

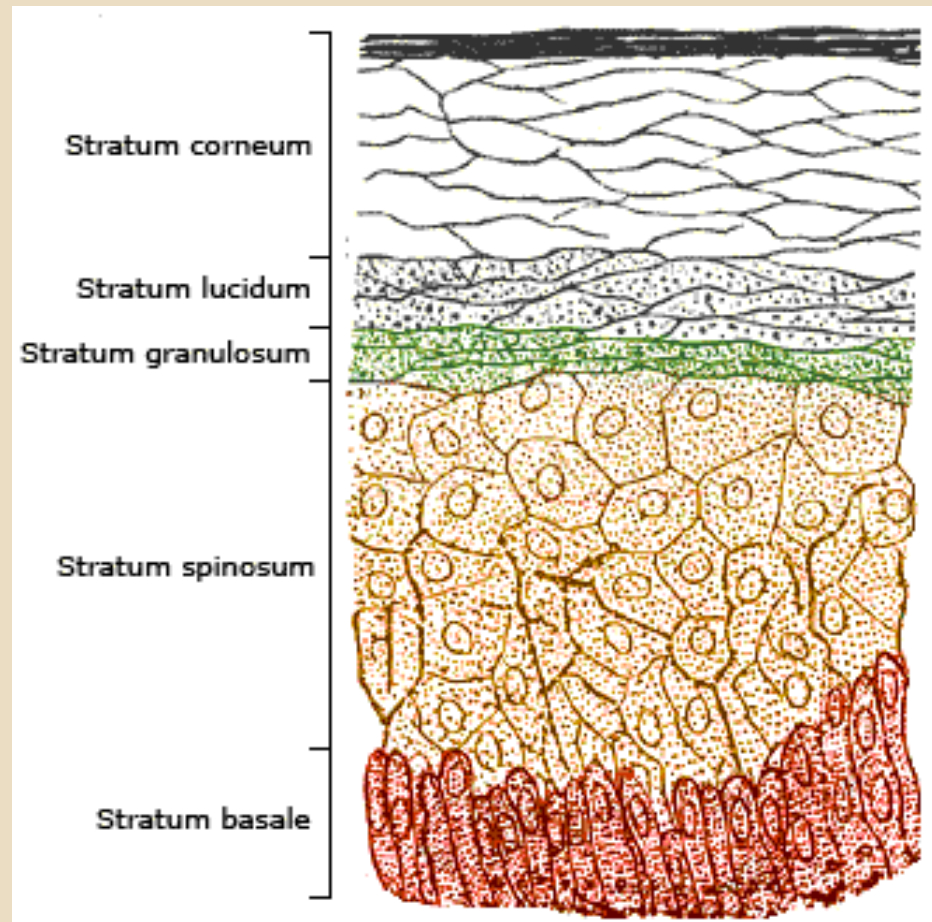
# SKIN CHANGES WOUND HEALING

M. CHALUPOVÁ

# Skin

## □ EPIDERMIS

- stratified squamous epithelium
- ectoderm



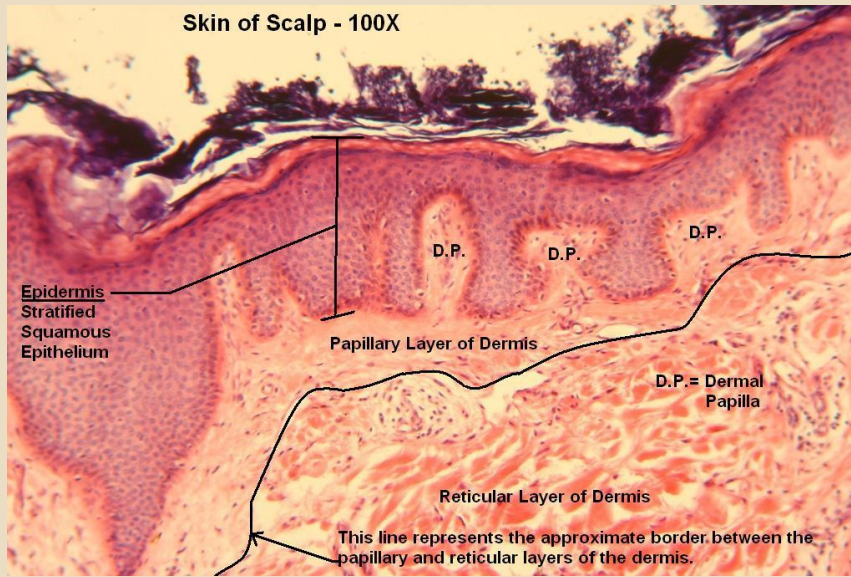
# Skin

## □ DERMIS

- collagenous fibrous tissue from mesoderm
- papillary layer
- reticular layer

## □ SUBCUTANEOUS LAYER

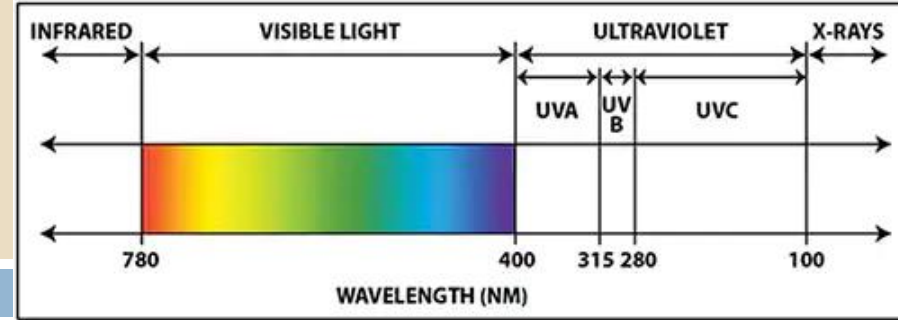
- collagenous fibrous tissue with adipocytes



# Skin

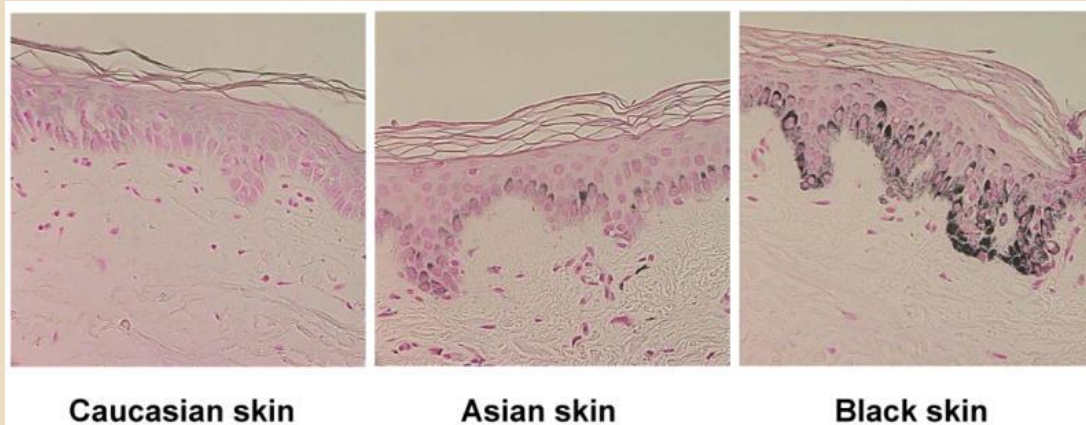
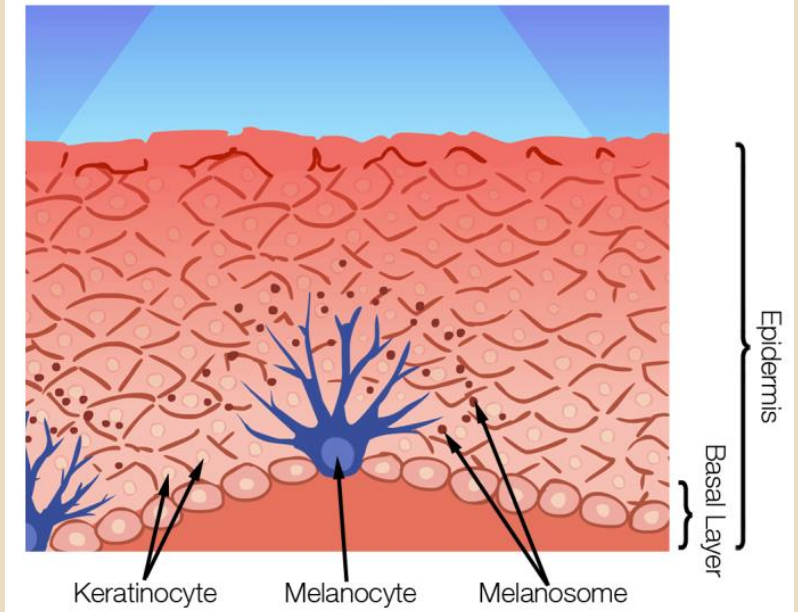
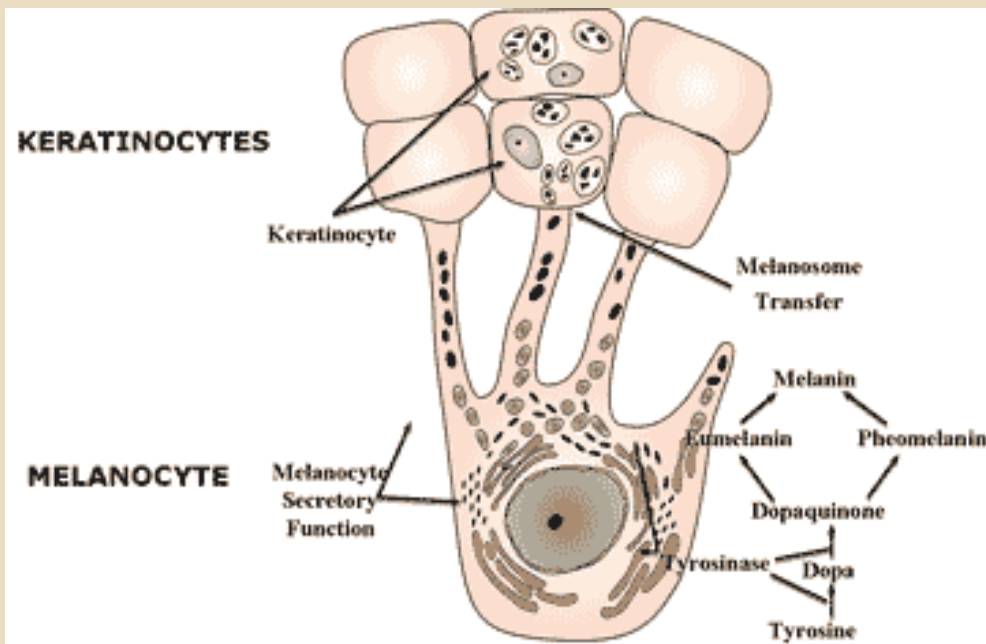
- total area of 1,6 – 2,0 m<sup>2</sup>
- **barrier** between external environment and organism
  - protection against physical, chemical and microbiological agents
- **skin senses**
  - receptors, free nerve endings
- **thermoregulation**
- **metabolism**
  - vitamin D synthesis
  - storage and synthesis of substances (lipids, water)

# UV radiation



- electromagnetic radiation of a shorter wavelength than visible light
- Sun is a natural source
- **UVA** (315–400 nm)
  - indirect DNA impairment based on reactive oxygen species (ROS)
- **UVB** (280–315 nm)
  - **main source of skin damage/tumor development**
  - absorbed by ozone layer
- **UVC** (less than 280 nm)
  - the highest energy, but almost none passage through the atmosphere
  - germicidal lamps

# Melanin



# Skin changes in old age

- **epidermis** becomes thinner and loses its undulating rete pattern
- **stratum corneum** loses its ability to retain water, and cell replacement, barrier function, and wound healing decrease
- **dermis** becomes thinner and loses its elasticity, partly because of a decrease in the number of fibroblasts
- **eccrine sweat glands** shrink and secrete less sweat
- **Langerhans cells** decrease in number, affecting immune responsiveness



# Skin changes in old age

- **wrinkles, furrows, sagging, sunken cheekbones**
- **solar lentigines**
  - ▣ tan or brown macules or patches on sun-exposed areas
  - ▣ benign
- **actinic keratoses**
  - ▣ rough, reddened, on sun-exposed areas
  - ▣ precancerous





# Seborrheic keratoses

- brown hyperkeratotic plaques appearing stuck to the skin surface
- cause is unknown
- therapy is usually not necessary unless they are pruritic, irritated, or inflamed



# Pruritus (itching)

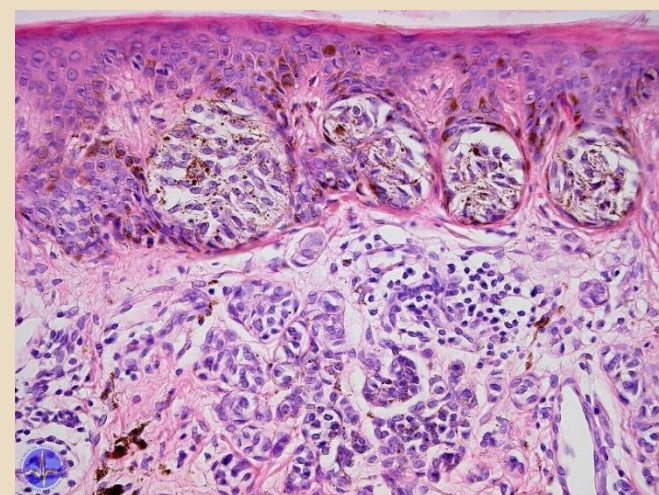
- common condition of advanced age, affecting nearly one half of older adults than 60 years with/without rash
- **chronic renal/hepatic insufficiency**
- **anemia**
- **thyroid gland diseases**
- **diabetes mellitus**
- **malignancy**
- **seborrheic dermatitis**
- treatment is symptomatic
  - ▣ lubrication with emollients, antihistamine drugs, coupled with treatment of any underlying problem
  - ▣ topical/systemic corticosteroids

# Seborrheic dermatitis

- scaly, red plaques on the scalp, face, and central chest
  - ▣ prevalence and severity are higher in patients with neurologic disease (e.g. Parkinson's disease)
- treatment includes shampoo for the scalp
  - ▣ zinc pyrithione, selenium sulfide, or ketoconazole and mild topical corticosteroid



# Pigment naevi





# Basal cell carcinoma (basalioma)

- **most common malignant tumor** from epidermal basal cells
- **UV rays exposition**
- almost **no metastatic potential**
- if progressed **local tissue destruction** could appear

# Basalioma

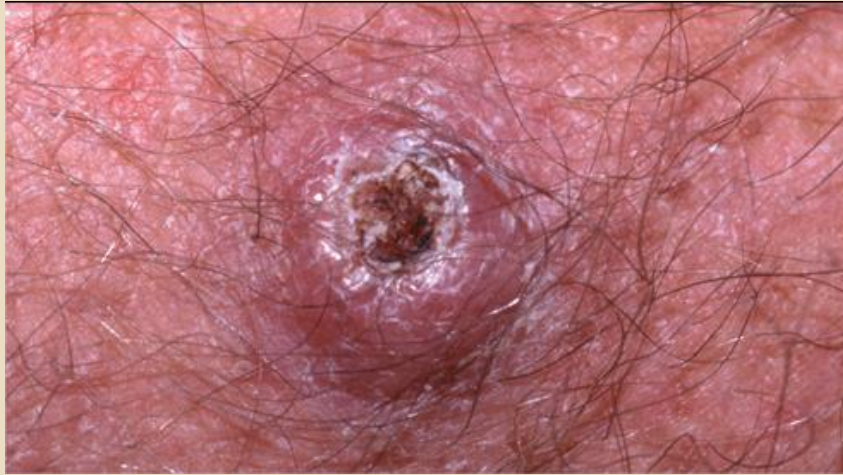




# Spinocellular carcinoma (spinalioma)

- malignant tumor from epidermal squamous cells
- ability of invasive growth and metastases, mainly into the regional lymph nodes
- be aware of white nodules and granulations
  - ▣ in the places of sun light impairment (or X-rays))
  - ▣ in burn scars
  - ▣ chronic inflammatory processes (crural ulcers)

# Spinalioma



# Malignant melanoma (MM)

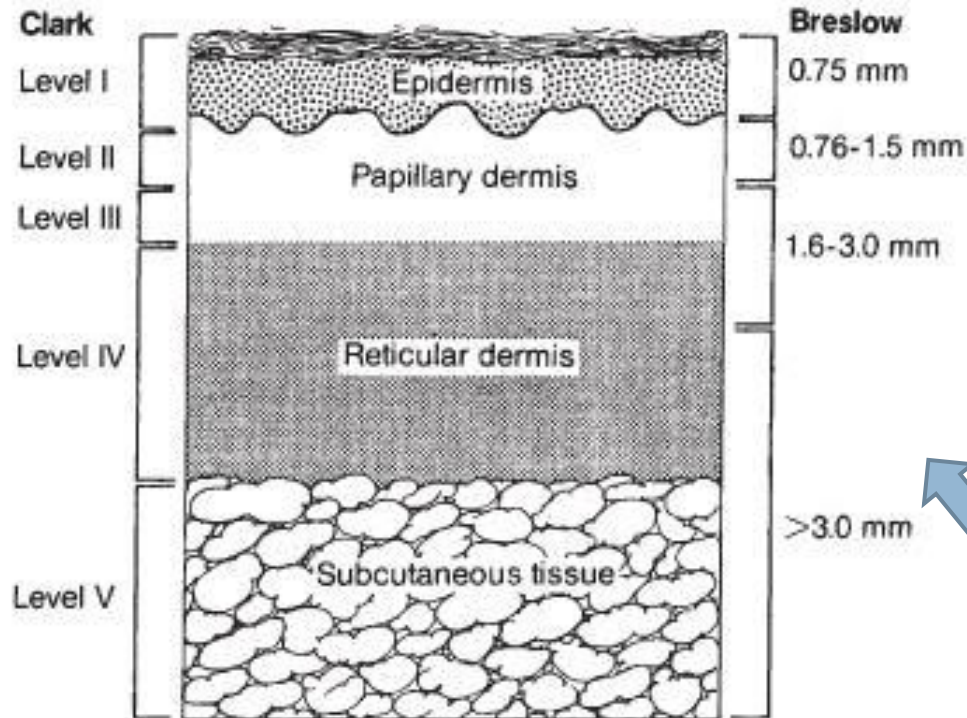
- malignant skin tumor from melanocytes
- skin, eye, oral cavity and genital mucous membranes, meninges
  
- **lentigo maligna melanoma**
- **superficial spreading melanoma**
- **acral lentiginous melanoma**
- **nodular melanoma**

# MM pathophysiology

- etiology is multifactorial
- positive family anamnesis
- phototypes I and II
- UV radiation
  - ▣ UVB (290–320 nm)
  - ▣ UVA (320–400 nm)
- pigment naevus malignization (30 %)
- intact skin (*de novo*)

# Classification and stages MM

## Clark's level



## Breslow's depth

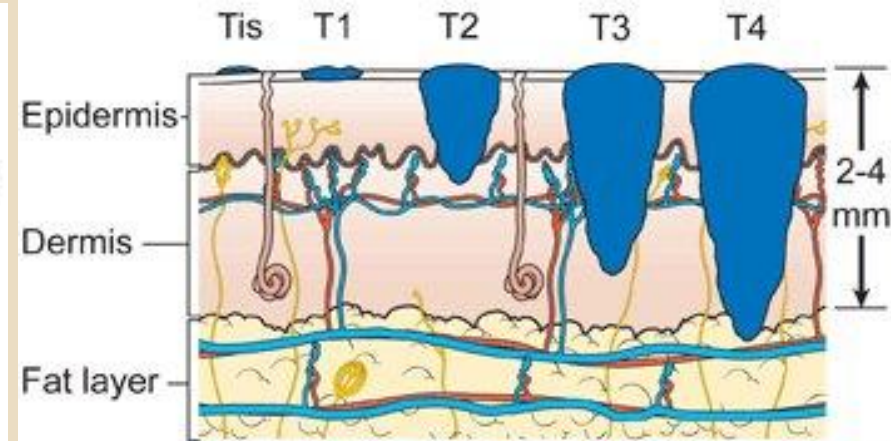


Diagram showing the T stages of melanoma  
Copyright © CancerHelp UK

0,76 mm: 98%  
0,76-1,5 mm: 63%  
above 1,5 mm: 44%

} 5-year survival



# Lentigo maligna melanoma





# Superficial spreading melanoma



# Acral lentiginous melanoma

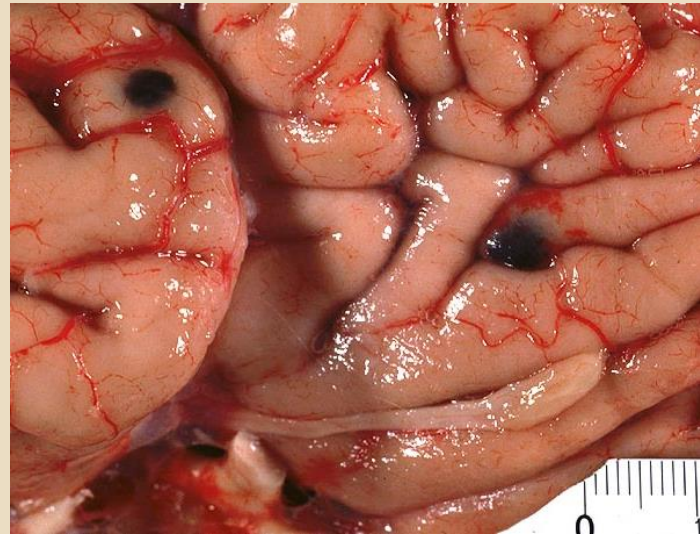
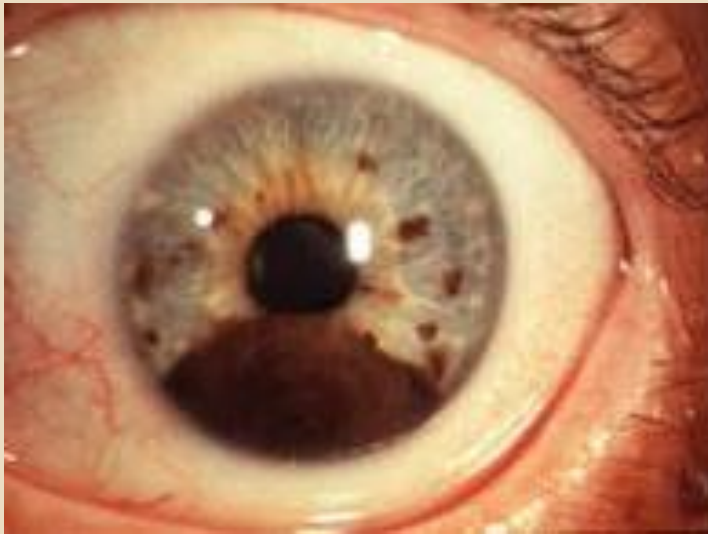




# Nodular melanoma



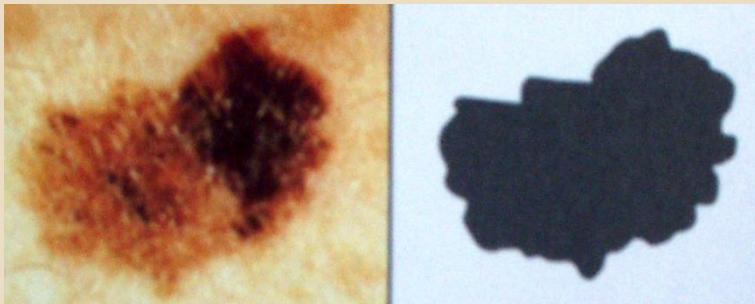
# Malignant melanoma – other locations



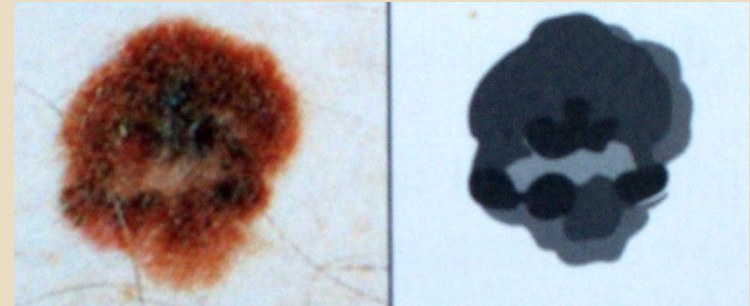


# ABCD rules

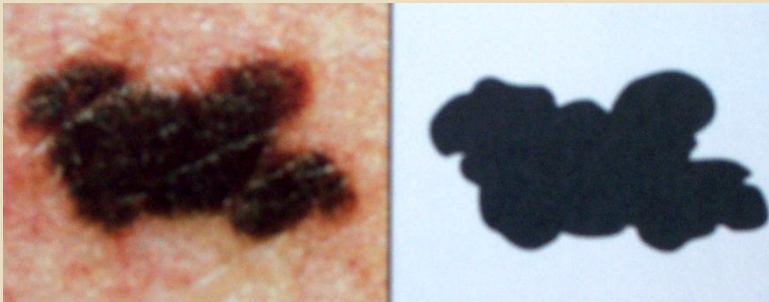
□ **A** (asymmetry)



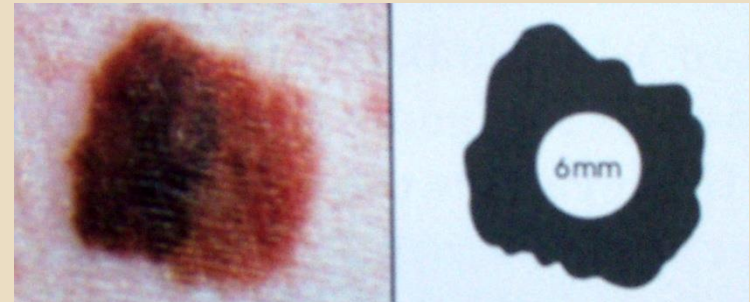
□ **C** (colour)



□ **B** (border)



□ **D** (diameter)

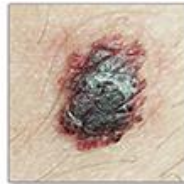


**! pain, itching, redness, bleeding, scarring !**

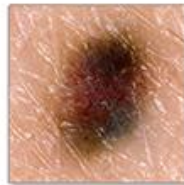
# ABCDE Rules



**A** is for **ASYMMETRY**  
If you draw a line down the middle of the mole, you will find that each half of a melanoma doesn't match in size.



**B** is for **BORDER**  
The edges of early Melanoma are quite likely to be irregular, crusty or notched.



**C** is for **COLOUR**  
Healthy moles are uniform in colour. A variety of colours, especially black, white and/or blue is worrying.



**D** is for **DIAMETER**  
Melanomas are usually larger in diameter than 6 millimetres, although they may be smaller.

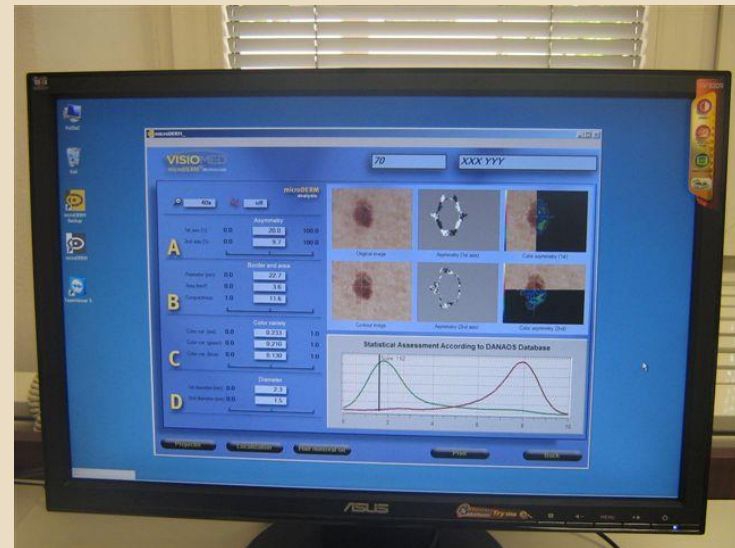


**E** is for **EVOLVING**  
When a mole begins to change in size, shape, colour, or features or develops symptoms like itching, tenderness or bleeding, this points to danger.



# Dermatoscopy

- magnifier with source of light (magnif. 10–20x)
- digital dermatoscopy



# Malignant melanoma metastases

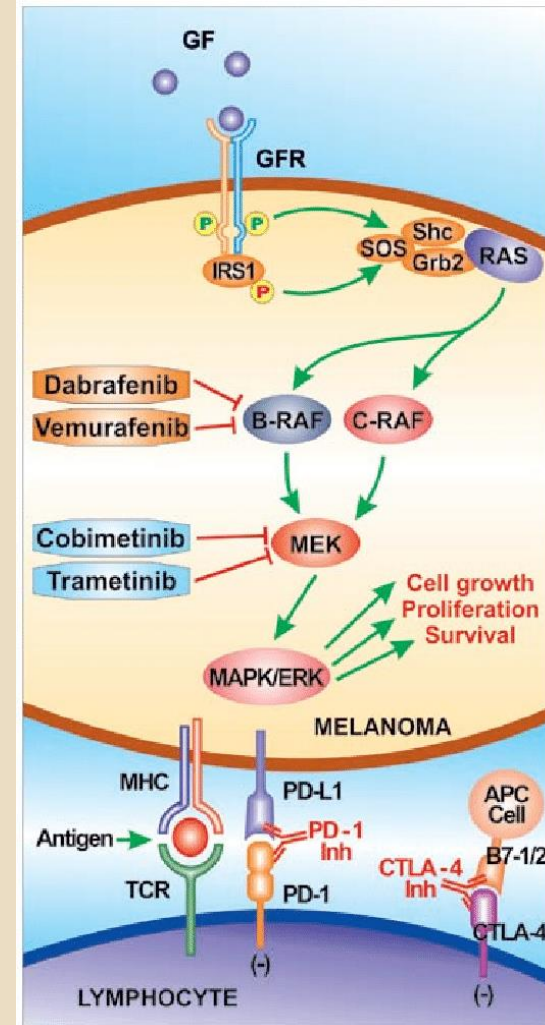


# MM therapy

- **surgery** (tumor excision + protective edge)
- **radiotherapy**
- **immunotherapy** (IFN- $\alpha$ , IL-2)
- **cryotherapy**
- **therapy with CO<sub>2</sub> laser**
- **isolated limb perfusion with cytostatic drugs**
  
- **biological therapy**

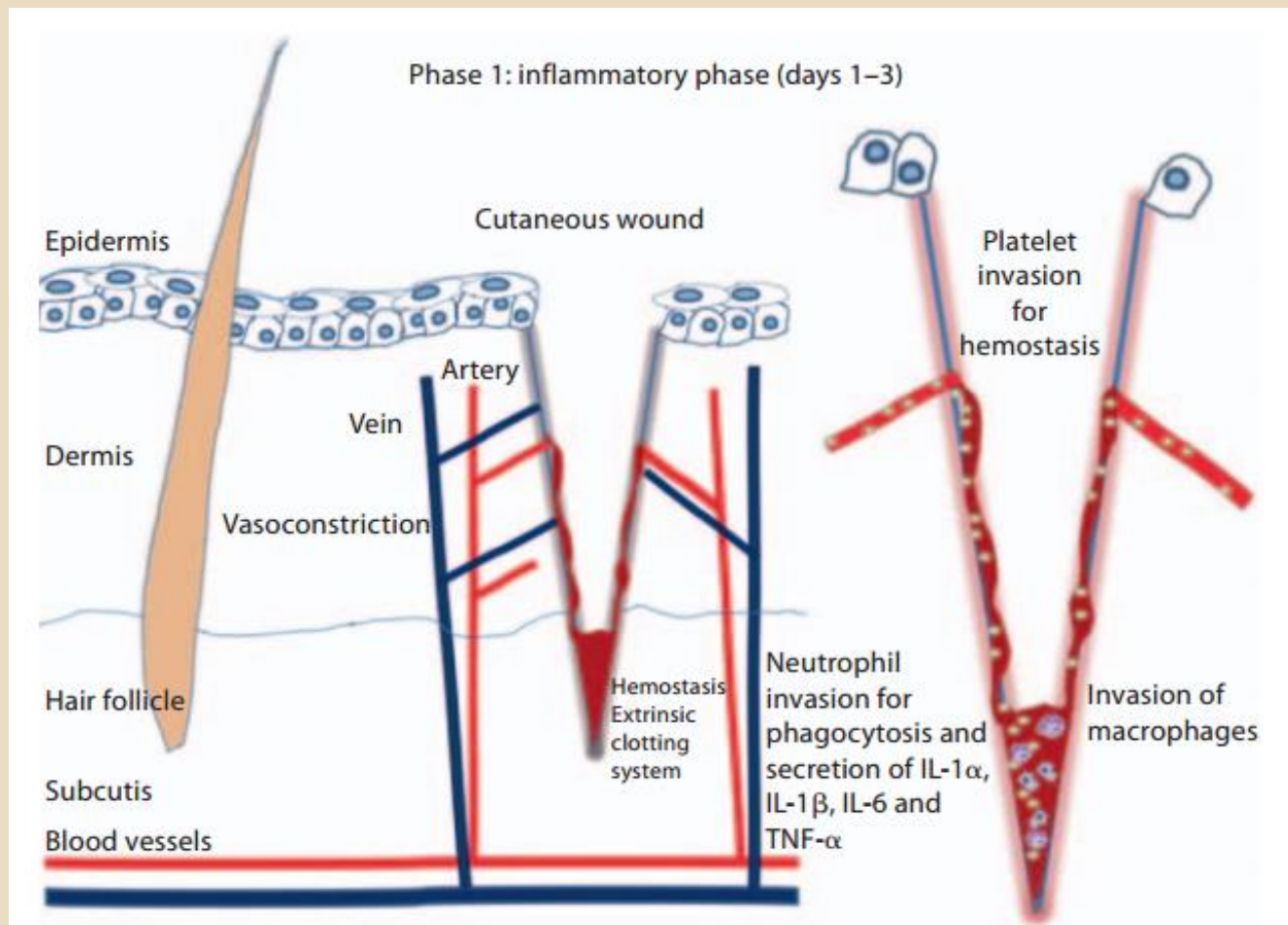
# MM biological therapy

- **BRAF-kinase inhibitors**
  - ▣ vemurafenib, dabrafenib
- **MEK-kinase inhibitors**
  - ▣ cobimetinib, trametinib
- **immune check-points inhibitors**
  - ▣ **anti CTLA4** (*cytotoxic T lymphocyte associated antigen-4*)
    - ipilimumab
  - ▣ **anti PD-1 /PD-L1** (*programmed death receptor/ligand*)
    - nivolumab, pembrolizumab



# Wound healing

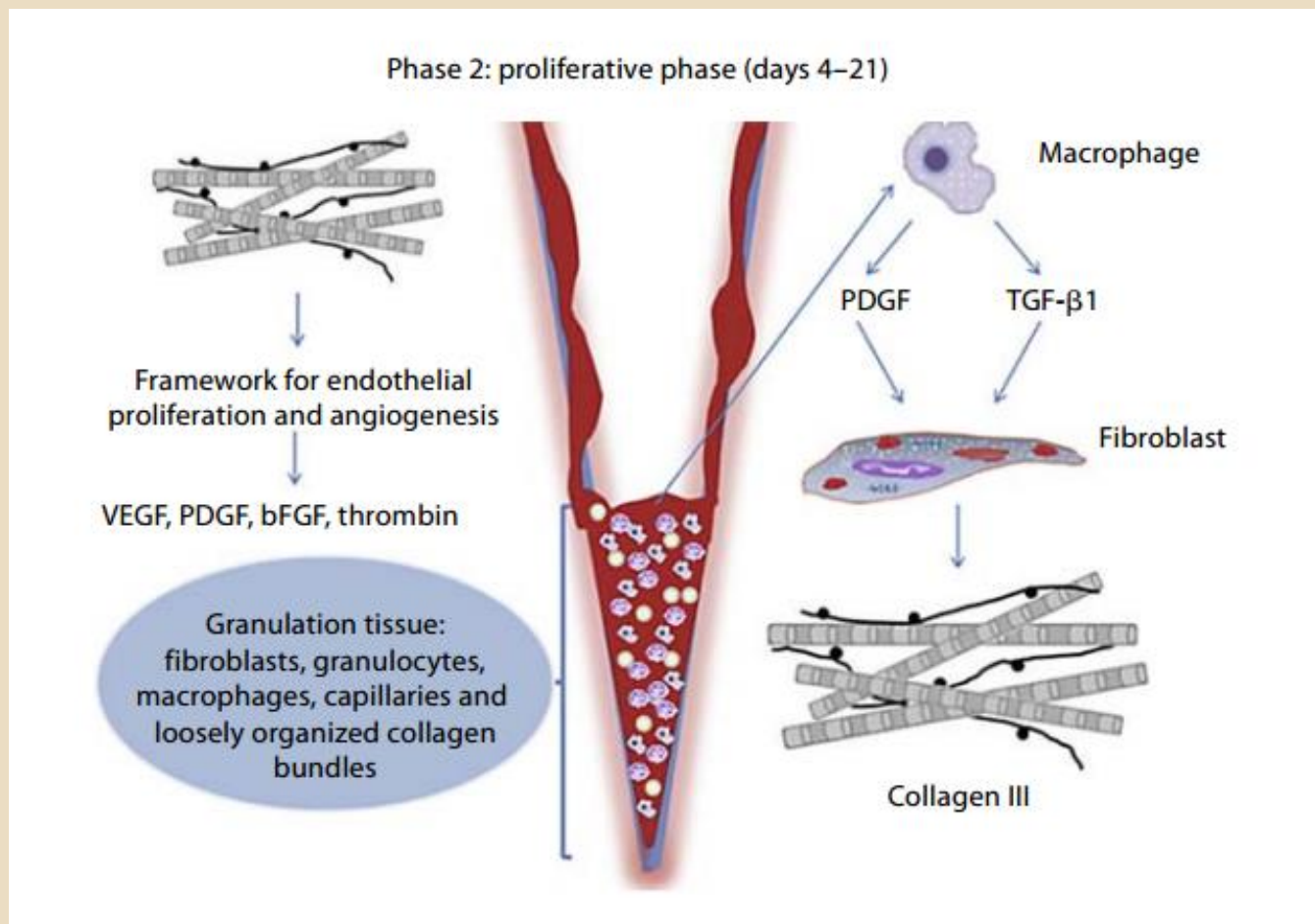
## □ inflammatory phase (1–3 days)





# Wound healing

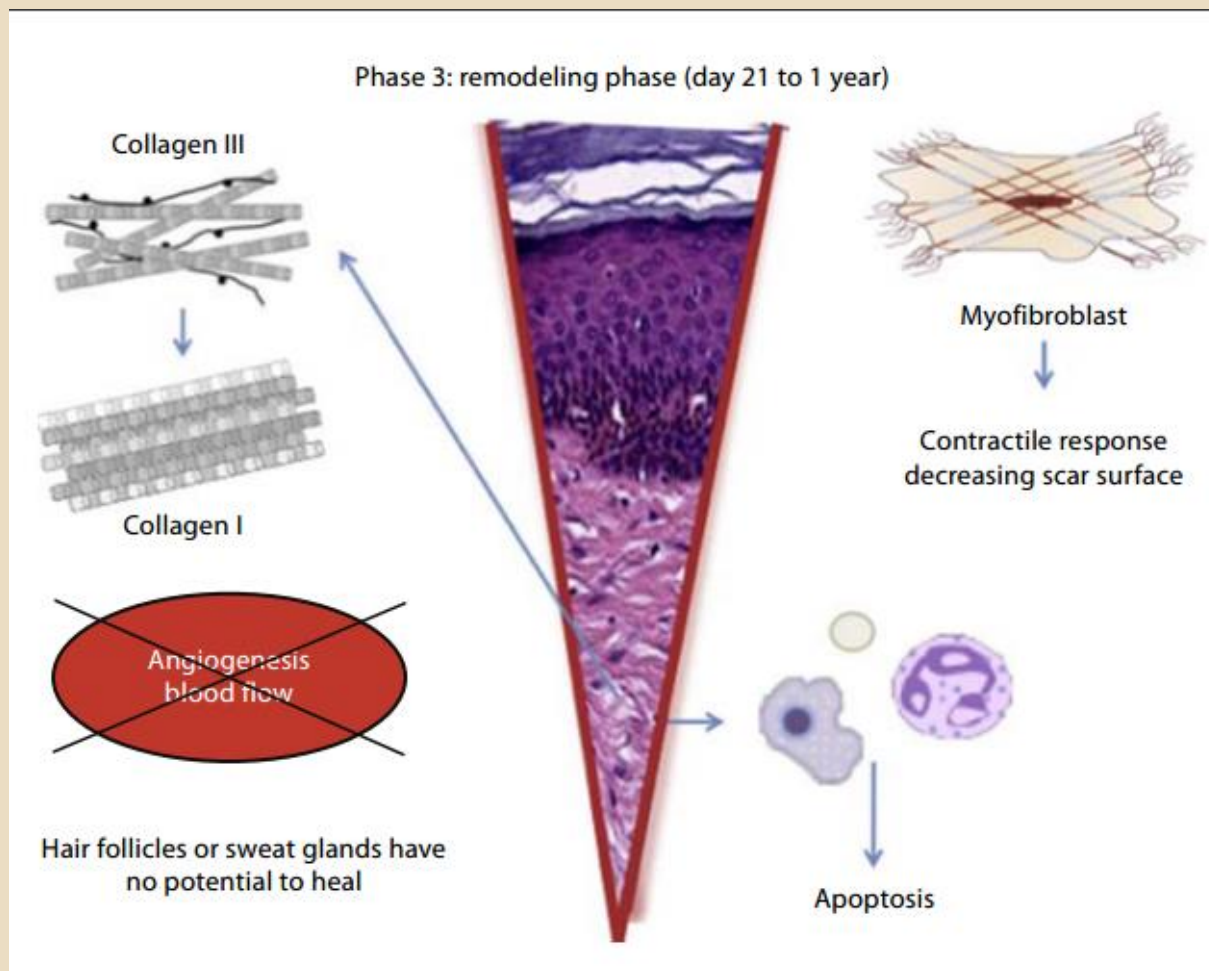
## □ proliferative phase (4–21 days)





# Wound healing

## □ remodeling phase (21 days–1 year)



# Stasis dermatitis

- 7% of older adults, usually the obese
- heaviness and swelling in the feet, worsening with standing and progressing through the day
- followed by the **dermatitis**
  - scaly, red, edematous plaques on the feet, ankles, calves, and shins
  - result of vascular insufficiency or venous hypertension
  - secondary ulcer can follow



# Leg ulcers

- **venous insufficiency**
- **arterial insufficiency**
- **neuropathy**
  - ▣ **diabetes mellitus**
  
- **trauma**
- **neoplasia**



# Leg ulcers treatment

- **compression stockings**
- **leg elevation**
- **reduction of prolonged standing**
- **pinch skin graft**
- **wound healing dressings**
  - **dry healing**
  - **moist healing**
    - moist environment help epithelial cells move and improve healing
    - hydrogels, hydrocolloids, polysaccharides, alginates, foams, laminates

# Decubitus ulcers (pressures sores)

- ❑ debilitated elderly patients, esp. hospitalized or bedridden
- ❑ follow friction, pressure, or shearing forces over bony prominences
  - ❑ **sacral region**
  - ❑ **heels**
- ❑ risk factors include immobility, fecal/urinary incontinence, diabetes mellitus, glucocorticoid use, malnutrition
- ❑ surgical débridement
- ❑ wound dressings

