

# Dermatologic (Integumentary) Agents

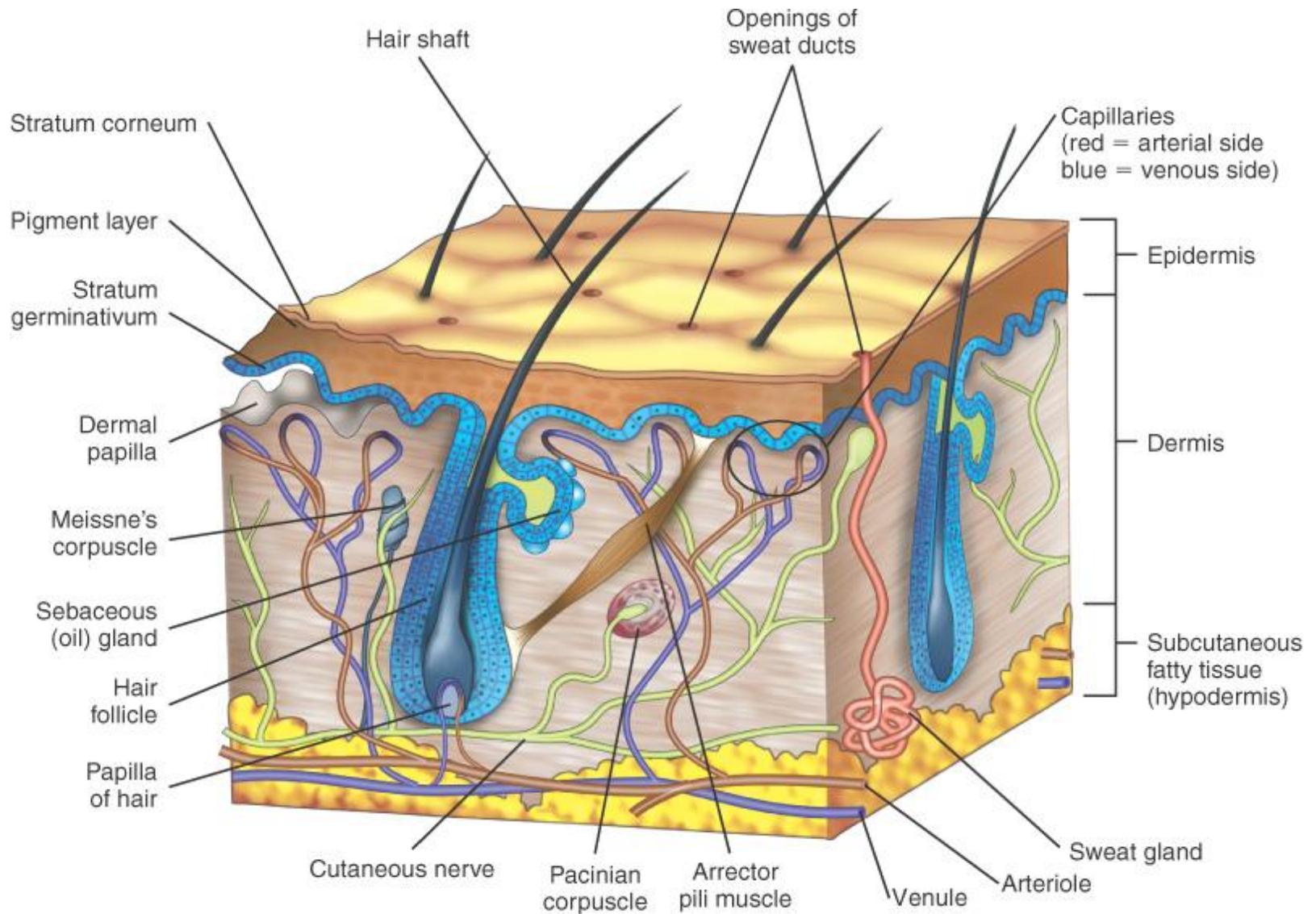
Presented by  
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# Skin

- Largest organ of the body
- Two layers
  - Dermis
  - Epidermis

# Skin Functions

- Protective barrier for the internal organs
- Ability to sense changes in temperature, pressure, or pain
- Regulation of body temperature
- Excretion of fluid and electrolytes
- Stores fat
- Synthesizes vitamin D
- Provides a site for drug absorption



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Figure 55-1 A microscopic view of the skin. The epidermis, shown in longitudinal section, is raised at one corner to reveal the ridges in the dermis. (Modified from Thibodeau GA, Patton KT: *Anatomy and physiology*, ed 5, St. Louis, 2003, Mosby.)

# TABLE 55-1

## EPIDERMAL LAYERS

Layer	Description
Stratum corneum ("horny layer," so named because keratin is the same protein that makes up the horns of animals)	Outermost layer consisting of dead skin cells that are made of a converted water-repellant protein known as <i>keratin</i> ; it is the protective layer for the entire body. After it is desquamated or shed, it is replaced by new cells from below.
Stratum lucidum ("clear layer")	Layer where keratin is formed; it is translucent and contains flat cells.
Stratum granulosum ("granular layer")	Cells die in this layer; granulated cells are located here, giving this layer the appearance for which it is named.
Stratum germinativum ("germinative layer")	New skin cells are made in this layer; it contains melanocytes, which produce melanin, the skin color pigment.

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# Dermis

- Lies between epidermis & subq fat
- 40 times thicker than epidermis
- Provide extra support and nourishment to the skin
- Contain exocrine glands

## TABLE 55-2

### EXOCRINE GLANDS OF THE SKIN

Gland	Function
Sebaceous	Large lipid-containing cells that produce oil or film that covers the epidermis; protects and lubricates skin and is water repellent and antiseptic
Eccrine	Sweat glands that are located throughout the skin surface; help regulate body temperature and prevent skin dryness
Apocrine	Mainly in axilla, genital organs, and breast areas; emit an odor; believed to be scent or sex glands

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# Dry skin

- **Dry skin**
  - a consequence of inadequate moisture content in the stratum corneum.
  - normal water content of this layer of tissue is between 10-20%.
  - dry skin appears when
    - water content falls below 10

# Dry skin

- Causes
  - Aging
    - Epidermis begins to thin
    - Loses ability to retain moisture
  - Overexposure to the sun
  - Exposure to cold weather
  - Inflammatory skin conditions
    - Dermatitis, eczema

# Dry skin

- **Symptoms**
  - **Loss of flexibility, roughness**
  - **Hyperkeratosis**
    - **Thickening of the outer layer of the skin**
  - **Inflammation**
  - **Pruritus**

# Dermatologic Agents: Formulations - Emollients

- **Lotion**

- Contains water, alcohol, and solvents
- May be a suspension, emulsion or solution
- Good for large or hairy areas

- **Ointment**

- Contains no water – not removable by water
- Occlusive, greasy and semisolid
- Used for dry lesions

- **Cream**

- Contains water and can be removed with water
- Not greasy or occlusive
- Usually white semisolid
- Good for moist areas

# Dermatologic Agents: Formulations - Others

- Aerosol foam/spray
  - Cover large areas
  - Useful for body cavities (vagina or rectum) or hairy areas
- Bar (similar to soap)
  - Spreads thin liquid or powder film, covers large area
  - Useful when skin tender to touch (burns)
- Gel/jelly
  - Contains water and possibly alcohol, easily removed
  - Good lubricator, usually clear

# Dermatologic Agents: Formulations - Others

- Oil

- Contains very little water – not removable with water
- Occlusive, liquid

- Paste

- Similar to ointments – contains more powder
- Excellent protectant properties

- Tape

- Most occlusive formulation
- Consistent topical delivery
- Useful when small, straight areas affected

- Powder

- Slight lubricating properties
- May be shaken on affected area
- Promotes drying

# Nursing considerations

- **Administration of an emollient**
  - **Depends on the patient condition**
  - **Individuals may benefit from a bath prior to using an emollient**
    - **Lukewarm (approximately 37(C)).**
  - **Skin should be gently patted dry following bathing**
  - **Apply emollient preparation**
    - **Before the skin dries out**
    - **Immediately following the bath**
  - **Emollients can be applied as often as they are required throughout the day**

# Types of Dermatologic Agents

- Antibacterial agents
- Antifungal agents
- Antiinflammatory agents
- Antineoplastic agents
- Antipruritic agents (for itching)
- Antiviral agents
- Drugs for treatment of burns

# Types of Dermatologic Agents (cont'd)

- Emollients (soften skin)
- Keratolytics
- Local anesthetics
- Topical vasodilators
- Debriding agents (promote wound healing)

# Barrier preparations

- Used to protect the skin against environmental irritants
  - e.g. urinary and fecal incontinence, or repeated moistening
  - e.g. areas around stomata, sore areas in the elderly, bedsores, and napkin rash
- Involve a number of constituents including
  - Emollients
  - Skin protectants
  - Antiseptics
  - Water-repellent substances such as dimethicone or other silicones
- Examples
  - Zinc Oxide
  - Castor Oil Ointment
  - Dimethicone cream
  - Titanium ointment

# Topical Antiinfectives

- Antibacterial agents
- Antifungal agents
- Antiviral agents
- Agents for acne
- Agents for dermatologic parasitic infections
  - Pediculicides and scabicides

# Antibacterial Agents

- Used to treat:
  - Folliculitis
  - Impetigo
  - Furuncles
  - Carbuncles
  - Cellulitis

# Antibacterial Agents (cont'd)

- Bacteria responsible for most common skin disorders
  - *Streptococcus pyogenes*
  - *Staphylococcus aureus*

# Antibacterial Agents (cont'd)

- Most common agents
  - bacitracin (Baciguent)
  - neomycin and polymyxin B (Neosporin)

# Acne Agents

- Acne is caused by *Propionibacterium acnes*
- Agents used to treat acne
  - benzoyl peroxide
  - erythromycin
  - tetracycline
  - isotretinoin (Accutane)
  - clindamycin
  - meclocycline
  - retinoic acid
  - salicylic acid

# Acne Agents (cont'd)

- benzoyl peroxide
  - Causes death of the anaerobic *P. acnes* bacteria by slowly releasing oxygen
  - Antibacterial, antiseptic, drying, and keratolytic actions
  - Keratolytic: softens scales and loosens the outer layer of the skin
  - Produces improvements in 4 to 6 weeks

# Acne Agents (cont'd)

- benzoyl peroxide (cont'd)
  - May cause peeling skin, redness, or sensation of warmth
  - Available in many formulations

# Acne Agents (cont'd)

- erythromycin
  - Macrolide antibiotic
  - Used topically to treat acne vulgaris
  - May cause skin reactions

# Acne Agents (cont'd)

- isotretinoin (Accutane)
  - Oral and topical forms
  - Inhibits sebaceous gland activity
  - Pregnancy category X
  - Patient counseling regarding using two forms of contraception and not becoming pregnant during use is important

# Acne Agents (cont'd)

## isotretinoin (Accutane)

- Initially acne may worsen
- Cannot donate blood or become pregnant up to 30 days after treatment
- Avoid ETOH - ↑ risk of ↑ triglycerides
- May ↓ night vision
  - Warn about night vision
- Do not crush
- Don't take vitamin A while on drug
- Avoid prolonged sun exposure

# Acne Agents (cont'd)

- tretinoin (retinoic acid, vitamin A acid)
  - Used to treat acne
  - Also used to reduce dermatologic changes associated with sun damage
  - Stimulates the turnover of epithelial cells, resulting in skin peeling
  - May result in severe irritation and skin peeling

# Acne Agents (cont'd)

- **Salicylic Acid:**
  - Effective in treating acne blemishes, oily skin, changes in texture, and even some pigmentation disorders
  - Safe and effective for all skin types
  - Works by encouraging the dead skin cells to shed at a normal rate so that the chances of these cells being stuck in a pore and causing a blemish are greatly reduced
    - Also works as a preventative on areas that aren't currently breaking out
  - No harsh side effects
    - mild dryness can occur
      - application of a moisturizer usually effective
  - Will not bleach your clothes or furniture!

# Acne Agents (cont'd)

## Nursing considerations

- Most topical
  - Orally if necessary
- Pregnancy test prior to treatment
- Use gloves for application
- Application may cause
  - Stinging, local irritation, dryness
- Avoid exposure to direct sunlight
  - Prevent photosensitivity

# Topical Fungal Infections

- Difficult to eradicate
- Therapy may be prolonged
  - Several weeks to 1 year
- Topical fungal infections caused by
  - Dermatophytes
  - *Candida* spp. (candidiasis)
  - *Malassezia furfur* (tinea versicolor)

# Topical Antifungal Agents

- clotrimazole (Lotrimin)
  - Lozenge for oral candidacies (thrush)
  - Vaginal form for yeast infections
  - Other forms used for other fungal infections
- miconazole (Monistat)
  - Topical cream
  - Vaginal suppository or cream
- ketocanazole (Nizoral)
  - Topical cream
  - Systemic infections
- itraconazole (Sporanox)
  - Systemic infections

# Topical Antiviral Agents

- acyclovir (Zovirax) and penciclovir (Denavir)
  - Only topical antiviral agents
- Both used to treat initial and recurrent herpes simplex infections
- Do not cure viral skin infections but may reduce healing time and pain

# Topical Anesthetic Agents

- Used to reduce pain or pruritus associated with:
  - Insect bites, sunburn, poison ivy exposure
- Also used to numb the skin before a painful injection
- Ointments, creams, sprays, liquids, jellies

# Topical Anesthetic Agents (cont.)

- Examples
  - benzocaine (Solarcaine, Lanacane)
    - Topical, aerosol, spray
  - cocaine
    - Topical
  - prilocaine/lidocaine (EMLA)
    - Topical
  - Lidocaine
    - Topical – 5% patch

# Topical Antipruritic Agents

- Antihistamines
- Corticosteroids
  - Anti-inflammatory effects
  - Antipruritic effects
  - Vasoconstrictor actions

# Topical Antipruritic Agents (cont.)

- Should not be used
  - Chickenpox
  - Widespread poison ivy
  - Large body surface are involvement

# Topical Antipruritic Agents (cont.)

- Corticosteroids
  - Systemic side effects averted when applied topically
    - In suggested dosages
  - Vary in potency
    - Ointments
      - Generally more penetrating
      - Followed by gels, creams and lotions

# Topical Antipruritic Agents (cont.)

## Corticosteroids (cont.)

- Side effects
  - Skin reactions
    - Acne eruptions, allergic contact dermatitis
    - Burning sensations, drying, itching
    - Hypopigmentation, purpura
    - Hirsutism, folliculitis
    - Round, swollen face
    - Alopecia
    - Opportunistic overgrowth of bacteria, fungi or virus

# Topical ectoparasitocidal drugs

- Ectoparasites – insects that live on the outer surface of the body
  - Pediculosis (three forms)
    - Pubis
    - Corporis
    - Capitis
  - Scabies
    - Caused by *Sarcoptes scabiei* or scabies mite

# Topical ectoparasitocidal drugs (cont.)

- Pediculicides and Scabicides
  - OTC preparations
    - RID (pyrethrin)
    - Nix (permethrin)
  - Prescription preparations
    - lindane (Kwell, Scabene) – no longer approved in children
      - 1% lotion and shampoo

# Topical ectoparasitocidal drugs (cont.)

- Side effects of Lindane
  - Eczematous skin rash
  - CNS toxicity
    - More common in young children and in cases of overuse
  - The FDA recommends
    - Labeling changes to try other agents first

# Other Topical Dermatologic Agents (cont'd)

- Topical hair growth drug
  - minoxidil (Rogaine)
- Systemic hair growth drug
  - finasteride (Propecia)
    - Used inn MEN only!!!
    - Highly teratogenic!!!
- Topical antineoplastic drug
  - fluorouracil (Efudex)

# Other Topical Dermatologic Agents (cont'd)

- **minoxidil (Rogaine) - Topical hair growth drug**
  - Vasodilating drug
    - Also administered systemically for hypertension
    - Same effect when applied topically – stimulates hair growth
  - Used on both sexes for baldness and hair thinning
  - Apply to affected area (balding area) twice daily
  - Generally takes 4 months for results to be seen
  - Systemic side effects possible
    - tachycardia, fluid retention and weight gain – so can be absorbed systemically!

# Other Topical Dermatologic Agents (cont'd)

- **finasteride (Propecia) - Systemic hair growth drug**
  - Lower strength version of med used to treat BPH (1mg) vs 5 mg for BPH
  - Withdrawal of treatment is associated with reversal of any hair growth benefits within 12 months
  - Pregnant women or who can become pregnant should not handle

# Other Topical Dermatologic Agents (cont'd)

- **fluorouracil (Efudex) - Topical antineoplastic drug**
  - Used for various premalignant skin lesions and basal cell carcinomas
  - Also used for treatment of solar or actinic keratosis
  - Side effects are minimal in comparison to systemic administration of drug
    - Usually limited to local inflammatory responses
      - Dermatitis, stomatitis, photosensitivity
      - Major side effects can include
        - » Swelling, scaling, pain, pruritis
        - » Burning, soreness, tenderness
        - » Suppuration, scarring and hyperpigmentation

# Other Topical Dermatologic Agents (cont'd)

- silver sulfadiazine (Silvadene)
  - Topical antiinfective
  - Used to prevent or treat infection at the site of burns
  - Can cause problems related to ototoxicity and nephrotoxicity

# Other Topical Dermatologic Agents (cont'd)

- Topical immunomodulators
  - pimecrolimus (Elidel)
    - Only drug in class
    - Indicated for treatment of atopic dermatitis
  - Patient teaching
    - Avoid sunlight, UV rays
    - May cause skin burning (usually first few days)

# Nursing Implications

- Assess for presence of contraindications, especially drug allergies
- Do not apply antiinfective agents until culture and sensitivity testing (if ordered) are completed

# Nursing Implications

- Assess area affected thoroughly before applying medication
- Keep in mind that systemic absorption is higher in the very young and very old because the skin may be more permeable

# Nursing Implications

- For isotretinoin (Accutane)
  - Strict guidelines are in place for monthly pregnancy testing and prescription renewal
  - Monitor liver function before and during therapy

# Nursing Implications

- Follow specific manufacturer's guidelines for administration techniques
- Cleanse the area thoroughly to remove debris and residual medication—follow specific recommendations

# Nursing Implications

- Wear gloves when applying agents
- Apply dressings (wet, wet-to-dry, occlusive, etc.) as ordered

# Nursing Implications

- Document
  - Site of application
  - Drainage (color, amount)
  - Swelling, temperature
  - Odor, color, pain, or other sensations
  - Type of treatment given
  - Patient's response

# Nursing Implications

- Protect affected area from sunlight
- Do not double up on dose if a dose is missed
- Dispose of all contaminated dressings properly

# Nursing Implications

- Provide patient/family teaching as necessary for self-care
- Monitor for therapeutic responses
- Monitor for side/adverse effects

# The Physiology of Wound Healing

- Breakdown in the protective functions of the skin
- Process of healing occurs in three overlapping phases:
  - Inflammation
  - Proliferation
  - Maturation

# Wound Assessment

- Accurate assessment
  - Cause of the wound
  - Client's general condition
  - Environmental and social circumstances
  - Wound
    - The position and size of the wound and the wound etiology
    - The tissue type (e.g. sloughy, necrotic, granulating, or epithelialising)
    - The amount of exudate
    - The presence or absence of infection
    - The presence or absence of pain
    - The possibility of a sinus

# The Function of a Wound Dressing

- Functions of dressings
  - Maintenance of high humidity
  - Removal of excess exudate
  - Gaseous exchange
  - Provision of thermal insulation
  - Impermeability to bacteria
  - Freedom from particles and toxic wound contaminants
  - Removal without causing trauma

# Occlusive/Semi-Occlusive Dressings

- Hydrocolloids
  - Provide moist environment
  - Promote autolytic debridement
  - Stimulates angiogenesis
- Examples:
  - DuoDERM<sup>®</sup>
  - Granuflex<sup>®</sup>
  - Tegaserb<sup>®</sup>

# Occlusive/Semi-Occlusive Dressings

## Hydrocolloids(cont.)

- ***Indications for use***
  - Granulating or necrotic wounds
  - To facilitate rehydration and autolytic debridement of dry, sloughy or necrotic wounds.
- ***Contraindications***
  - Infected wounds
  - Sensitivity to the hydrocolloid.
- ***Application of dressings***
  - Warming the dressing
  - Can remain in place during bathing.
  - Ideally should be left in situ for 4-5 days

# Occlusive/Semi-Occlusive Dressings (cont.)

- Hydrogels
  - Lose or absorb water depending on the state of hydration of the wound
  - Examples:
    - Intrasite Gel<sup>®</sup>
    - Nu-Gel<sup>®</sup>
    - Purilon Gel<sup>®</sup>
    - Sterigel<sup>®</sup>

# Occlusive/Semi-Occlusive Dressings

## Hydrogels (cont.)

- *Indications for use*
  - Primarily dry "sloughy" or necrotic wounds
  - Lightly exuding wounds
  - Granulating wounds
- *Contraindications*
  - Not suitable for infected or heavily exudating wounds
- *Application of dressings*
  - A secondary dressing is required
  - Dressings should be changed every 1-3 days

# Occlusive/Semi-Occlusive Dressings (cont.)

- Foam Dressings
  - Encourage healing by absorbing exudate, maintaining a moist environment, and providing thermal insulation
- Examples
  - Lyofoam<sup>®</sup>
  - Allevyn<sup>®</sup>
  - Spyrosorb<sup>®</sup>
  - Tielle<sup>®</sup>

# Occlusive/Semi-Occlusive Dressings

## Foam Dressings (cont.)

- *Indications*
  - Exuding, granulating wounds.
- *Contraindications*
  - Not recommended for dry superficial wounds.
- *Application of dressing*
  - A secondary dressing is not normally required
  - Some products can be left in situ for up to seven days.

# Occlusive/Semi-Occlusive Dressings (cont.)

- Alginates
  - In the presence of wound exudate
    - Change from a fibrous structure to a gel
    - Believed to facilitate healing
  - Examples
    - Kaltogel<sup>®</sup>
    - Kaltostat<sup>®</sup>
    - Sorbsan<sup>®</sup>
    - Tegagen<sup>®</sup>

# Occlusive/Semi-Occlusive Dressings

## Alginates (cont.)

- *Indications for use*
  - Moderately to heavy exudating granulating wounds
  - Leg ulcers, acute surgical wounds, sinuses and other cavity wounds (e.g. pressure sores).
- *Contraindications*
  - Very dry wounds or wounds covered with hard necrotic tissue.
  - Should not be used with topical antimicrobial or antibiotic agents
    - may prevent the gelling process from occurring.
- *Application of dressings*
  - Can cause maceration and excoriation of surrounding skin
  - A secondary dressing must be applied to prevent the alginate from drying out.
  - All traces of dressing must be removed from the wound
  - Ideally, these products should be removed after they have been in situ for 3-5 days.

# Debriding Agents



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