the release of large amounts of IL-1, IL-2, and TNF, antibodies against TSST are found.

b. Exfoliatin, cause separation of the skin at stratum granulosum, causing scalded skin syndrome and impetigo.

c. Leukocidins toxins, are two:
   i. Alpha toxin, forms a hole in the cells causing necrosis of skin and hemolysis, by forming pores on the cell membrane.
   ii. P-V leukocidin, its gene is located in a lysogenic phage, this toxin form a hole in cell membrane causing death of cells especially WBCs, causes of necrotizing pneumonia.

● Enzymes:
   a. Beta lactamase, the cause of penicillin resistance.
   b. Catalase, causes the break of $H_2O_2$.
   c. Hyaluronidase, spreading factor, causes breaking of hyaluronic acid thus make penetration easy to subcutaneous tissue.
   d. Coagulase, either
      i. bound "clumping factor," facilitate binding to surfaces and cause clumping of plasma.
      ii. releasable, formation of plasma clot that forms a protective wall around the bacterium inhibiting leukocyte migration, by activating prothrombin to thrombin, which activate fibrinogen to fibrin.
   e. Fibrinolysin, AKA staphylokinase, breaks blood clots.

● Diseases:
   i. Pyogenic diseases:
      ● Conjunctivitis typically presents with unilateral burning eye pain, hyperemia of the conjunctiva, and a purulent discharge."most common cause".
      ● Sepsis, with clinical features that of gram -ve rods.
      ● Acute Endocarditis may occur on normal or prosthetic heart valves, especially right-sided endocarditis (tricuspid valve) in intravenous drug users.
      ● Osteomyelitis and septic arthritis (old individuals and children) may arise either by hematogenous spread from a distant infected focus or be introduced locally at a wound site, the most common cause of septic arthritis in adults is S. Aureus.