

Microbiology Flash Cards

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What are the infections caused by
S. aureus?

(mechanism is by skin invasion and
destruction or from toxins)



folliculitis



cellulitis



Toxic shock syndrome



Scalded skin syndrome



Bullous impetigo



Furuncles vs Carbuncles

TSS & SSS are toxin mediated from exofoliative or epidermolytic toxins and TSS toxin respectively

TSS



SSS



A close-up photograph of a person wearing a white lab coat, holding a small, clear, circular object (possibly a lens or a small container) between their hands. The background is blurred, showing a white wall and a blue object. The text is overlaid on the image.

What are the mechanisms of
skin infections?

- Causes of skin lesions:

- A) Direct microbial infection of skin.
- B) Toxins produced by microbes.
- C) Inflammatory response to microbial infection.

- Routes of infection:

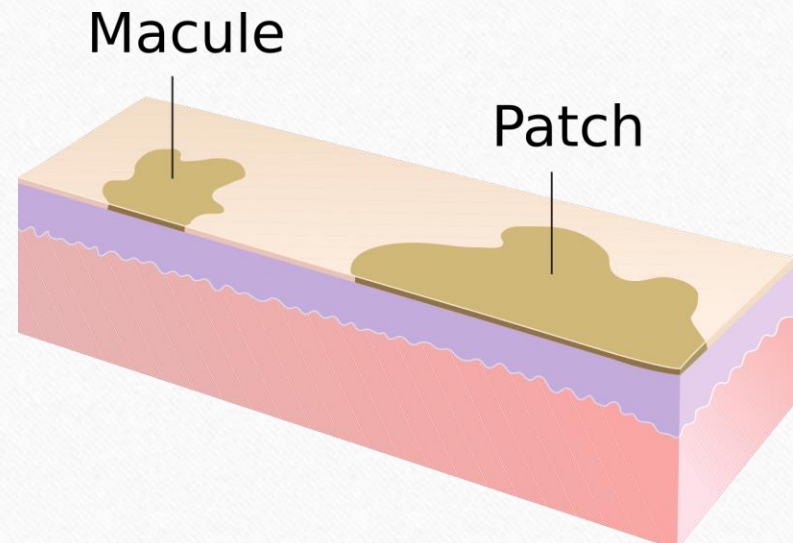
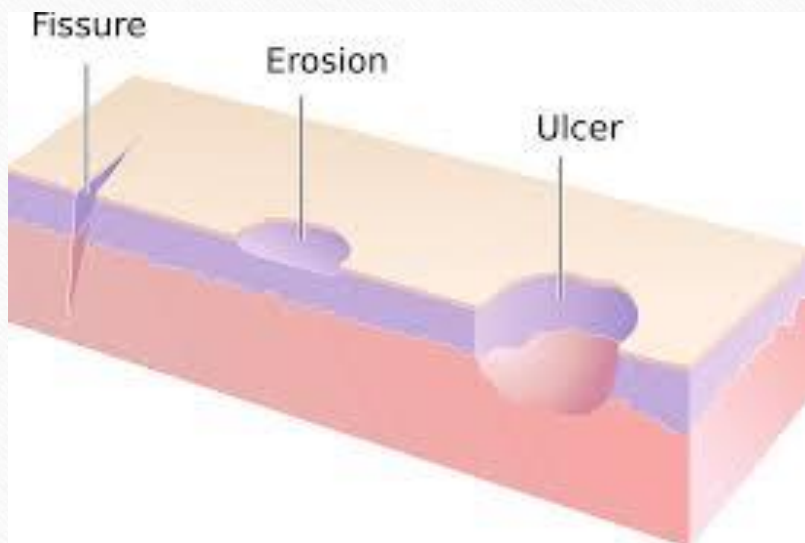
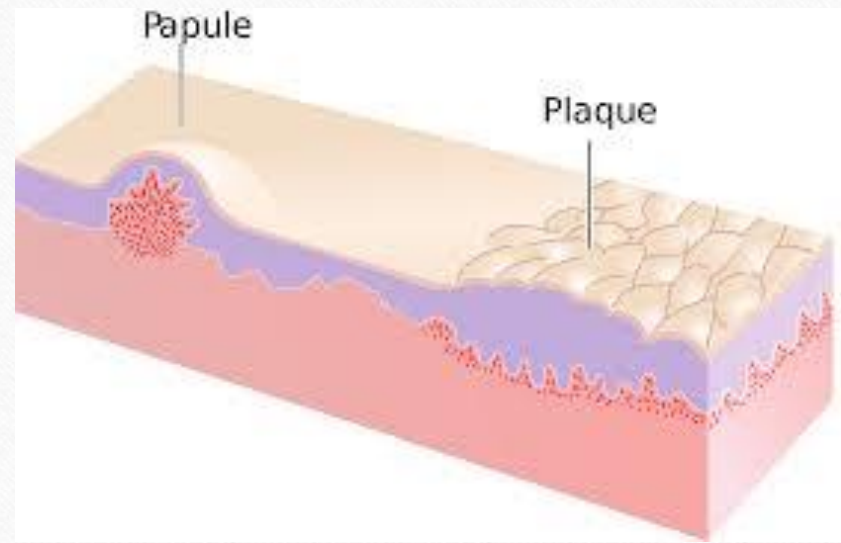
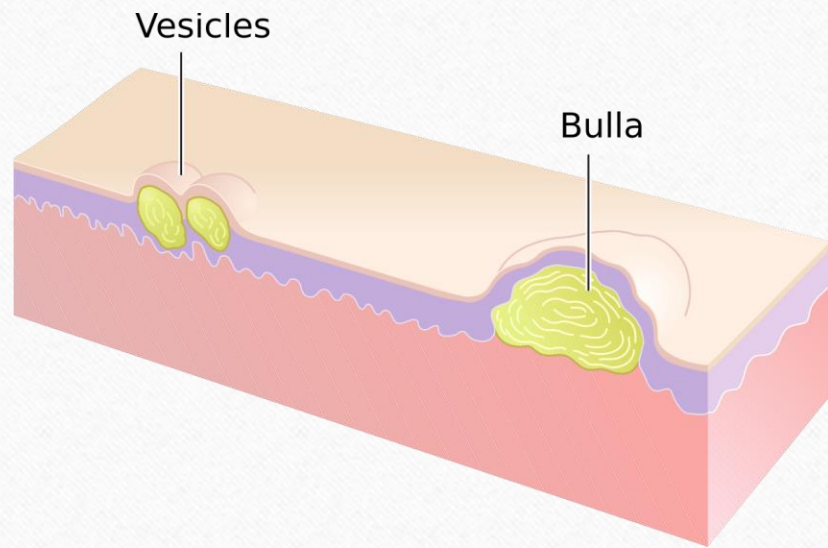
- A) Breaks in skin outer layer or via hair follicle infections.
- B) Insect or animal bites, human bites, needle sticks, scratches and burns.
- C) Clogged hair follicles (more susceptible to infection).

- Progression of infection:

- - Infections can extend to dermis, and in severe cases to subcutaneous fat, fascia, muscles causing necrotizing fasciitis, myositis and gas gangrene.



What are the classification of
skin lesions in clinical
practices



Name some common fungal

infections

DERMATOPHYTES



Microsporium



Trichophyton



Epidermophyton

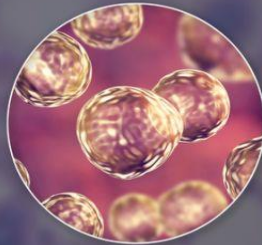
BLASTOMYCOSIS



Cutaneous form



Pulmonary form



Blastomyces dermatitidis fungi



Infection by *Candida albicans*



Infection by *Malassezia furfur*

The background is a dark blue, semi-transparent image. It features a close-up, microscopic view of human skin, showing the ridges and valleys of fingerprints. Overlaid on this are several circular, glowing blue structures that resemble viruses or bacteria, some with distinct outer shells and inner cores. The overall aesthetic is scientific and clinical.

Name some viral skin
infections

HSV 1
VERSUS
HSV 2

Visit www.PEDIAA.com

HSV1	HSV2
HSV 1 refers to a virus that causes sores around the mouth and lips	HSV 2 refers to a virus that causes sores around the genitals or rectum
Spreads through oral contact	Spreads through sexual contact
Causes oral herpes and cold sores	Causes genital herpes

HSV-1 (oral herpes) vs HSV-2 (genital herpes)



Human Papilloma Virus

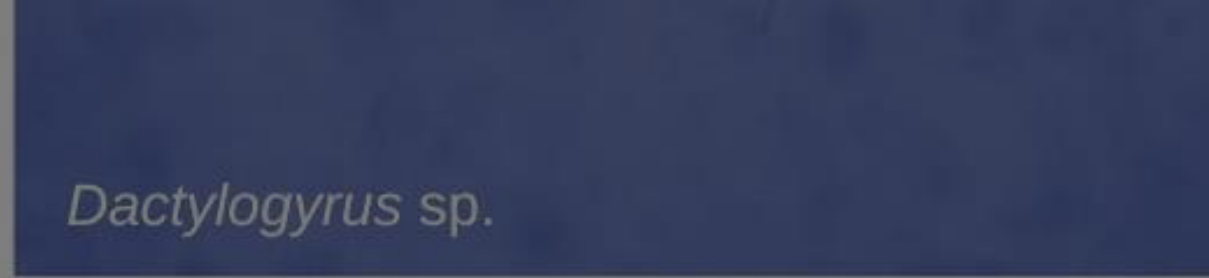


Viral Rash (Parvovirus B19)



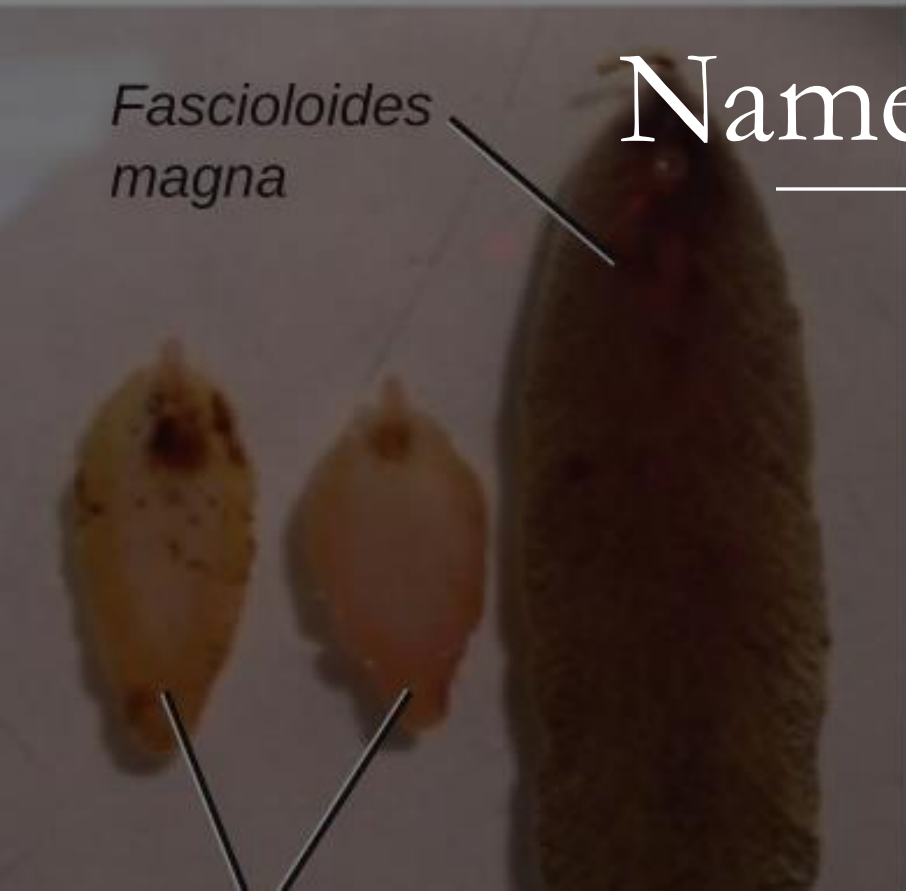
*Pseudobiceros
bedfordi*

(a) Class Turbellaria



Dactylogyrus sp.

(b) Class Monogenea



*Fascioloides
magna*

Name some parasitic skin infections



- Arthropods: The most frequent parasites. Eg: *Sarcoptes scabiei* which causes scabies / *Pediculus capitis, corporis, pubis* caused by lice (*pediculus humanus* and *Pthirus pubis*). / *Cimex lectularius* (bed bugs) feeds nocturnally on human blood causing skin rashes and blisters.

- Protozoa: Common in certain regions. E.g: *Leishmania* spp. Transmitted by sand fly causing leishmaniasis.

- Helminthes: Less commonly encountered. E.g: *Shistosoma* spp.



Scabies

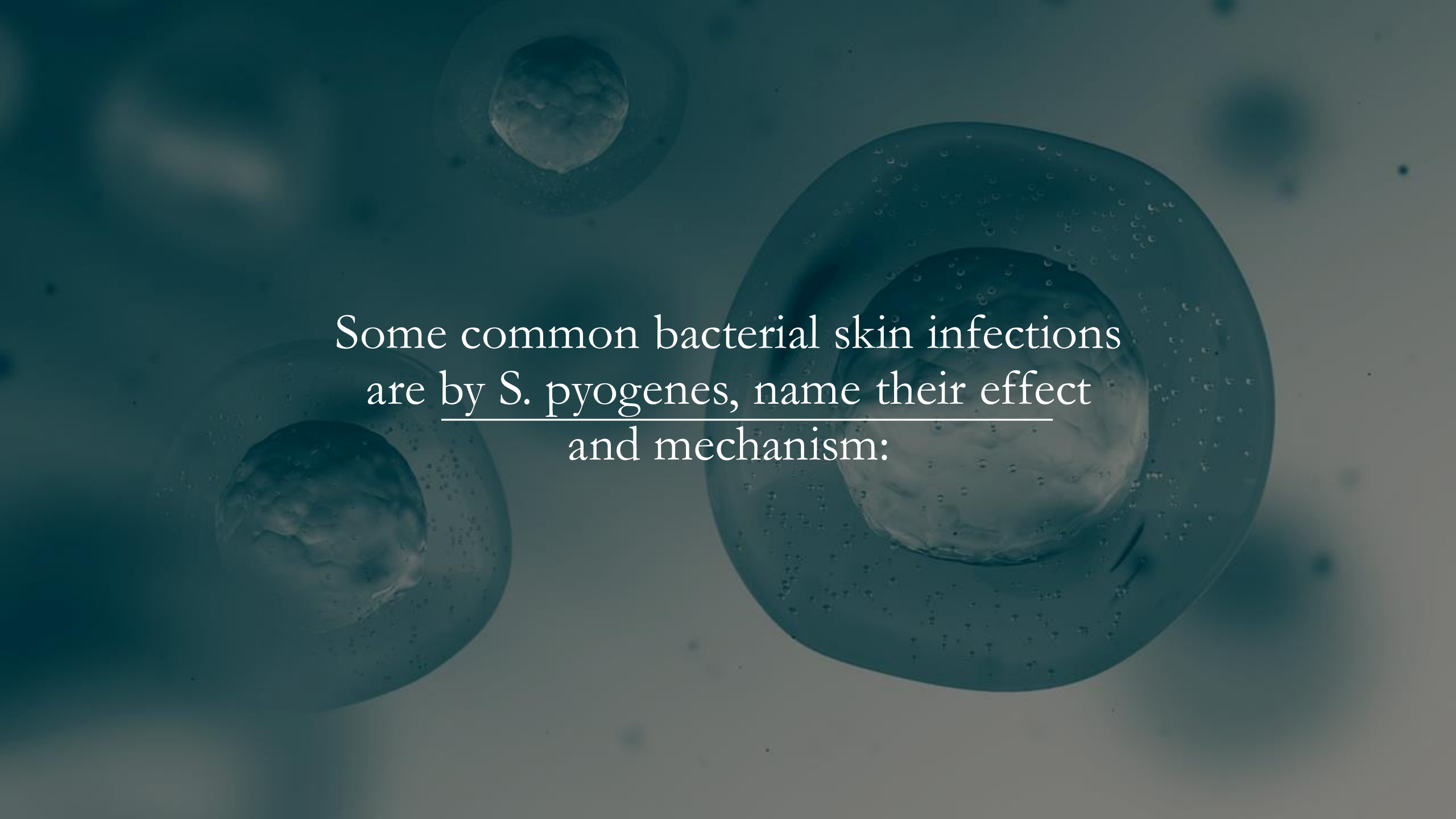


Cutaneous Leishmaniasis

Schistosomiasis



Bed Bugs rash

A microscopic view of several bacterial cells, likely Staphylococcus pyogenes, showing their characteristic spherical shape and arrangement. The cells are arranged in small groups and chains, with some showing a distinct cell wall and internal structure. The background is a light, slightly grainy texture, typical of a Gram stain preparation.

Some common bacterial skin infections
are by *S. pyogenes*, name their effect
and mechanism:



Impetigo by skin colonization or invasion



Scarlet fever (*S. pyogenes* endotoxin) or erythrogenic toxin



Erysipelas by skin colonization or invasion



Necrotizing fasciitis by skin colonization or invasion

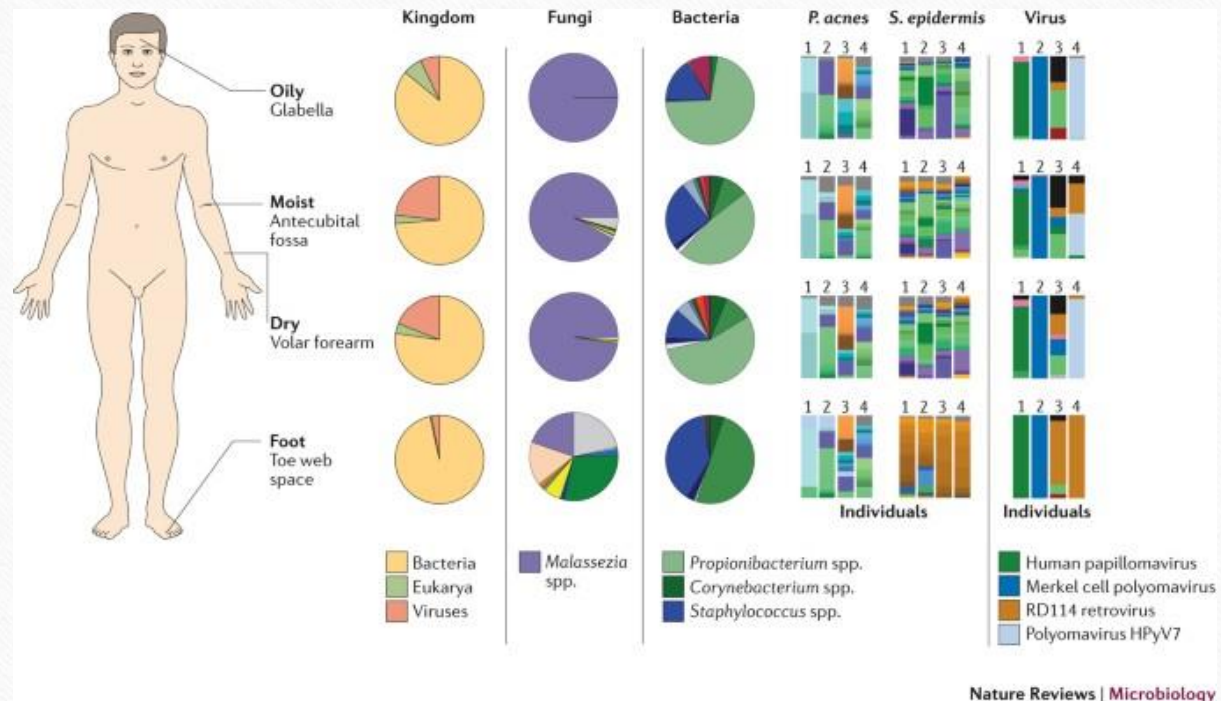


Streptococcal toxic shock syndrome (*S. pyogenes* toxin or erythrogenic toxin)

Name the skin microbiome
and the most prevalent one:

A close-up photograph of a mosquito on human skin. The mosquito is positioned in the center-right of the frame, with its legs and wings visible. The skin is a light brown color. The background is a soft, out-of-focus green. A white text overlay is centered on the image, reading "Name the skin microbiome and the most prevalent one:". The text is in a white serif font, and the word "microbiome" is underlined.

Key colonizers: Predom. G+ve bacteria like coagulase –ve Staph, *Corynebacterium* and *Propionibacterium* (*Propionibacterium acne* colonizes hair follicles and develops *acne vulgaris*). *Staph epidermidis* is the most prevalent skin microorganism. *Candida* and *Malassezia* are the main fungi on skin. Moist areas have: G-ve bacilli like *Enterobacter*, *Pseudomonas*, *Klebsiella*, *E. coli* and *Proteus*.



What are the two primary skin layers
and what are the types of infections?

Two Primary Layers & Two Levels of Infection


- 1- Epidermis: outermost, has protective stratum corneum made of keratinocytes.
 - 2- Dermis: Denser, thicker with connective tissue, has blood vessels, nerve endings, sebaceous glands and hair follicles.
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- 1- Surface-level: Dermatophyte infections (tinea or ringworm), primarily affects the epidermis especially stratum corneum.
 - 2- Deeper skin conditions: Infections like furuncles, carbuncles, erysipelas invade the dermis when epidermis is compromised.

How does the skin prevent
infections?



How our skin prevents infections

- **Dry environment:** Limits colonization by certain microorganisms, including Gram-negative bacteria.
- **Renewal of the epidermis:** Regular shedding of keratinocytes prevents overgrowth of potential pathogens.
- **Protective barrier:** The keratinocytes form a waterproof barrier, blocking the entry of infectious agents.
- Skin secretions include **beta defensins**, peptides that destroy microorganisms by disrupting their **cell membranes**.
- **Skin-resident immune cells:** Langerhans cells, dermal dendritic cells, macrophages, mast cells, and eosinophils.
- **Skin pH:** Sebaceous glands secrete sebum rich in fatty acids and lactic acid;
 - Fatty acids are effective against most gram-positive bacteria and gram-negative cocci (e.g., *Neisseria*)
 - Lactic acid lowers skin pH, inhibiting many microorganisms.
- **Sweat glands** produce sweat containing lysozyme and high levels of sodium chloride.
 - **Lysozyme** breaks down bacterial **cell walls**.
 - Sodium chloride concentration can inhibit bacterial growth.

A microscopic view of skin cells, showing large, rounded cells with a textured surface and numerous small, red, spiky protrusions. The background is dark and slightly blurred, highlighting the cellular structures.

What is a resident microorganism?
How does the skin normal flora prevent
pathogen colonization?

What are the type of habitats on skin?

Answer:

- **Resident microorganisms:** Despite a hostile environment, skin is colonized by specific microbes, including Diphtheroids, *Propionibacterium acnes*, *Staphylococcus*, and *Malassezia*.
- Skin normal flora help to prevent pathogen colonization by:
 - Blocking attachment to the skin surface.
 - Producing substances that inhibit the growth of other microbes.
- Habitats on skin:
 - Most reside in the superficial stratum corneum and upper hair follicles.
 - **Moist areas** (e.g., scalp, axilla, perineum) **have higher colonization than drier regions** (e.g., arms, legs, chest, back).