

SNS COLLEGE OF ALLIED HEALTH SCIENCE
Affiliated to The Tamil Nadu Dr M.G.R Medical University, Chennai



DEPARTMENT OF CARDIO PULMONARY PERFUSION CARE

TECHNOLOGY

COURSE NAME: CLINICAL MICROBIOLOGY

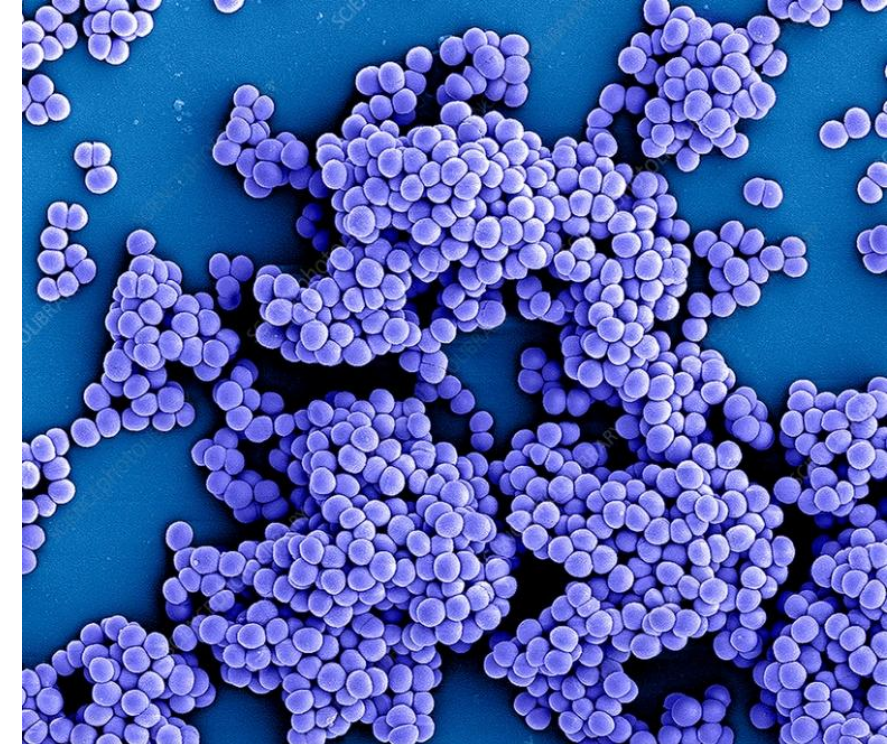
UNIT : 4

TOPIC : STAPHYLOCOCCUS

FACULTY NAME: MITHRA V

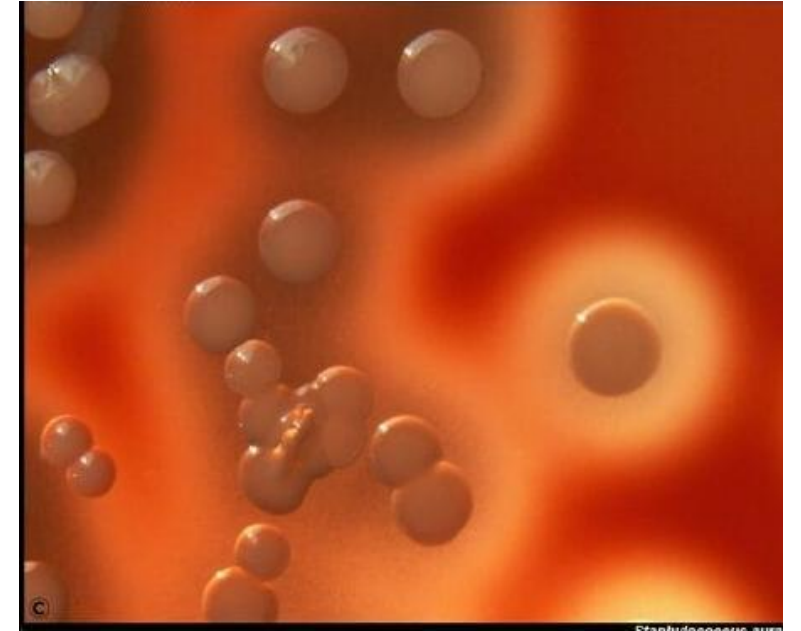
STAPHYLOCOCCUS

- **Gram-positive** spherical **cocci**
- Most important : *Staphylococcus aureus*
- *S. albus* (*S. epidermidis*) – normal flora, opportunistic pathogen
- Survives **high salt** concentration (sweat)
- Size: 0.8–1.0 μm
- Arranged in **grape-like clusters**
- Non-motile, non-sporing, usually non-capsulated



GROWTH FEATURES

- Nutrient agar/Blood agar: 1–2 mm smooth, shiny colonies
- Color: Golden yellow (most strains), some white/cream
- β -hemolysis on blood agar (sheep/human/ox blood)
- Grows well in 7–10% NaCl

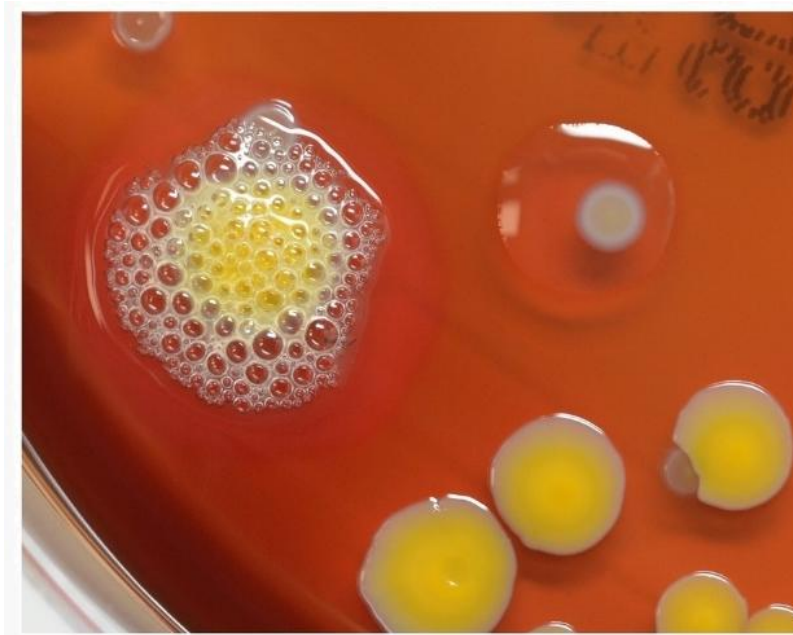


- **Selective & Differential Media**
- Milk agar with 7–10% NaCl
- Mannitol Salt Agar (7% NaCl + phenol red)
- *S. aureus* ferments mannitol → yellow colonies



BIOCHEMICAL TESTS

- Catalase: Positive
- Ferments glucose, lactose, sucrose, maltose, mannitol
- Methyl Red & Voges Proskauer: Positive



MR test



VP test

VIRULENCE FACTORS

- Cell wall-associated virulence factor
- **Protein A** (anti-opsonic, binds IgG)
- **Peptidoglycan**
- **Teichoic acid**

TOXINS

- **Hemolysins** (α , β , γ , δ)
- **Leukocidins** → kill WBCs, T cells
- **Enterotoxins** (A–I)
- Toxic Shock Syndrome
Toxin-1 (TSST-1)

ENZYMES

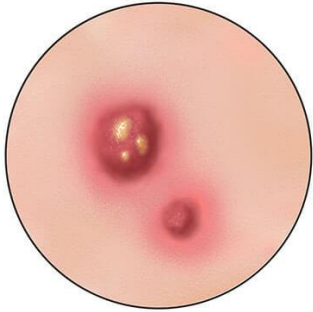
- **Coagulase** → converts fibrinogen to fibrin
- **Hyaluronidase** → spreads infection
- **DNase**,
- **Phosphatase**
- **Staphylokinase**



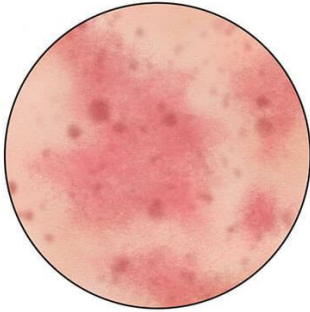
INFECTIONS



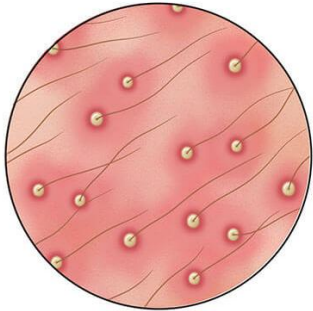
- Boils, abscesses, Pustules, carbuncles
- Impetigo (children)
- Pemphigus neonatorum
- Staphylococcal Scalded Skin Syndrome (SSSS)
- Cellulitis
- Deep & Systemic Infections
- Osteomyelitis
- Endocarditis
- Tonsillitis, pharyngitis, sinusitis
- Pneumonia, bacteremia, septicemia
- High fever, hypotension, rash, vomiting
- Conjunctival redness, confusion, multi-organ failure



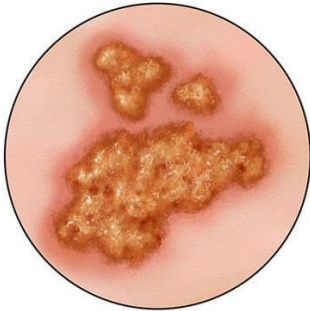
Abcesses and boils



Cellulitis



Folliculitis

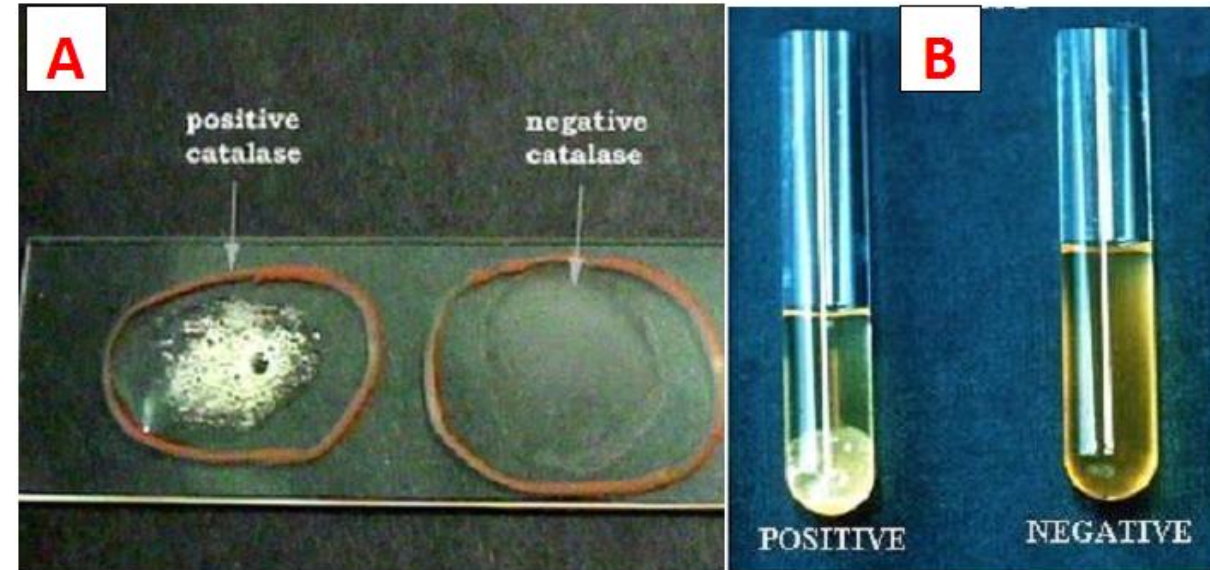


Impetigo



LAB DIAGNOSIS

- Pus, blood, urine, sputum, food, vomitus, feces
- Gram stain: Gram+ cocci in clusters
- Culture: Golden yellow colonies, β -hemolysis
- **Confirmatory Tests**
- Mannitol fermentation (+)
- DNase test (+)
- Coagulase test (Slide & Tube) – Gold standard for *S. aureus*



TREATMENT

- Sensitive strains:
- Cloxacillin, benzyl penicillin
- MRSA:
- Vancomycin, linezolid, daptomycin
- Clindamycin, rifampicin, fusidic acid



PREVENTION

- Hand hygiene
- Proper food handling & storage
- Aseptic techniques in hospitals
- Care in immunocompromised & device-implanted patients



REFERENCES

- Ananthanarayan and Paniker's Textbook of Microbiology, 11th Edition – Authors: R. Ananthanarayan & C.K. Jayaram Paniker (Revised by Reba Kanungo)
- Textbook of Microbiology for BSc and MSc Nursing & Allied Health Sciences – Author: C.P. Baveja, Latest Edition
- <https://microbenotes.com/staphylococcus-aureus/> – Microbe Notes (excellent summary with diagrams)
- <https://www.ncbi.nlm.nih.gov/books/NBK441868/> – NCBI Bookshelf: Staphylococcus aureus (Medical Microbiology section)

THANK YOU