A 63-year old woman develops an abscess on the back of her neck. Culture yields a Gram positive coccus that is catalase positive, coagulase positive. The isolate is tested and found to be positive for the meca gene.

Q. What do we know about this organism's susceptibility profile?

A. The isolate is susceptible to vancomycin
B. The isolate is resistant to vancomycin
C. The isolate is susceptible to nafcillin
D. The isolate is resistant to nafcillin
A 63-year old woman develops an abscess on the back of her neck. Culture yields a Gram positive coccus that is catalase positive, coagulase positive. The isolate is tested and found to be positive for the mecA gene.

Q. What is the identification of this organism?
A. *Enterococcus faecalis*
B. *E. coli*
C. *Staphylococcus aureus*—methicillin susceptible (MSSA)
D. *Staphylococcus aureus*—methicillin resistant (MRSA)
E. *Streptococcus pneumoniae*

Q. What does this tell you about treatment options?
A. Can use a 1st generation cephalosporin
B. Can use a 3rd generation cephalosporin
C. Can use a 4th generation cephalosporin
D. Can use ampicillin
E. None of these can be used

Q. Which of the following statements regarding the role of protein A in the pathogenesis of infections caused by *Staphylococcus aureus* is correct?
A. It is responsible for the rash in toxic shock syndrome.
B. It converts hydrogen peroxide into water and oxygen.
C. It is a potent enterotoxin.
D. It is directly responsible for lysis of neutrophils.
E. It is a bacterial surface protein that binds to the Fc portion of IgG1.
Case 2

A 3-week-old infant was well until 2 days ago when she stopped feeding and became irritable. Her parents brought her to the emergency department when she developed a fever of 38.6°C. On exam she is difficult to arouse. She has a petechial rash all over her body. Blood cultures were sent. A lumbar puncture was performed. Culture of the spinal fluid on blood agar revealed β–hemolytic colonies that typed as Lancefield group B.

Q. Which one of the following is the most likely causative organism?

A. Staphylococcus aureus  
B. Staphylococcus saprophyticus  
C. Streptococcus agalactiae  
D. Streptococcus pneumoniae  
E. Streptococcus pyogenes

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Q. What is the diagnosis in this case?
A 3-week-old infant was well until 2 days ago when she stopped feeding and became irritable. Her parents brought her to the emergency department when she developed a fever of 38.6°C. On exam she is difficult to arouse. She has a petechial rash all over her body. Blood cultures were sent. A lumbar puncture was performed. Culture of the spinal fluid on blood agar revealed β-hemolytic colonies that typed as Lancefield group B.

Q. Which of the antibiotics that you have heard about in lecture might be viable treatment options for this clinical presentation?

Case 3

A 36-year-old man is admitted to the hospital because of mental status changes. He is unkempt and homeless and lives in an encampment with other homeless people, who called the police when he could not be woken up. On exam his temperature is 38.9°C. He moans when attempts are made to arouse him. Physical and examination and chest radiography show evidence of a left lower lobe pneumonia. An endotracheal aspirate is done and yields rust-colored sputum. Examination of the Gram-stained sputum smear shows numerous polymorphonuclear cells and numerous Gram positive lancet-shaped diplococci.

Q. The pathogenesis of the organism causing the infection includes which one of the following?

A. Resistance to phagocytosis mediated by M proteins
B. Lysis of phagocytic vacuole and release into the circulation
C. Inhibition of phagocytosis by a polysaccharide capsule
D. Invasion of cells lining alveoli and entry into the pulmonary venule circulation
E. Migration to mediastinal lymph nodes
A 36-year old man is admitted to the hospital because of mental status changes. He is unkempt and homeless and lives in an encampment with other homeless people, who called the police when he could not be woken up. On exam his temperature is 38.9°C. He moans when attempts are made to arouse him. Physical and examination and chest radiography show evidence of a left lower lobe pneumonia. An endotracheal aspirate is done and yields rust-colored sputum. Examination of the Gram-stained sputum smear shows numerous polymorphonuclear cells and numerous Gram positive lancet-shaped diplococci.

Q. What is the etiologic agent in this case and which antibiotic that you have heard about in lecture might be a viable treatment option?

Case 4

A 28-year old woman is admitted to the hospital because of fever and increasing anorexia, headache, weakness and altered mental status of 3 days’ duration. She works for an airline as a flight attendant, flying between the Indian subcontinent and other places Southeast Asia and the West Coast of the United States. Ten days before admission she had a diarrheal illness that lasted for about 36 hours. She has been constipated for the past 3 days. Her temperature is 39.1°C, heart rate is 66 beats per minute and respirations are 18 breaths per minute. She knows who she is and where she is but does not know the date. She is picking at the bed clothes. Rose spots are seen on her trunk. The remainder of the physical exam findings are normal. Blood cultures are done, and an intravenous line is placed.

Q. The most likely cause of her illness is
A. Enterotoxigenic E coli (ETEC)
B. Shigella sonnei
C. Salmonella enterica serotype Typhimurium (Salmonella Typhimurium)
D. Salmonella enterica serotype Typhi (Salmonella Typhi)
E. Enteroinvasive E coli (EIEC)
A 28-year old woman is admitted to the hospital because of fever and increasing anorexia, headache, weakness and altered mental status of 3 days' duration. She works for an airline as a flight attendant, flying between the Indian subcontinent and other places Southeast Asia and the West Coast of the United States. Ten days before admission she had a diarrheal illness that lasted for about 36 hours. She has been constipated for the past 3 days. Her temperature is 39.1°C, heart rate is 66 beats per minute and respirations are 18 breaths per minute. She knows who she is and where she is but does not know the date. She is picking at the bed clothes. Rose spots are seen on her trunk. The remainder of the physical exam findings are normal. Blood cultures are done, and an intravenous line is placed.

Q. Which agar plate is consistent with this case?

A B C D

Q. For the plates pictured here, what phenotypic feature can be seen on both?

A. Production of urease
B. Motility in the medium
C. Inability to ferment lactose
D. Fermentation of glucose
E. Production of gas in the medium

A 28-year old woman is admitted to the hospital because of fever and increasing anorexia, headache, weakness and altered mental status of 3 days' duration. She works for an airline as a flight attendant, flying between the Indian subcontinent and other places Southeast Asia and the West Coast of the United States. Ten days before admission she had a diarrheal illness that lasted for about 36 hours. She has been constipated for the past 3 days. Her temperature is 39.1°C, heart rate is 66 beats per minute and respirations are 18 breaths per minute. She knows who she is and where she is but does not know the date. She is picking at the bed clothes. Rose spots are seen on her trunk. The remainder of the physical exam findings are normal. Blood cultures are done, and an intravenous line is placed.

Q. Which antibiotics might be viable treatment options in this case?
Case 5

A 39-year-old homeless man with alcoholism presents with severe multilobar pneumonia. He requires intubation and mechanical ventilation. A Gram stain of his sputum, that looks like currant jelly, reveals numerous polymorphonuclear leukocytes and gram-negative rods that appear to have a capsule. The organism is a lactose fermenter on MacConkey agar and is very mucoid.

Q. Which of the following is the most likely organism causing this man’s illness?

A. Serratia marcescens  
B. Enterobacter species  
C. Proteus mirabilis  
D. Klebsiella pneumoniae  
E. Morganella morgani

A 39-year-old homeless man with alcoholism presents with severe multilobar pneumonia. He requires intubation and mechanical ventilation. A Gram stain of his sputum, that looks like currant jelly, reveals numerous polymorphonuclear leukocytes and gram-negative rods that appear to have a capsule. The organism is a lactose fermenter on MacConkey agar and is very mucoid.

Q. Which antibiotics that you have heard about in class might be viable treatment options? Which one is this organism intrinsically resistant to?
Case 6

Your patient in the emergency department has a 6-cm ulcer on her leg that is surrounded by a red, warm and tender area of inflammation. You do a Gram stain on the purulence expressed from the ulcer and see Gram positive cocci in chains. Culture of the fluid grows small beta hemolytic colonies that are catalase negative. The isolate agglutinates with Lancefield serogroup A antisera.

Q. Which organism is causing the patient’s lesion?
A. Enterococcus faecalis
B. Staphylococcus aureus
C. Streptococcus agalactiae
D. Streptococcus pneumoniae
E. Streptococcus pyogenes

Your patient in the emergency department has a 6-cm ulcer on her leg that is surrounded by a red, warm and tender area of inflammation. You do a Gram stain on the purulence expressed from the ulcer and see Gram positive cocci in chains. Culture of the fluid grows small beta hemolytic colonies that are catalase negative. The isolate agglutinates with Lancefield serogroup A antisera.

Q. What other types of infections does this infection cause?
Your patient in the emergency department has a 6-cm ulcer on her leg that is surrounded by a red, warm and tender area of inflammation. You do a Gram stain on the pusulence expressed from the ulcer and see Gram positive cocci in chains. Culture of the fluid grows small beta hemolytic colonies that are catalase negative. The isolate agglutinates with Lancefield serogroup A antisera.

Q. What other sequelae are important to keep in mind with this organism?

Case 7

A 5-year-old girl attended a birthday party at a local fast food restaurant. About 48 hours later, she developed cramping abdominal pain and a low-grade fever and had five episodes of loose, bloody stools. She is taken to a local emergency department the next morning because the diarrhea has continued, and she now appears pale and lethargic. On presentation, she has a temperature of 38°C, and she is hypotensive and tachycardic. The abdominal examination reveals tenderness in the lower quadrants. Laboratory work is remarkable for a serum creatinine of 2.0 mg/dL (elevated), a white blood cell count of 16,000 (normal), a hemoglobin of 8.0 mg/dL (low), thrombocytopenia, and evidence of hemolysis.

Q. What is the most likely pathogen causing this child’s illness?

A. Escherichia coli O157:H7
B. Salmonella enterica serotype Typhimurium
C. Enteropathogenic Escherichia coli
D. Edwardsiella tarda
E. Plesiomonas shigelloides
A 5-year-old girl attended a birthday party at a local fast food restaurant. About 48 hours later, she developed cramping abdominal pain and a low-grade fever and had five episodes of loose, bloody stools. She is taken to a local emergency department the next evening because the diarrhea has continued, and she now appears pale and lethargic. On presentation, she has a temperature of 38°C, and she is hypotensive and tachycardic. The abdominal examination reveals tenderness in the lower quadrants. Laboratory work is remarkable for a serum creatinine of 2.0 mg/dL (elevated), a serum hemoglobin of 8.0 mg/dL (low), thrombocytopenia, and evidence of hemolysis.

Q. What medium should be inoculated to help the laboratory staff make the diagnosis of this infection?

A. Blood agar
B. Sorbitol MacConkey agar
C. Hektoen enteric agar
D. CIN (cefsulodin, irgasan, novobiocin) agar
E. Thiosulfate citrate bile salts sucrose agar

A 5-year-old girl attended a birthday party at a local fast food restaurant. About 48 hours later, she developed cramping abdominal pain and a low-grade fever and had five episodes of loose, bloody stools. She is taken to a local emergency department the next evening because the diarrhea has continued, and she now appears pale and lethargic. On presentation, she has a temperature of 38°C, and she is hypotensive and tachycardic. The abdominal examination reveals tenderness in the lower quadrants. Laboratory work is remarkable for a serum creatinine of 2.0 mg/dL (elevated), a serum hemoglobin of 8.0 mg/dL (low), thrombocytopenia, and evidence of hemolysis.

Q. How would you explain the findings on physical exam and laboratory data? What is this constellation of symptoms called?

A 5-year-old girl attended a birthday party at a local fast food restaurant. About 48 hours later, she developed cramping abdominal pain and a low-grade fever and had five episodes of loose, bloody stools. She is taken to a local emergency department the next evening because the diarrhea has continued, and she now appears pale and lethargic. On presentation, she has a temperature of 38°C, and she is hypotensive and tachycardic. The abdominal examination reveals tenderness in the lower quadrants. Laboratory work is remarkable for a serum creatinine of 2.0 mg/dL (elevated), a serum hemoglobin of 8.0 mg/dL (low), thrombocytopenia, and evidence of hemolysis.

Q. What antibiotics might be good choices in this case?