *Streptococcus gallolyticus* subsp *pasteurianus* septicemia (?toxic shock syndrome) in an asplenic patient
 - Further studies
 - Toxin analysis
 - Electron microscopy
- Postsplenectomy sepsis associated with high morbidity and mortality
 - Opportunity for education and prevention