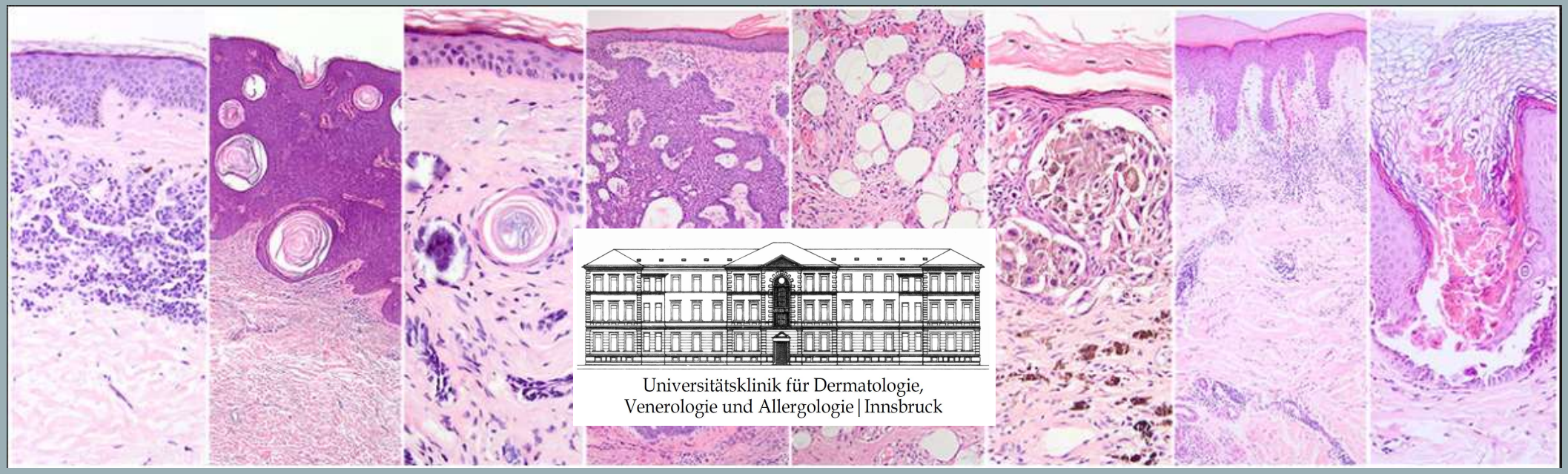
BASISKURS DERMATOHISTOPATHOLOGIE

NINA FRISCHHUT - UNIVERSITÄTSKLINIK INNSBRUCK

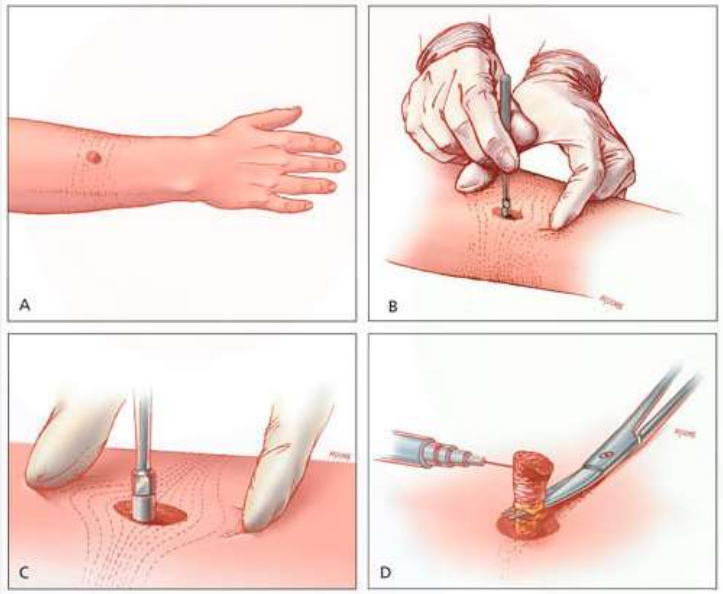


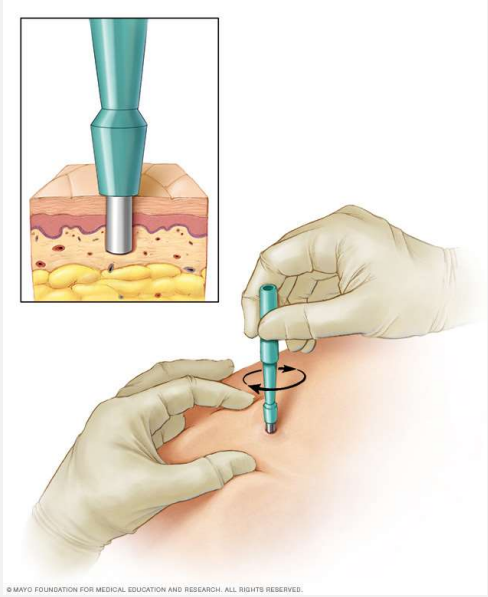
THEMEN

- Biopsien – „woher sie kommen und wohin sie führen“
- Präanalytik – „der Weg im Labor“
- Anatomie - Epidermis/Dermis/Subcutis/Adnexe
- Regionale und altersbedingte Unterschiede
- ABC des Dermatohistopathologen
- Diagnostische Wege

STANZBIOPSIE

- **Haut dehnen**
- **Stanze bis in das Fettgewebe führen**
- **Möglichst vorsichtig den Gewebezylinder anheben und abtragen – kein Druck!**

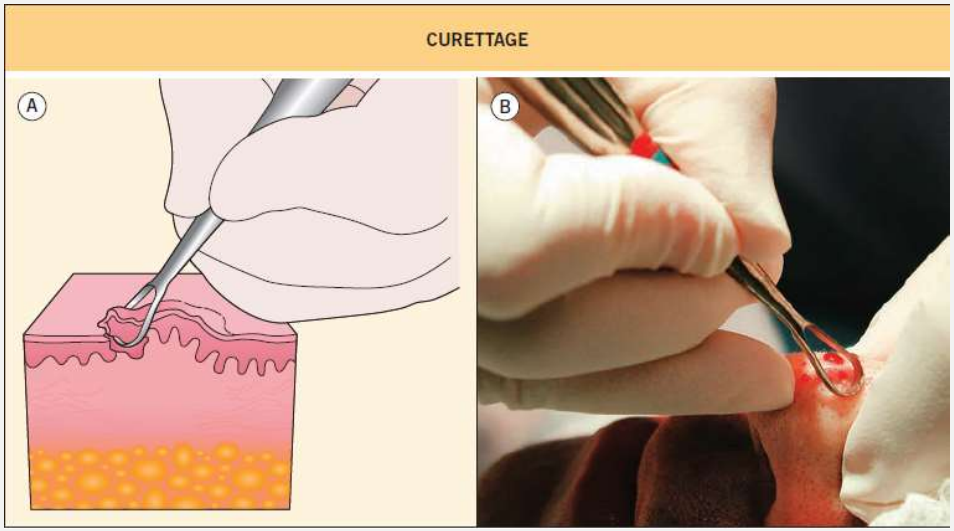


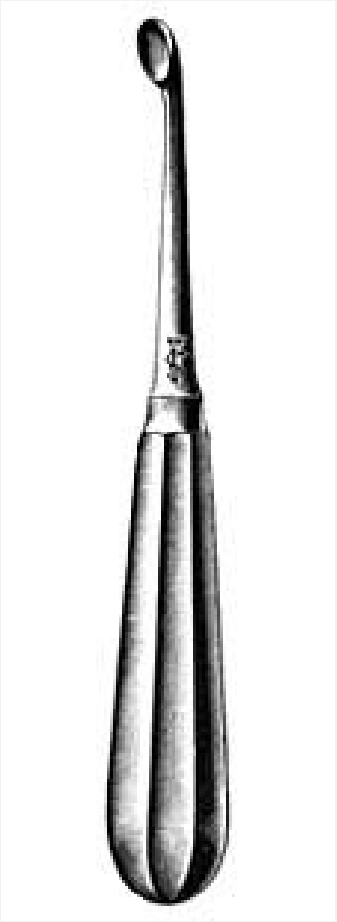


Adapted with permission from Zuber TJ. Punch biopsy of the skin. Am Fam Physician. 2002;65(6):1155–1158

SHAVE-BIOPSIE

- **Erhaltung des Stratum reticulare – bessere Heilung**
- **Skalpell / Ringkürette: Weniger Gewebeschädigung**

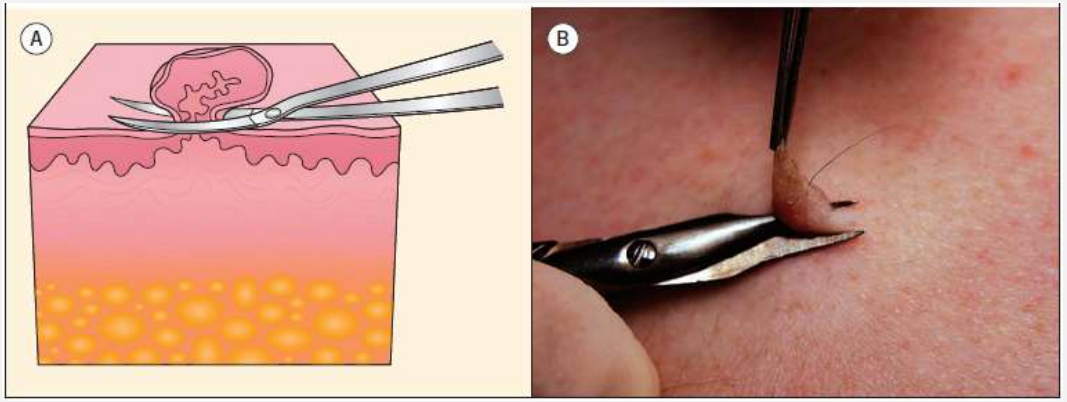




A review of microsampling techniques and their social impact August 2019
•Biomedical Microdevices 21(4); DOI: 10.1007/s10544-019-0412-y

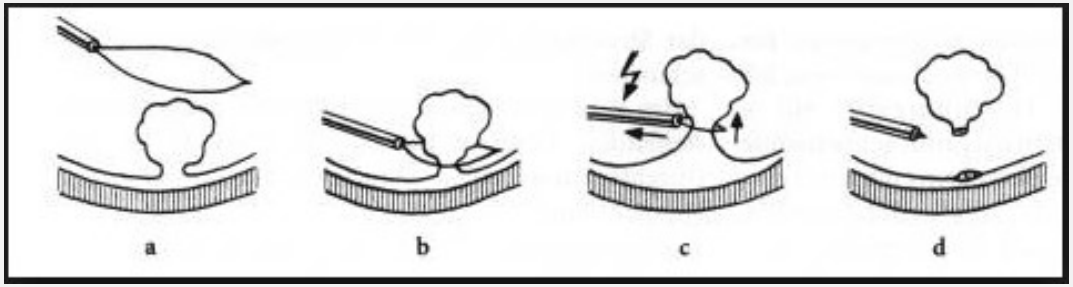
SCHERENSCHLAG UND ELEKTROSCHLINGE

- **Scherenschlag**



- **Elektroschlinge**

Ausgeprägte Artefakte durch Verkochung



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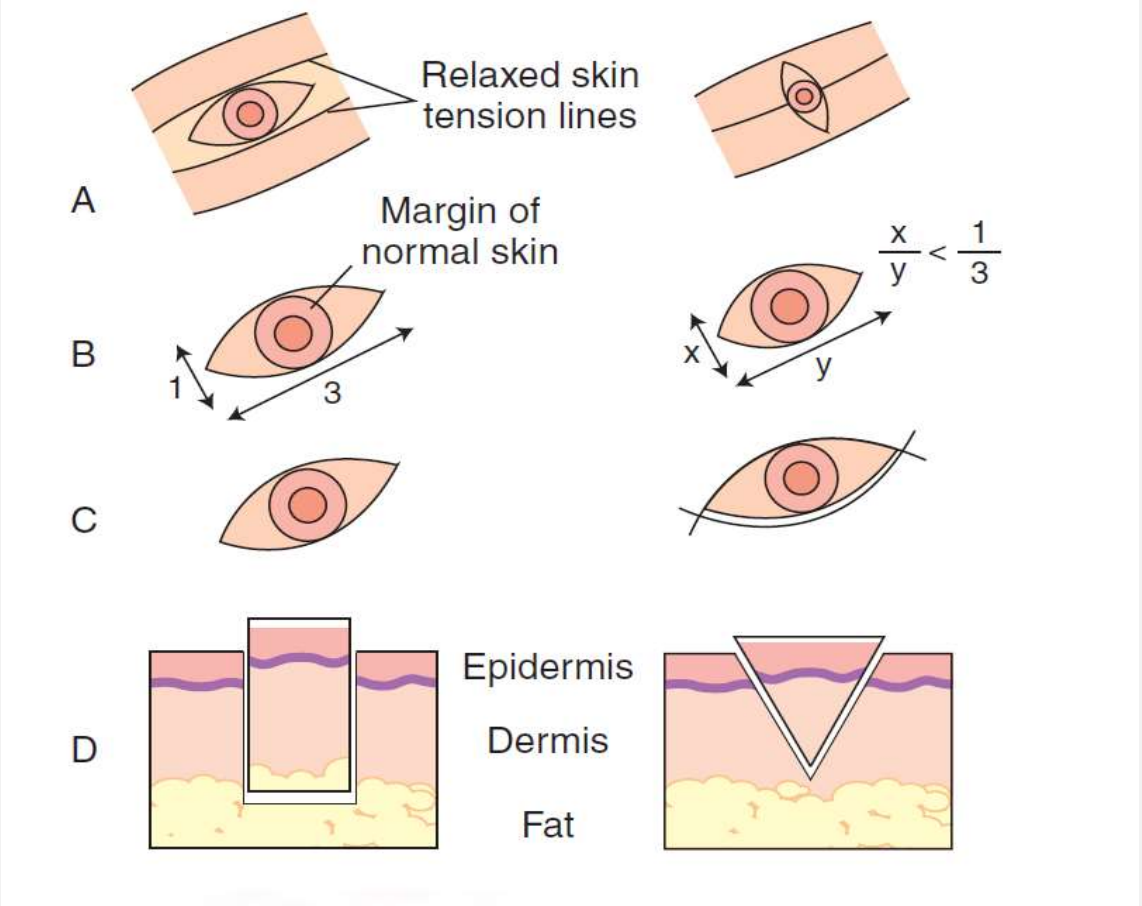
SPINDELEXZISION

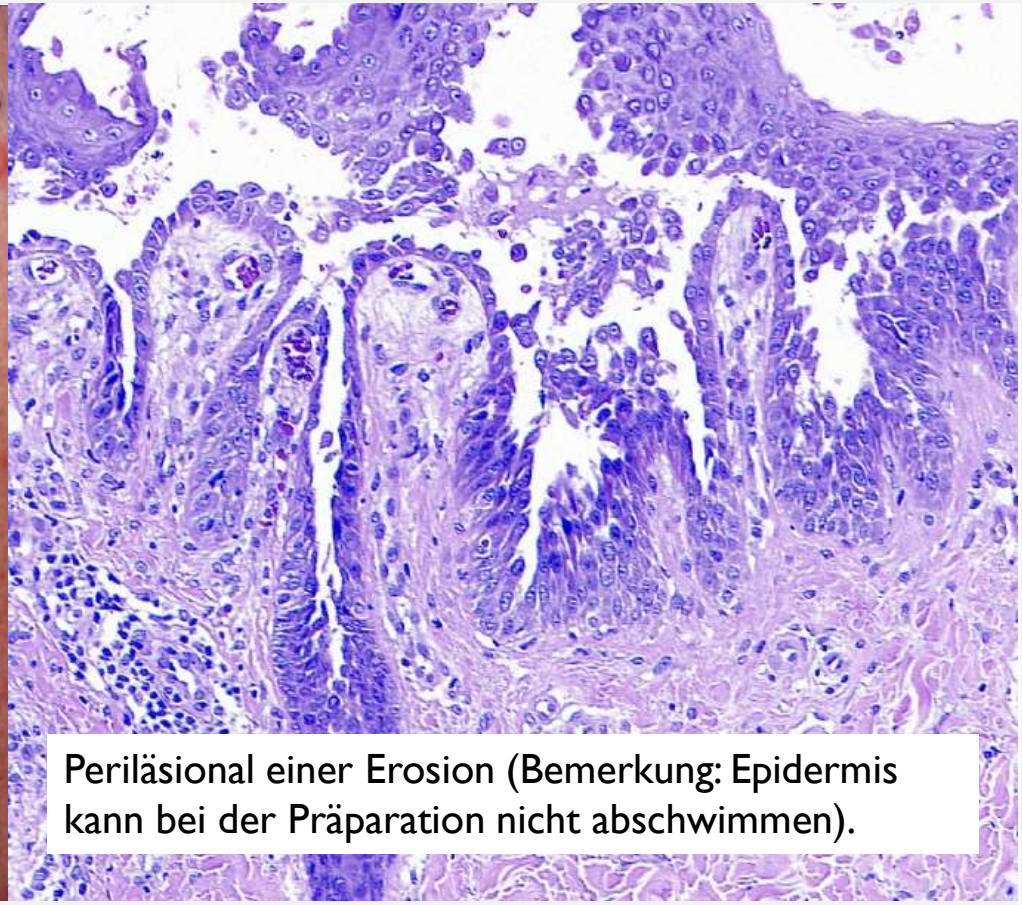
- **Schnittrichtung entlang der Spannungslinien**
- **Skalpell senkrecht halten und bis ins Fettgewebe führen**



WO BIOPSIEREN? BULLÖSES PEMPHIGOID

Für Histologie eine kleine stehende Blase

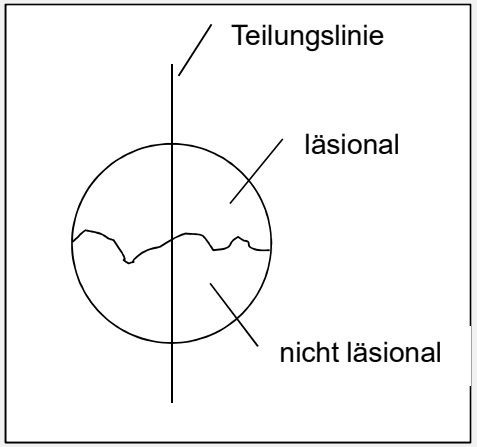
PEMPHIGUS VULGARIS



Periläsional einer Erosion (Bemerkung: Epidermis kann bei der Präparation nicht abschwimmen).

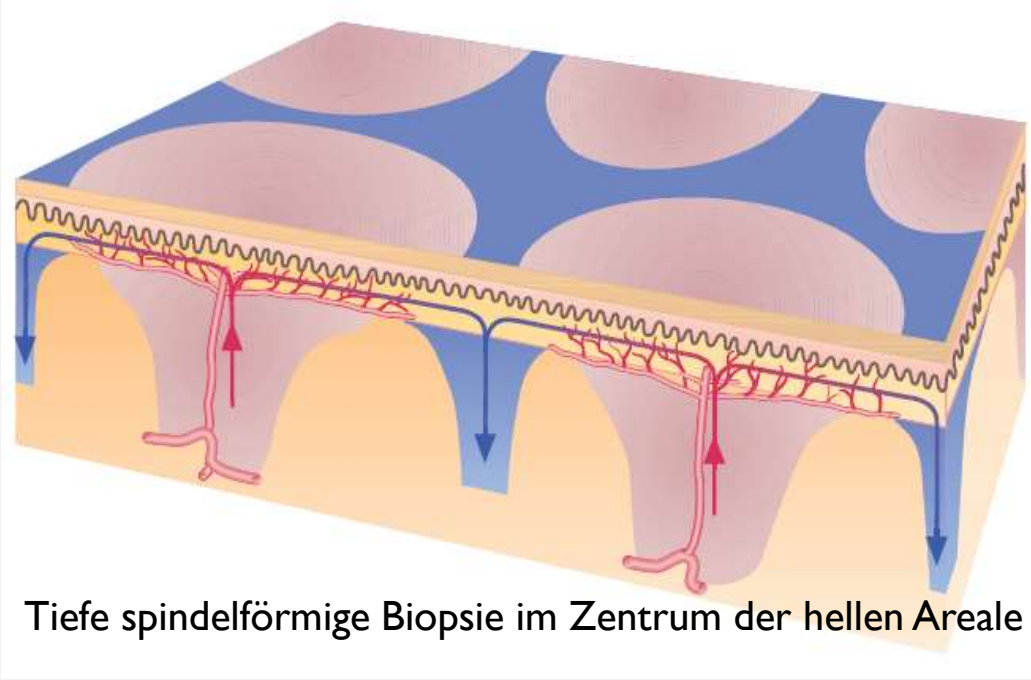
WO BIOPSIEREN? ENTZÜNDLICHE DERMATOSEN

- **PE 4mm zentral des am stärksten entzündeten Bereiches**
- **Keine Einbeziehung gesunder Haut ausser z.B. bei Vitiligo**



Lichen ruber

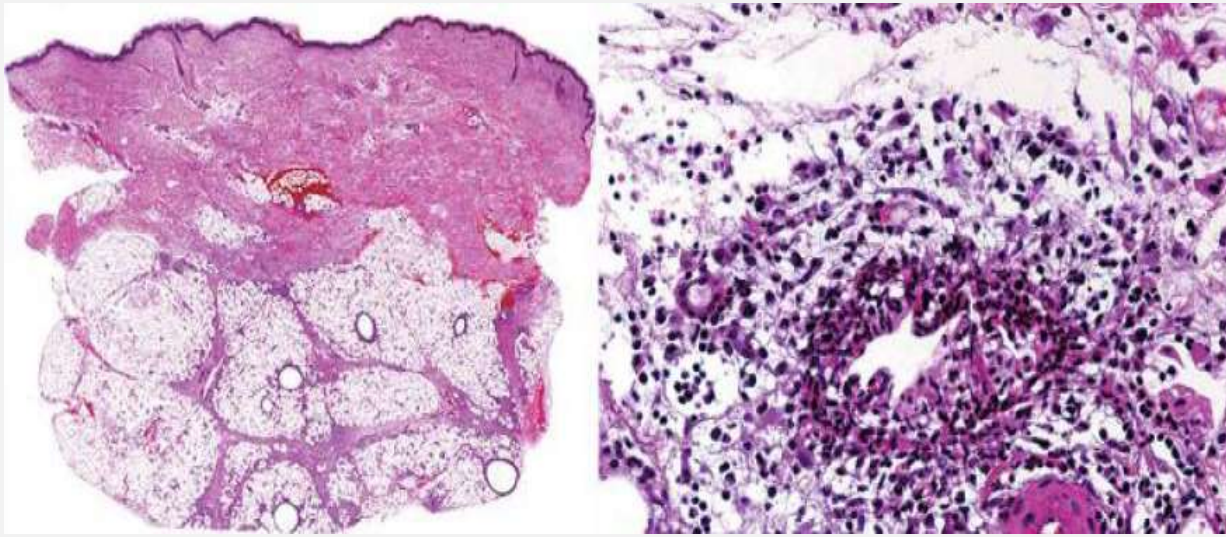
WO BIOPSIEREN? LIVEDO RACEMOSA



Tiefe spindelförmige Biopsie im Zentrum der hellen Areale

WO BIOPSIEREN? PANNIKULITIS

Erythema nodosum



Tiefe spindelförmige Biopsie bis in die Subcutis reichend

WO BIOPSIEREN? ANULÄRE HERDE

Stelle mit stärkstem Erythem bzw. aktivem Randsaum

WO BIOPSIEREN? LYMPHOM

Mycosis fungoides

LC-ATCL

Lymph.-Papulose

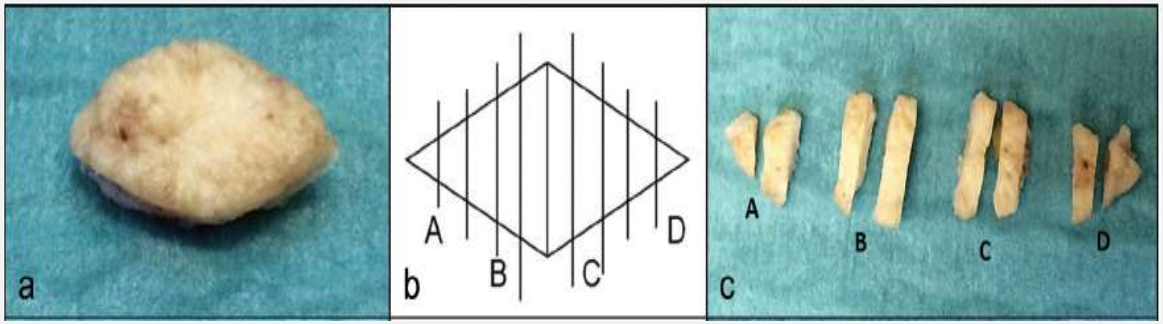
PRÄANALYTIK

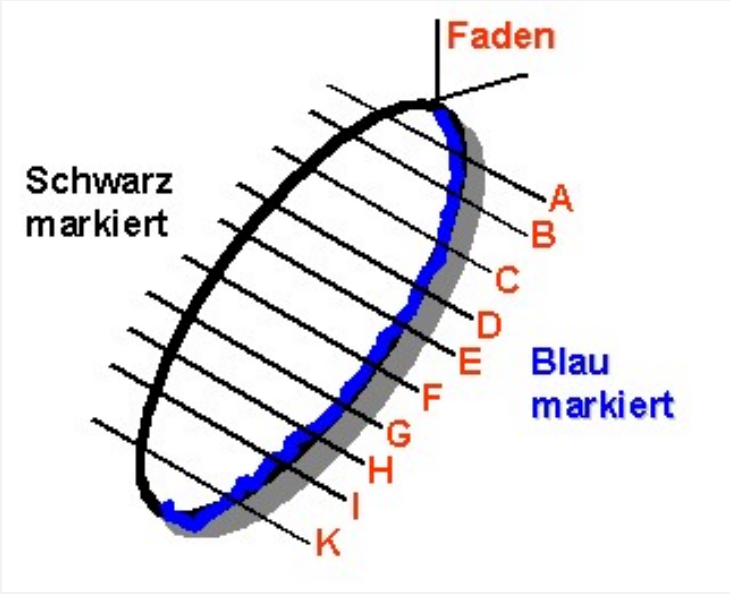
DER WEG INS LABOR: FIXIERUNG DES GEWEBES

- Histologie: 10%iges gepuffertes Formalin (20:1)
- Ein Biopsat pro Transportbehälter
- Versand im Winter: 95%iges Äthanol 1:10
- Kryoschnitte: Artefakte! Verzicht auf Formalinfixierung erhöht Gefahr von Fehldiagnosen!

IM LABOR: ORIENTIERUNG

- Skizze mit Fadenmarkierung bei Exzisionspräparaten





- Stanzen: zentral geteilt und eingebettet

KLINISCHE ANGABE

Verdachtsdiagnose

Entnahmeort der Biopsie

Fadenmarkierung!

Makroskopische Beschreibung und Foto

Evt. Lokaltherapie und systemische Therapie

Resultat vorangegangener Biopsien

FEHLERQUELLEN

Desinfektion mit starkem Druck – Wegreiben der Hornschicht

Zu rasche Injektion des Lokalanästhetikums

Kompression

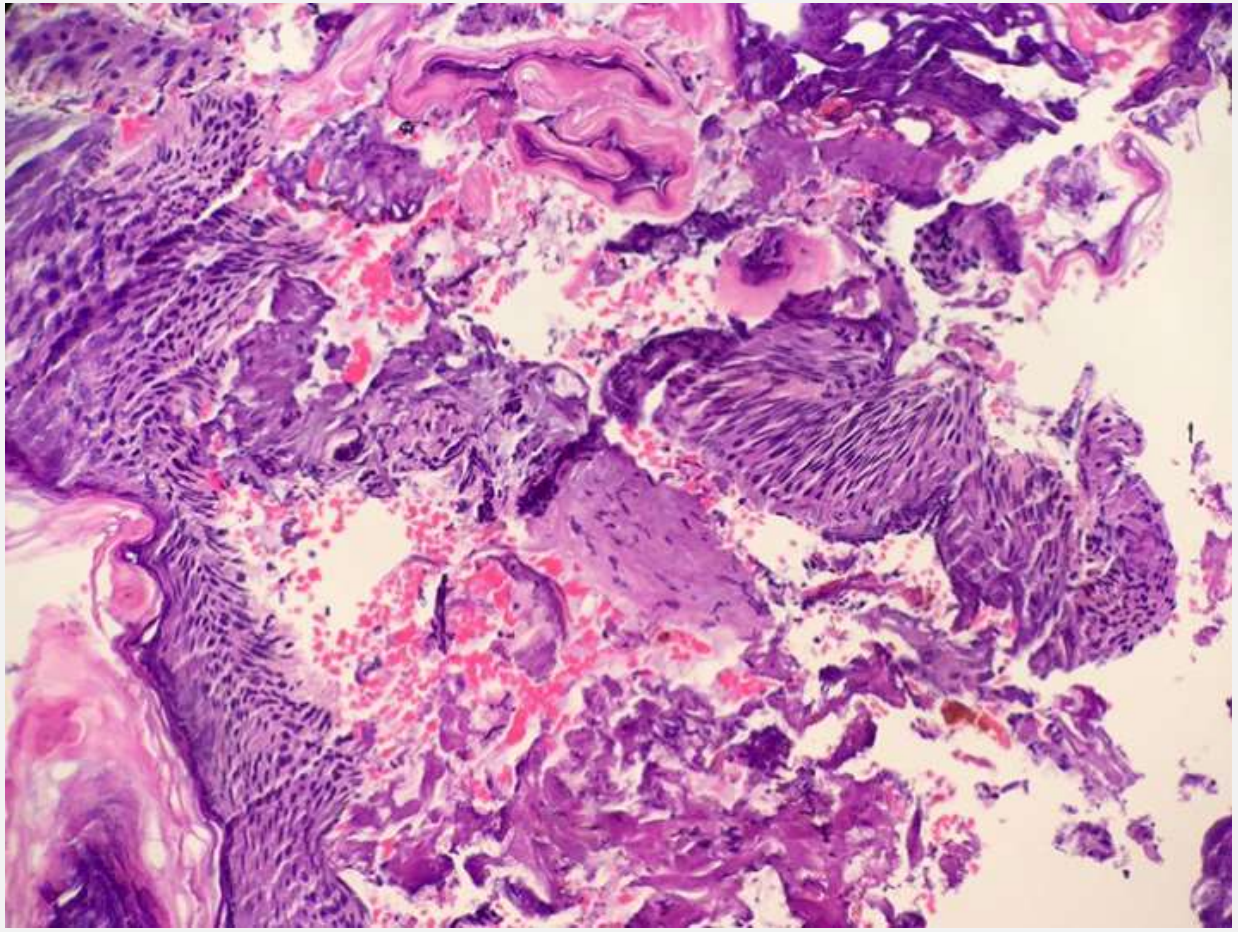
Koagulationsartefakte/Gefrierartefakte

Kaum fixiertes Material

HÜRDEN DER INTERPRETATION

- Klinisch eindeutige Fälle werden selten biopsiert
- Entwicklungsstadium („life of lesion“)
- Vorbehandlung
- Maskierende Lokalisationen (US bei CVI)
- Überlagerung verschiedener Dermatosen („Läuse und Flöhe“)
- Grenzen der Histologie

ARTEFAKTE



PRÄANALYTIK

- Präparation: Fixierung, Entwässern und Entfetten, in Paraffin Einbetten, Schneiden, Entparaffinisierung, Färbung, Eindecken

Dr. George Elgart

PRÄANALYTIK

- Färbungen: Hämotoxylin-Eosin, Eisen, Alcian, Masson, Goldner, van Gieson Elastika-Färbungen: Orcein bzw. Resorcin-Fuchsin…, Fluoreszenz-in-situ-Hybridisierung (z.B. HPV)
- PCR (Klonalitätsanalyse, HPV, …)
- Molekulargenetik: Translokationsanalyse (Sarkome), BRAF-, C-Kit-, NRAS-Mutationen bei MM

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ANATOMIE

SCHICHTEN AUFBAU

4 Schichten der Epidermis

Stratum basale
Stratum spinosum
Stratum granulosum
Stratum corneum
(evt Stratum lucidum)

Dr. George Elgart

SCHICHTEN AUFBAU

4 Schichten der Epidermis

Stratum basale
Stratum spinosum
Stratum granulosum
Stratum corneum
(evt Stratum lucidum)

Dermis

Papilläre Dermis
Retikuläre Dermis

Dr. George Elgart

SCHICHTEN AUFBAU

4 Schichten der Epidermis

Stratum basale
Stratum spinosum
Stratum granulosum
Stratum corneum
(evt Stratum lucidum)

Dermis

Papilläre Dermis
Retikuläre Dermis

Subcutis

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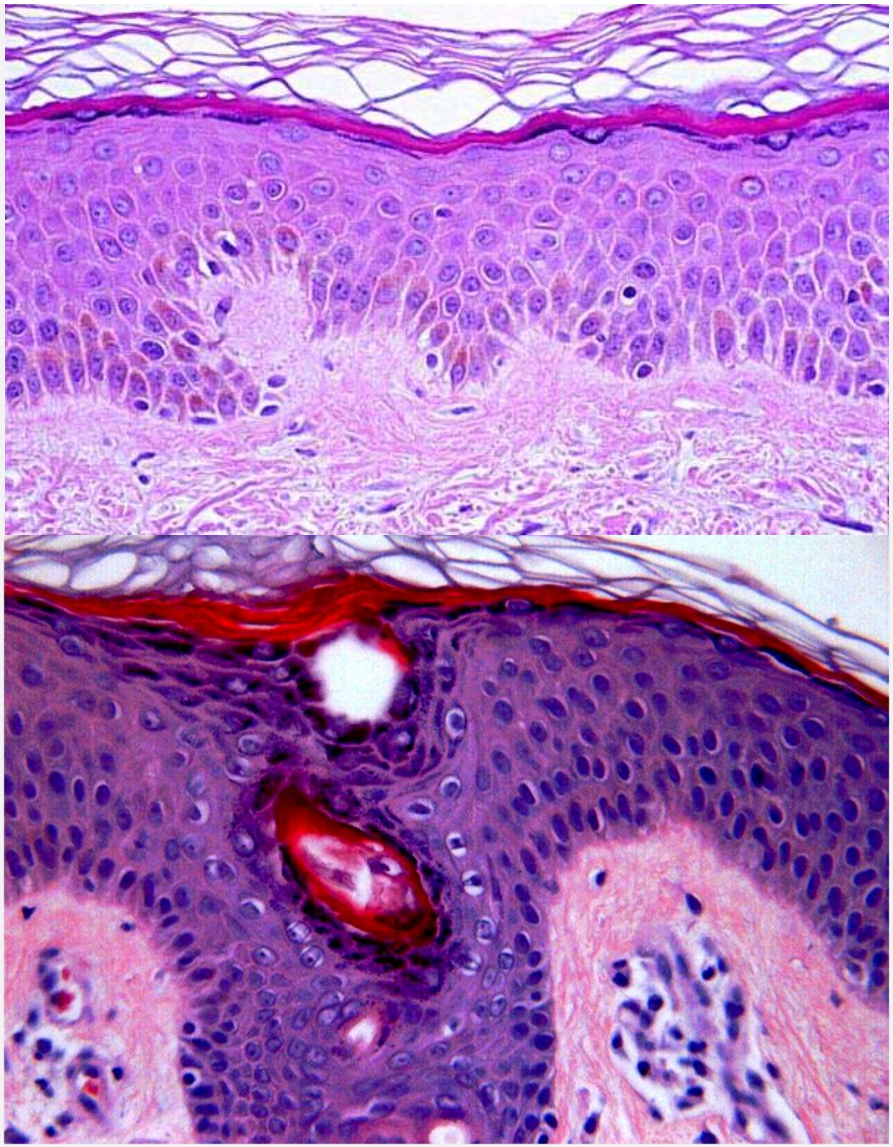
EPIDERMIS AUFBAU

- Stratum basale

einschichtig isoprismatische Zellen, die direkt auf der BMZ sitzen

eine Gruppe von Stammzellen befindet sich in der Bulge-Region im oberen Drittel des Haarfollikels am Ansatz des M. arrector pili



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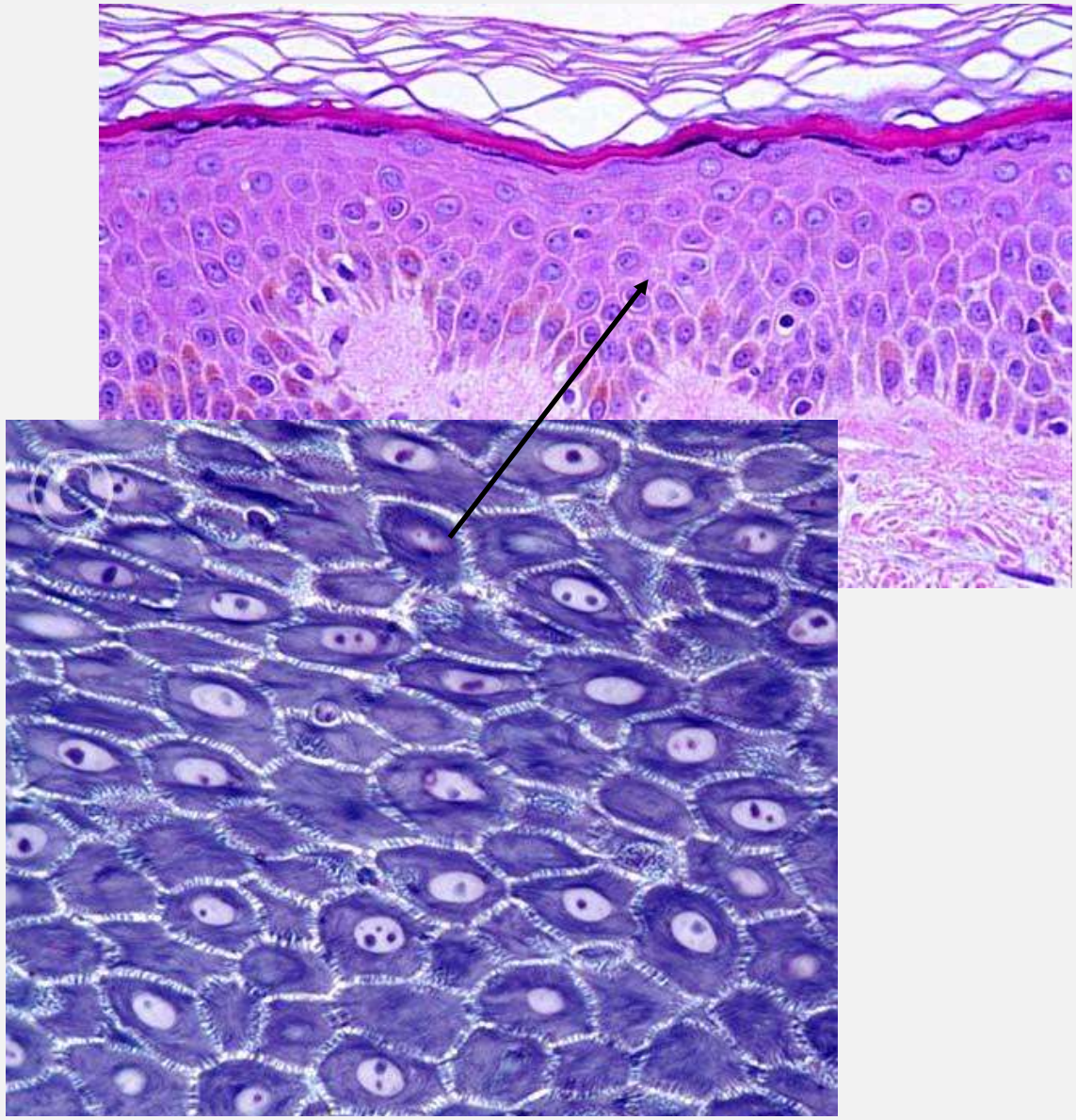
EPIDERMIS AUFBAU

- Stratum spinosum

2-5 Schichten, präparationsbedingte Schrumpfung der Keratinozyten (Desmosomen), erste Schritte der Verhornung



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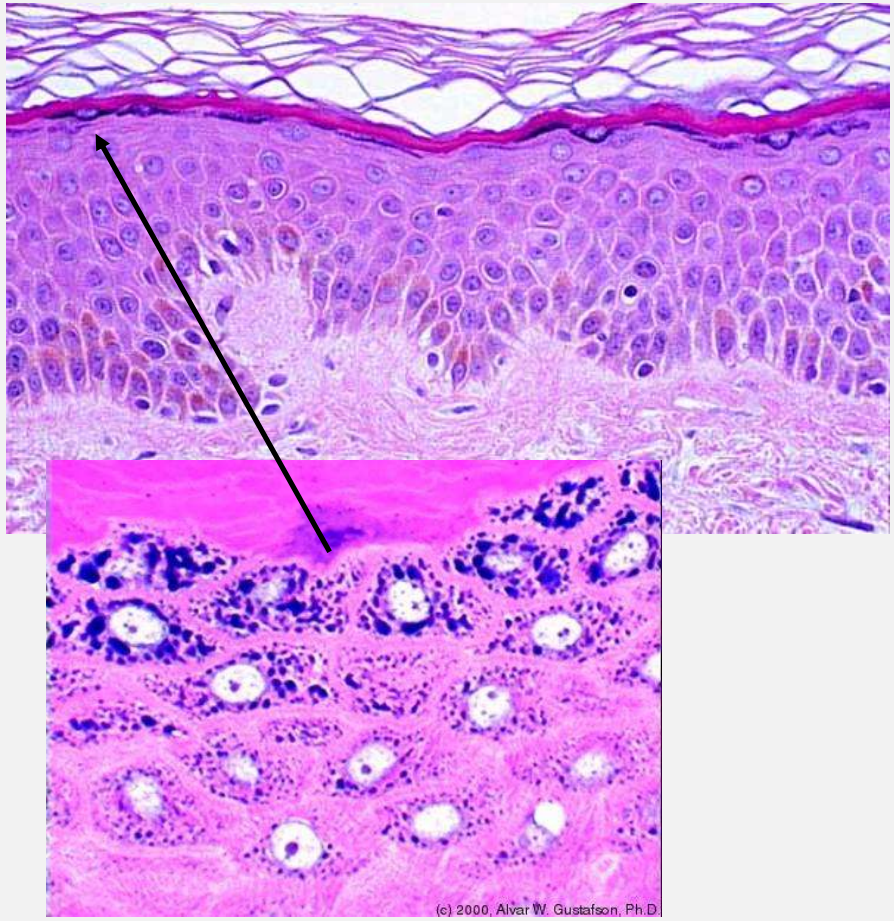
EPIDERMIS AUFBAU

- Stratum granulosum
  basophile Keratohyalingranula (Zytokeratine, Loricrin, Filaggrin,…)



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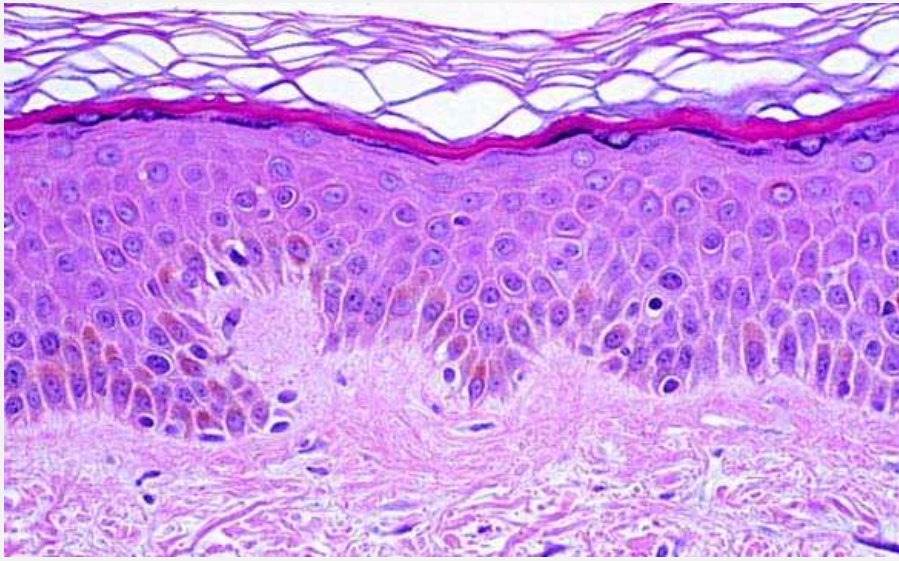
EPIDERMIS AUFBAU

- St.basale: Stammzellen, Mitosen
- St.spinosum: präparationsbedingte Schrumpfung der Keratinozyten (Desmosomen)
- St.granulosum: basophile Keratohyalingranula (Loricrin, Filaggrin,…)

- Stratum corneum
  lamellierte kernlose Korneozyten,
  präpartionsbedingtes Korbgeflecht -
  Korneozyt ->Desquamation
  (Hand/Fuß: dick und kompakt – Stratum lucidum)



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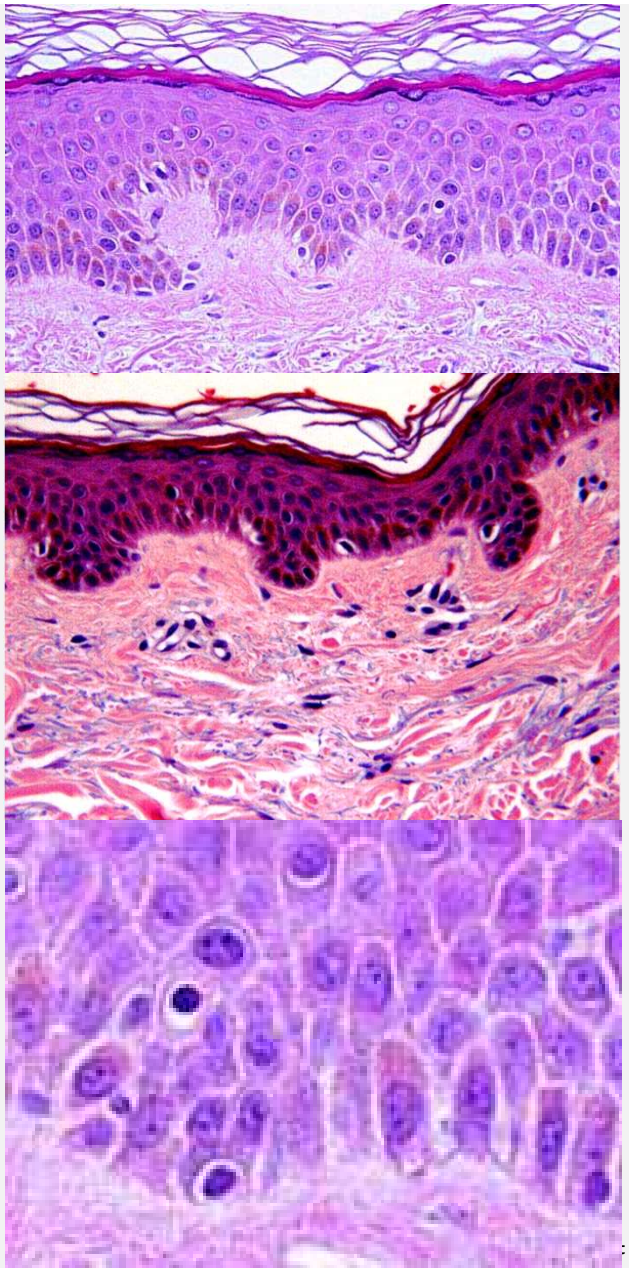
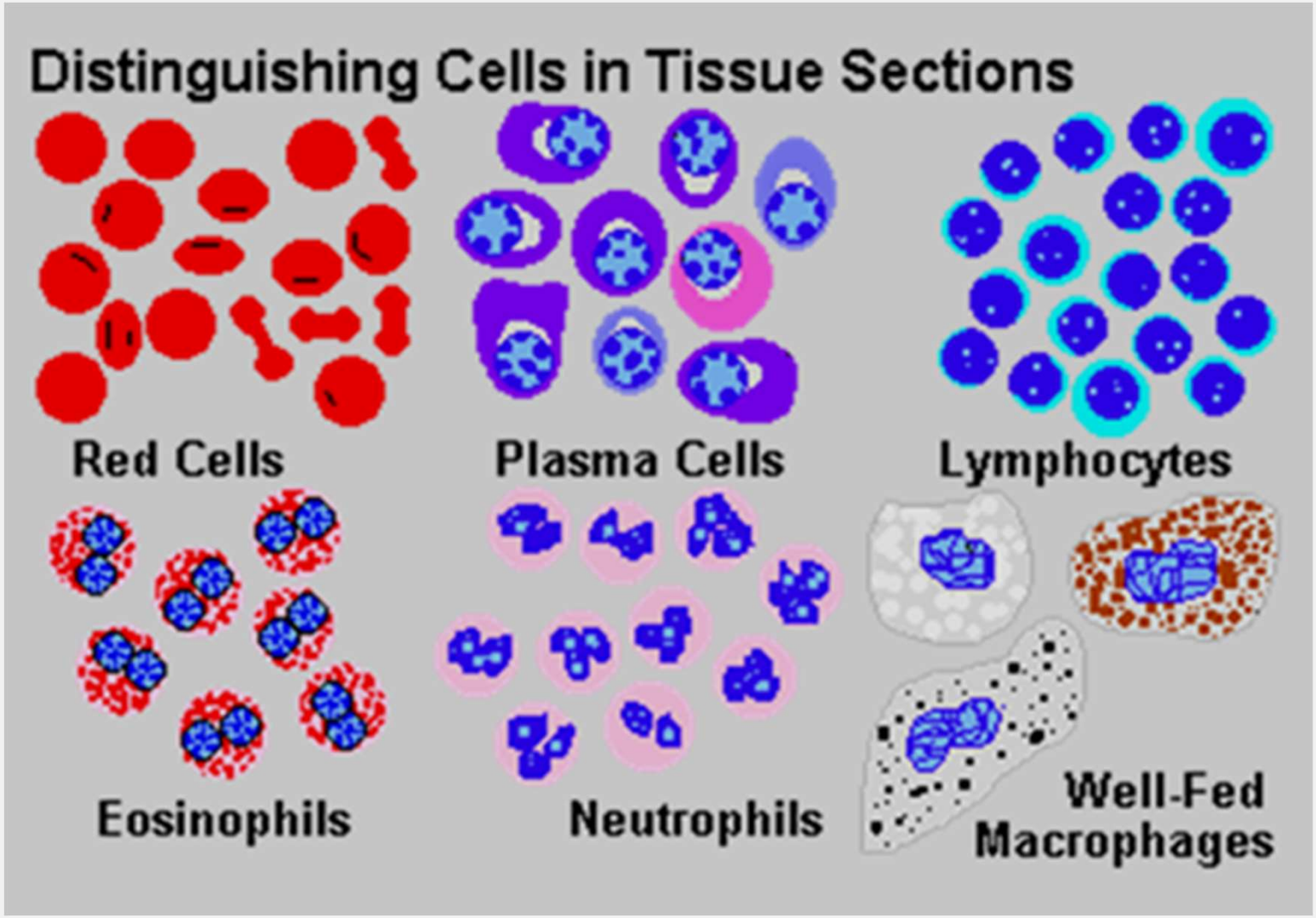
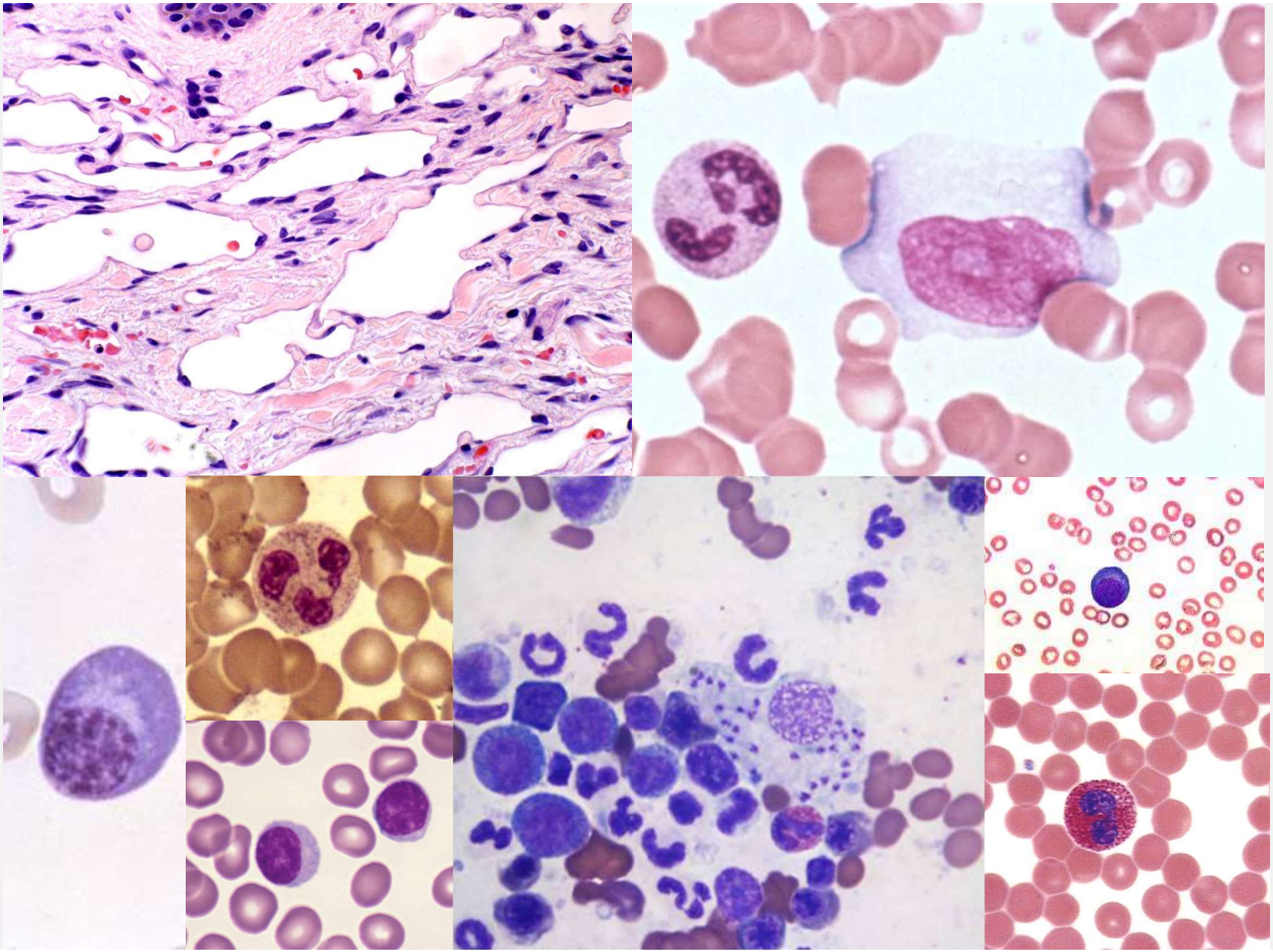
EPIDERMIS AUFBAU

- Keratinozyten (ca. 90%)
- Melanozyten
  - Basalzellschicht (1:10)
  - Keine Desmosomen
  - Dunkler Zellkern mit hellem Hof (präparationsbedingte Schrumpfung des Zytoplasmas)
- Langerhans Zellen
  - Suprabasal, mittleres St.spinosum - AG präsentierende Zelle
  - Hellzellige Elemente
- Merkelzellen
  - Vor allem in der Basalzellschicht, Tastempfindungen – basal afferentes Axon



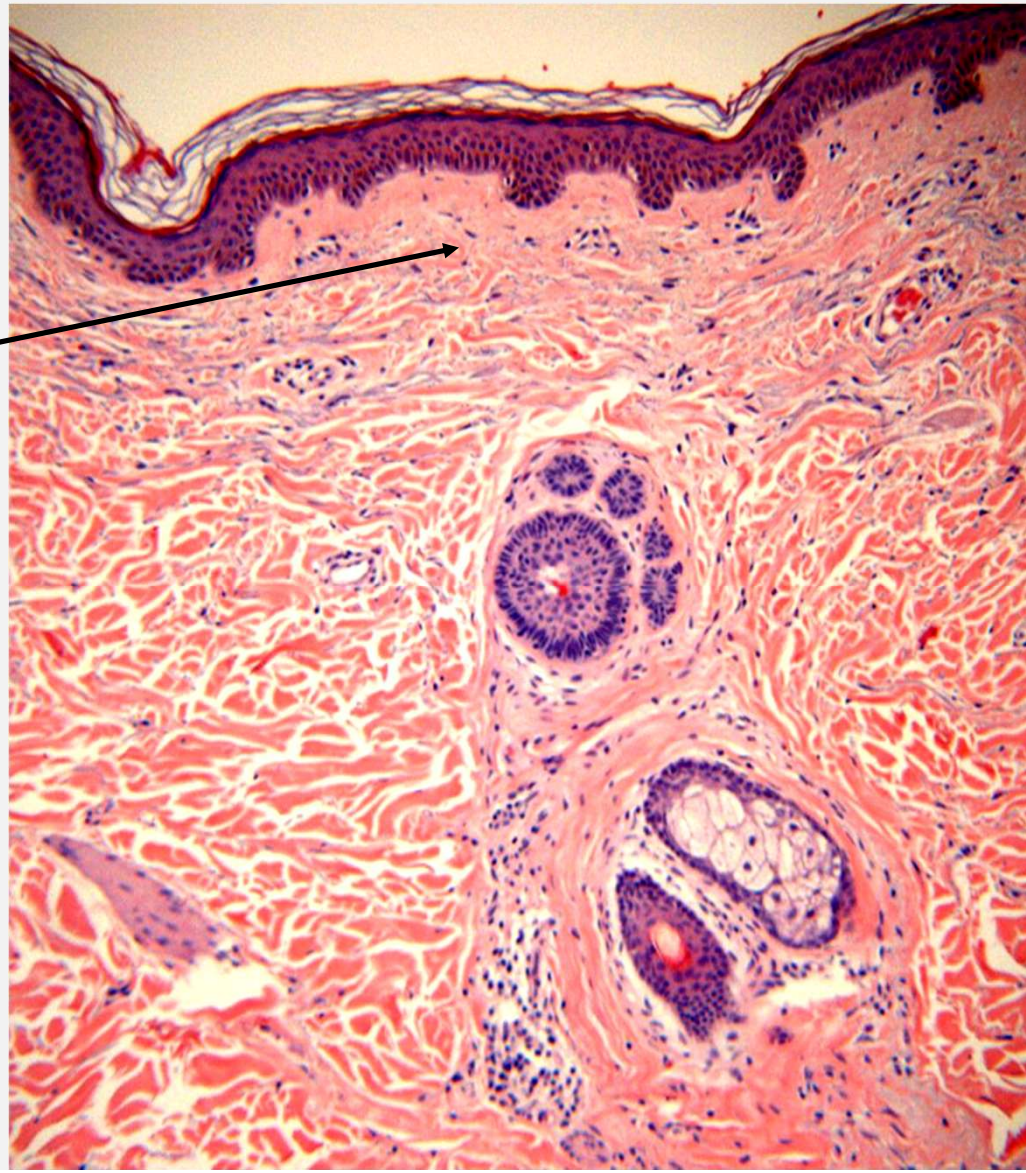


http://www.pathguy.com



DERMIS (=KORIUM)

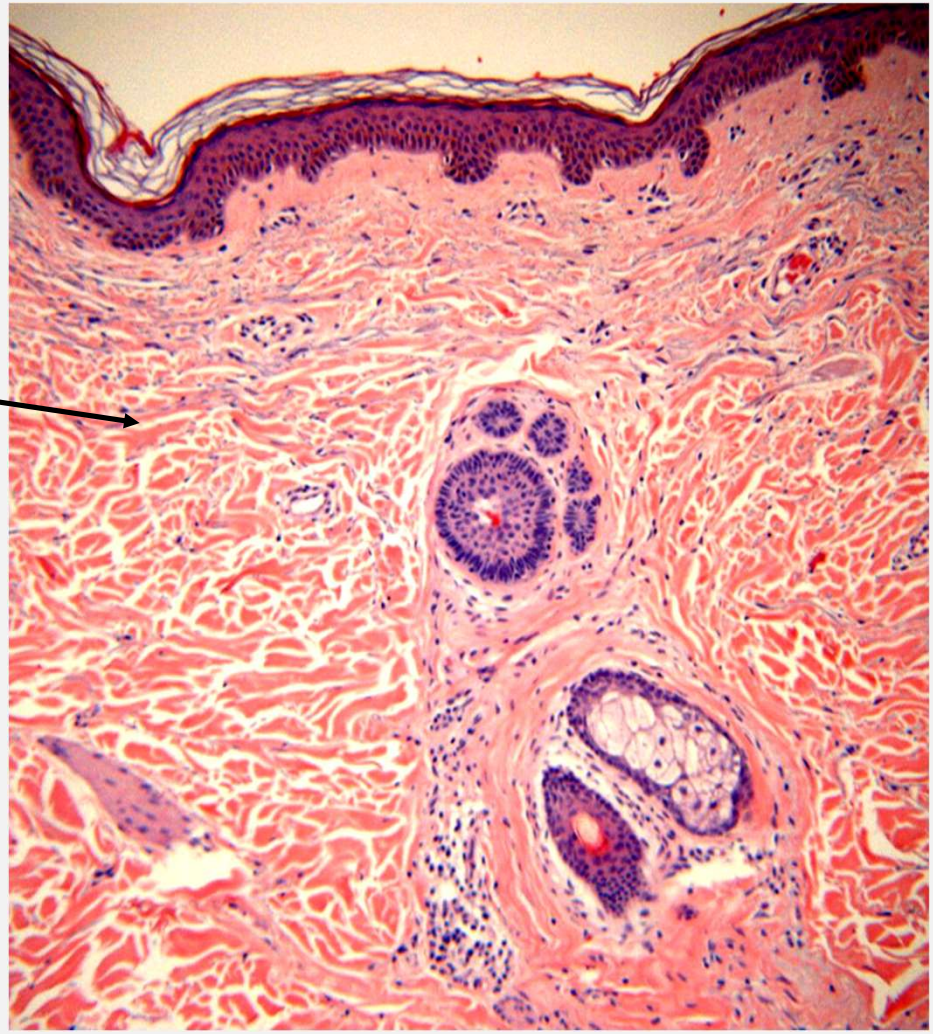
- St.papillare
  - feines Kollagen, dünne elastische Mikrofibrillen
  - hoher Gehalt an Kapillaren, Fibroblasten (länglich, schmaler Zellkern), Mukopolysacchariden,
  - Lymphozyten und einzelne Mastzellen perivaskulär
  - Postkapillären Venolen Grenze zur retikulären Dermis



DERMIS (=KORIUM)

Stratum reticulare

- kompaktes, dickes Kollagen, von optisch leeren Spalten getrennt, dazwischen elastische Fasern,
- Hautanhangsgebilde mit lockerem periadnexiellem Bindegewebe (adventielle Dermis),
- Haarfollikel mit sebazärer Drüse + M.arrector pili: glatt, spindelige Zellen mit zentralem zigarrenförmigen Zellkern
- Arterien, Venen, Nerven, Lymphgefäße



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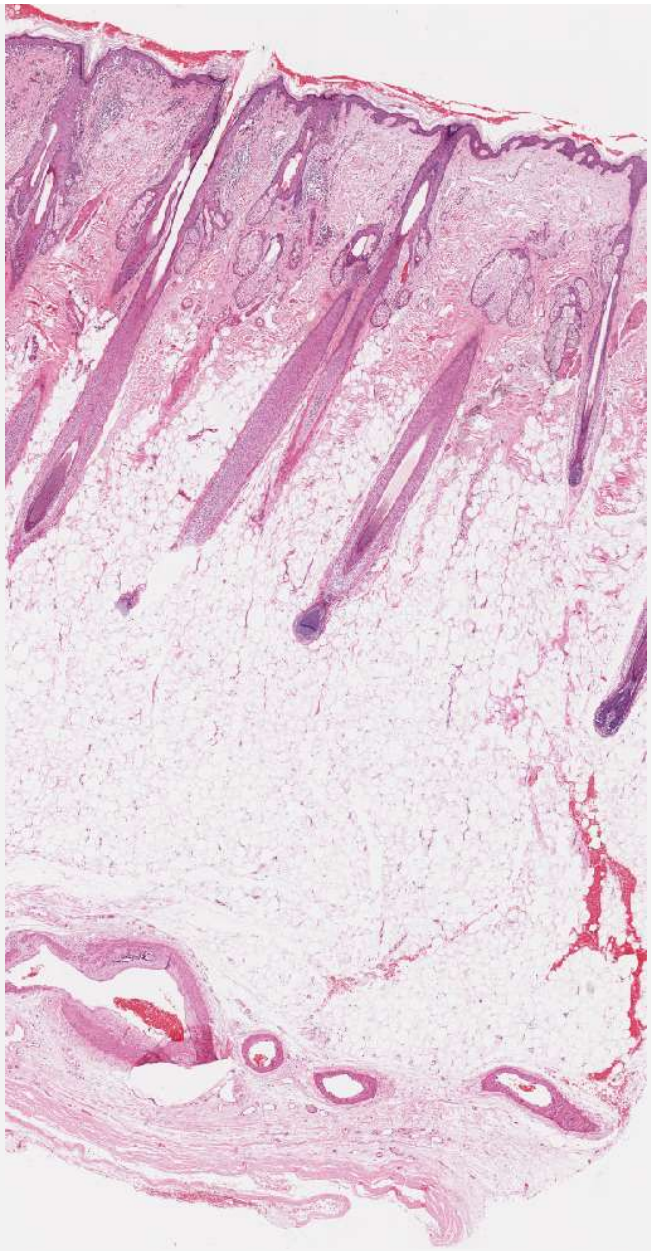
SUBCUTIS

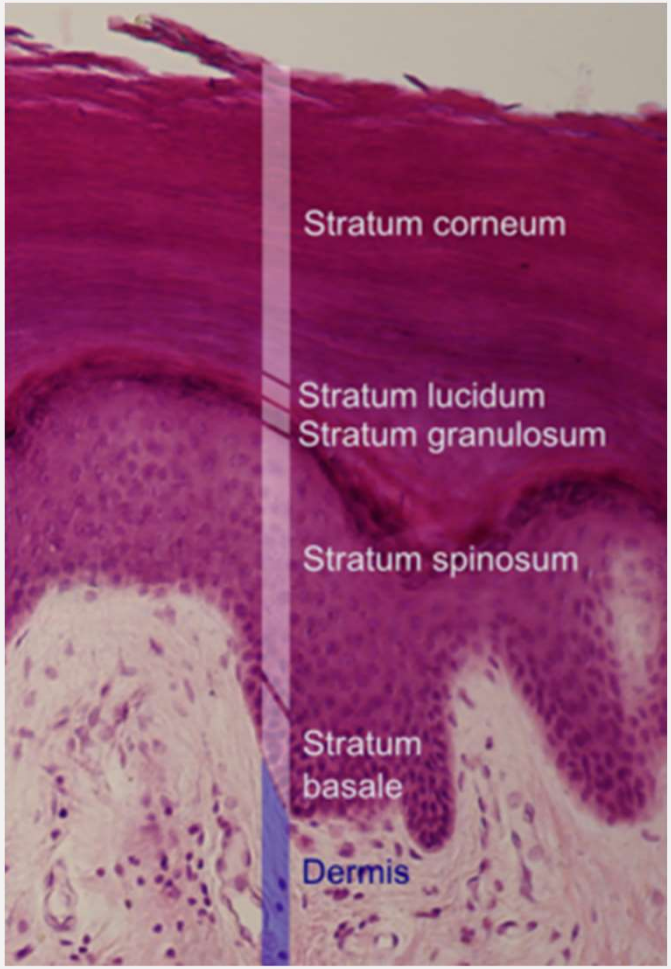
- Fettläppchen mit präparationsbedingt leerem Fettropfen und schmalem Zytoplasmasaum
- BG-Septen mit Gefäßen + Nerven und Anschluss an Faszie
- Arterien, Venen, Nerven, oft als Bündel



REGIONALE UNTERSCHIEDE

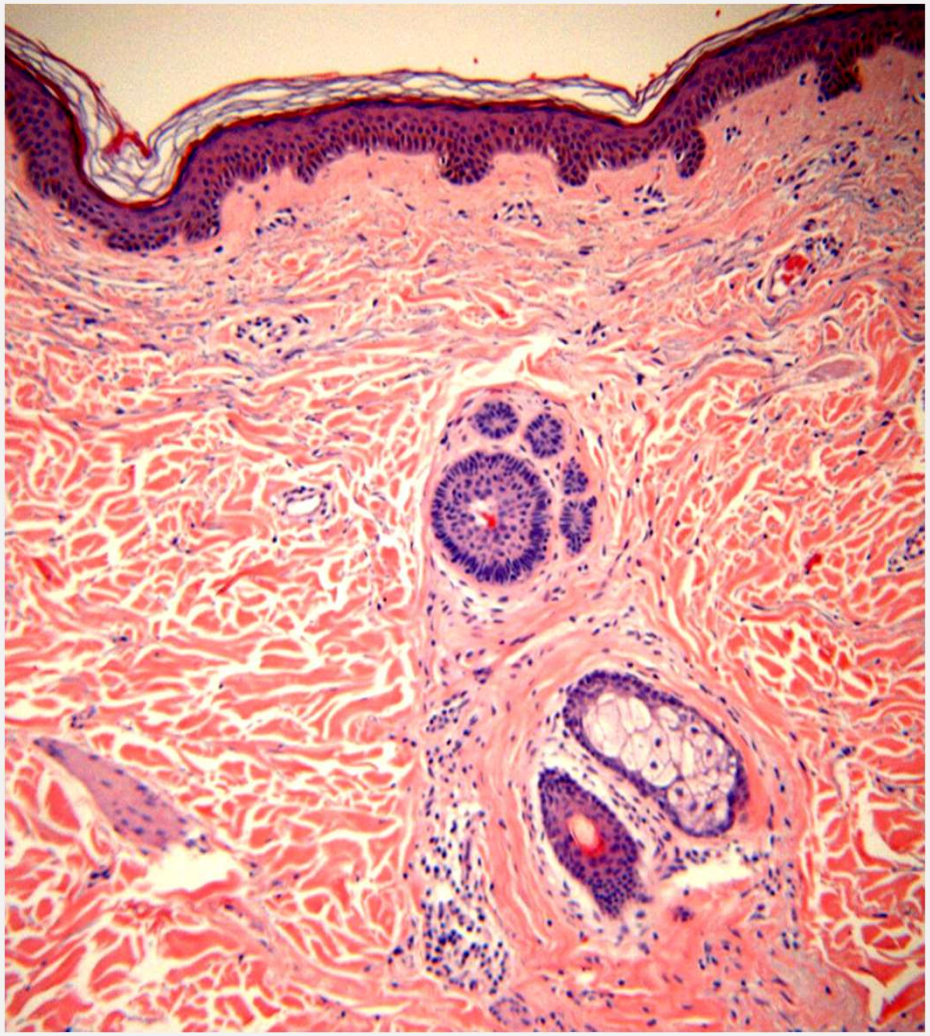
REGIONALE UNTERSCHIEDE

- Leistenhaut (Hände+Füße)
  - Dickes St.corneum (kompakte Orthohyperkeratose) mit St. lucidum
  - breite Epidermis;Verzahnung
  - ekkrine Schweißdrüsen mündet frei auf der Epidermis
  - keine Haare oder Talgdrüsen



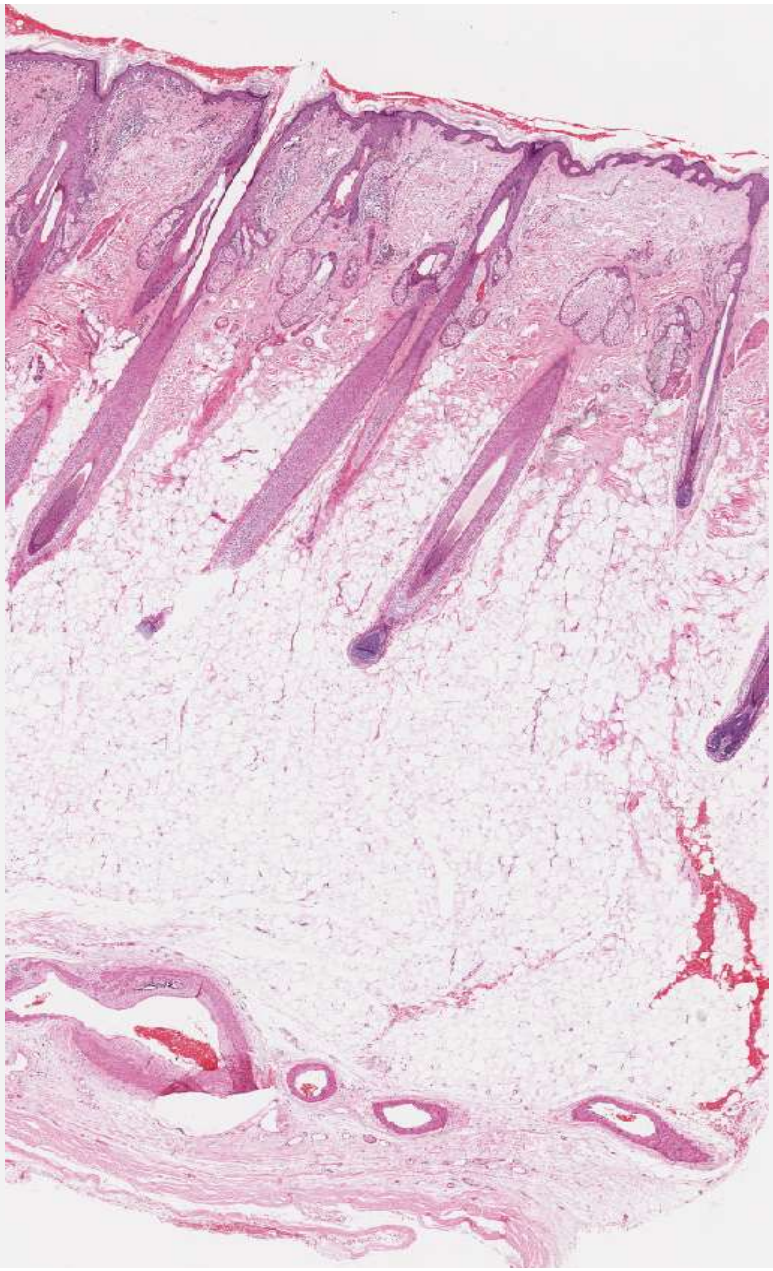
REGIONALE UNTERSCHIEDE

- Felderhaut (behaarte Haut)
  - Dünnes St.corneum
  - Ekkrine Schweißdrüsen
  - Haarfollikel mit sebazären Drüsen



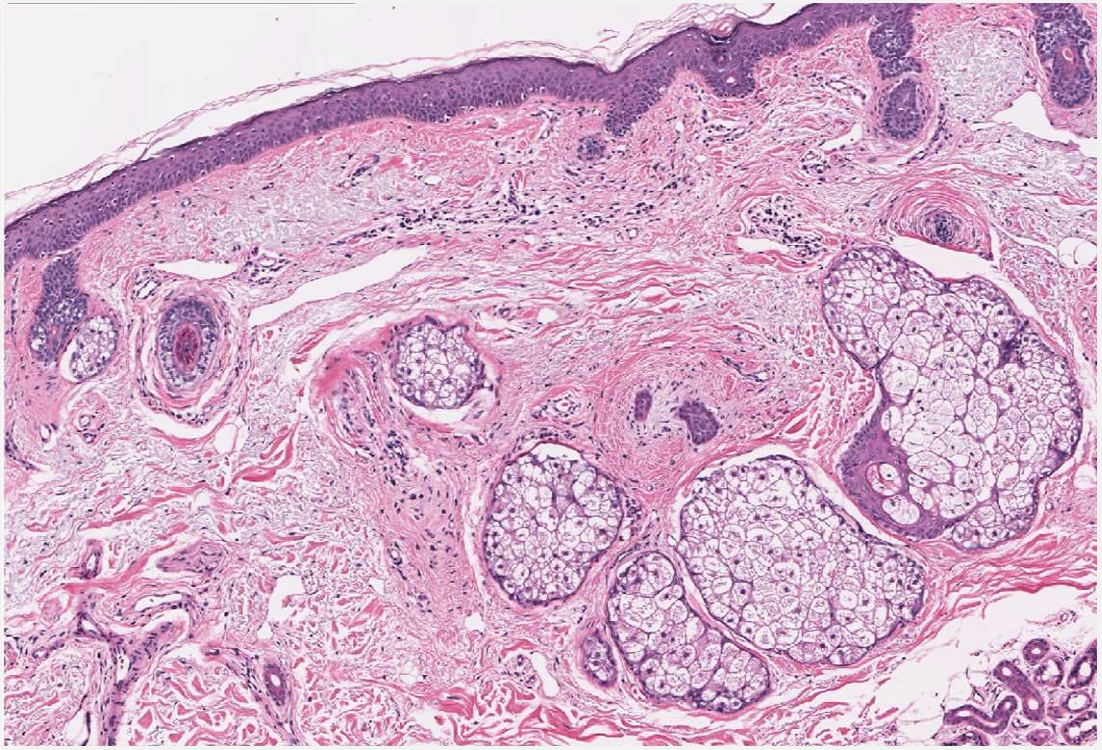
REGIONALE UNTERSCHIEDE

- Capillitium
  - Große Terminalhaarfollikel bis in Subkutis, kleine Talgdrüsen



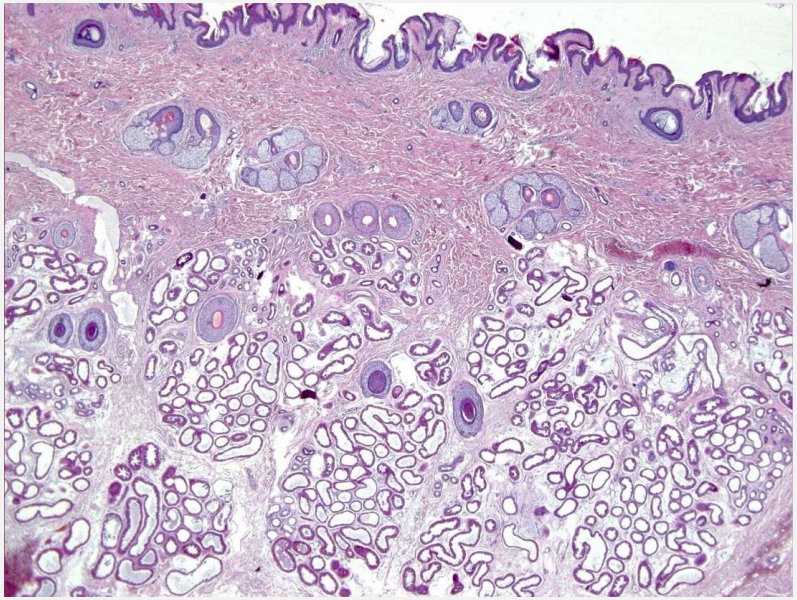
REGIONALE UNTERSCHIEDE

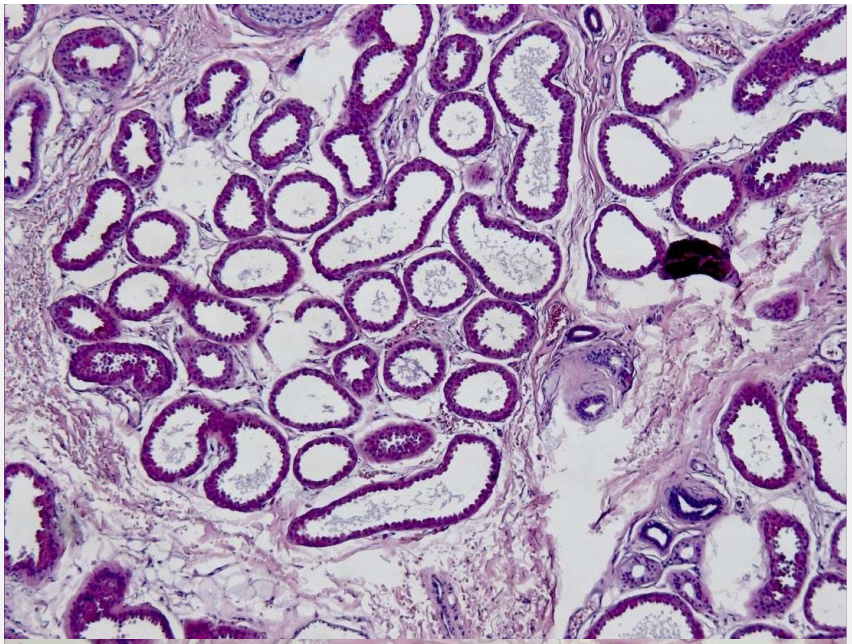
- Gesicht
  - Kleine Haarfollikel bis mittlere Dermis, große Talgdrüsen (holokrine Sekretion); dünne Epidermis, keine Reteleisten

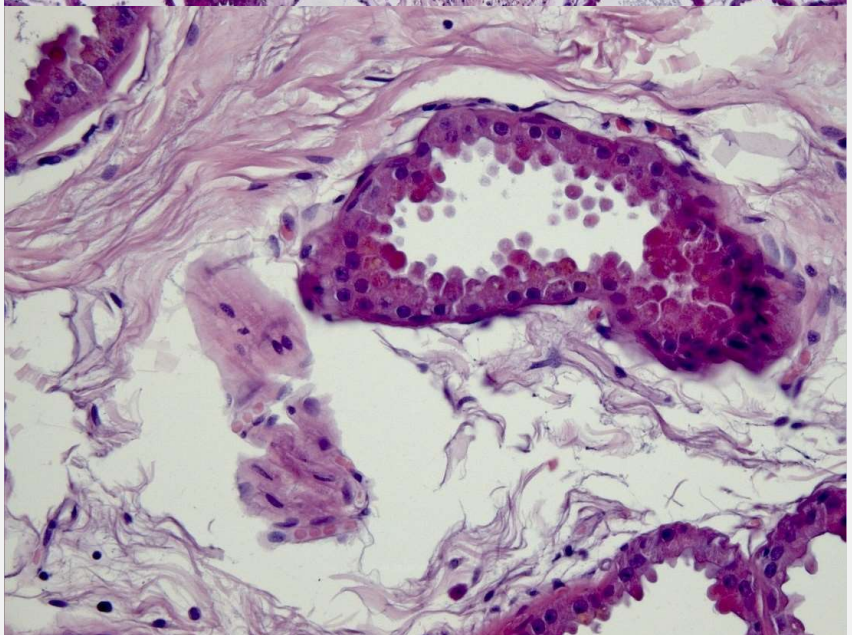


REGIONALE UNTERSCHIEDE

- Axillär, genital
  - Terminalhaar-follikel, zahlreiche apokrine Drüsen (Duftdrüsen)

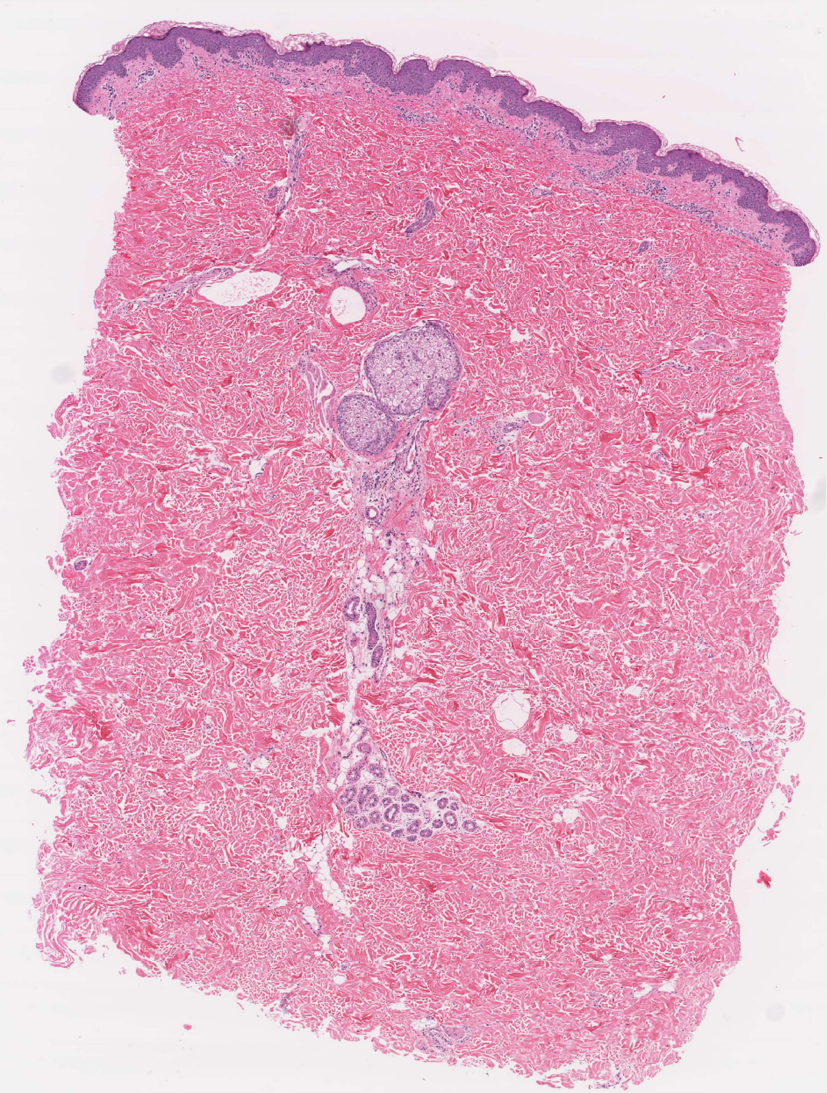






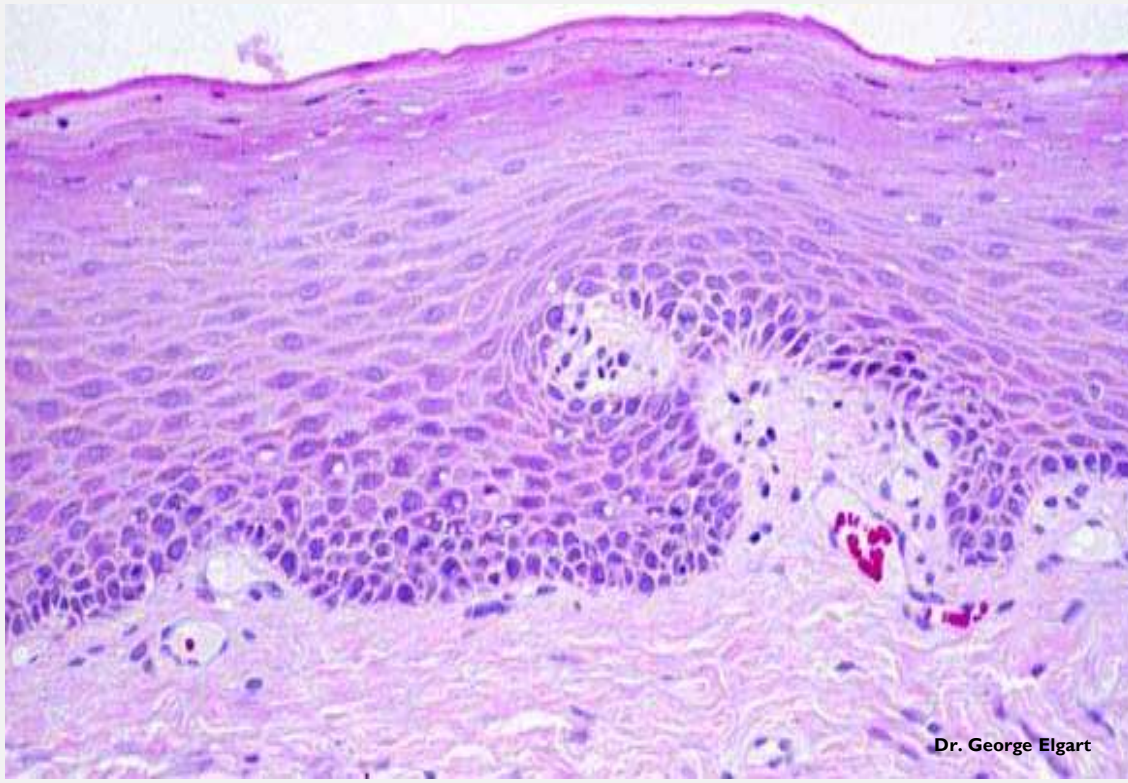
REGIONALE UNTERSCHIEDE

- Stamm
  - Sehr dickes St.reticulare, viel Fettgewebe
  - Stanzbiopsie erfasst Fettgewebe meist nicht

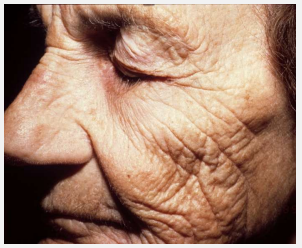


REGIONALE UNTERSCHIEDE

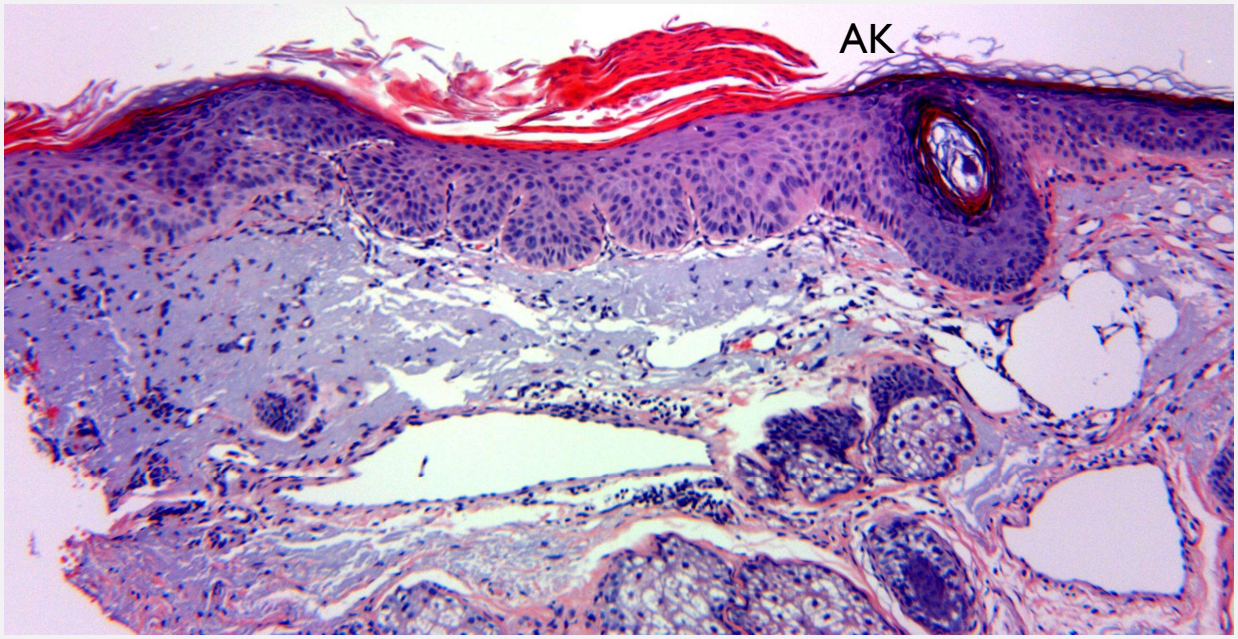
- Schleimhaut
  - Kein (ausgeprägtes) St.corneum, physiologische Parakeratose, meinst nur diskretes St.granulosum
  - helles Epithel durch Glykogen



ALTERSBEDINGTE UNTERSCHIEDE



- Kleinkinder: fibroblastenreiche Dermis
- Erwachsene: Solare Elastose = UV-bedingte Degeneration der Bindegewebsfasern mit schollig-konfluierendem blass basophilem Material in oberer Dermis, weitgestellte Gefäße, epidermale Atrophie, Abflachung des Reteleistenreliefs



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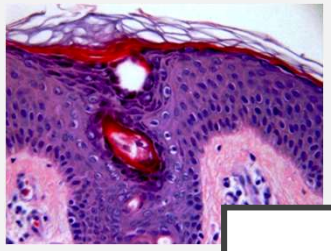
ABC

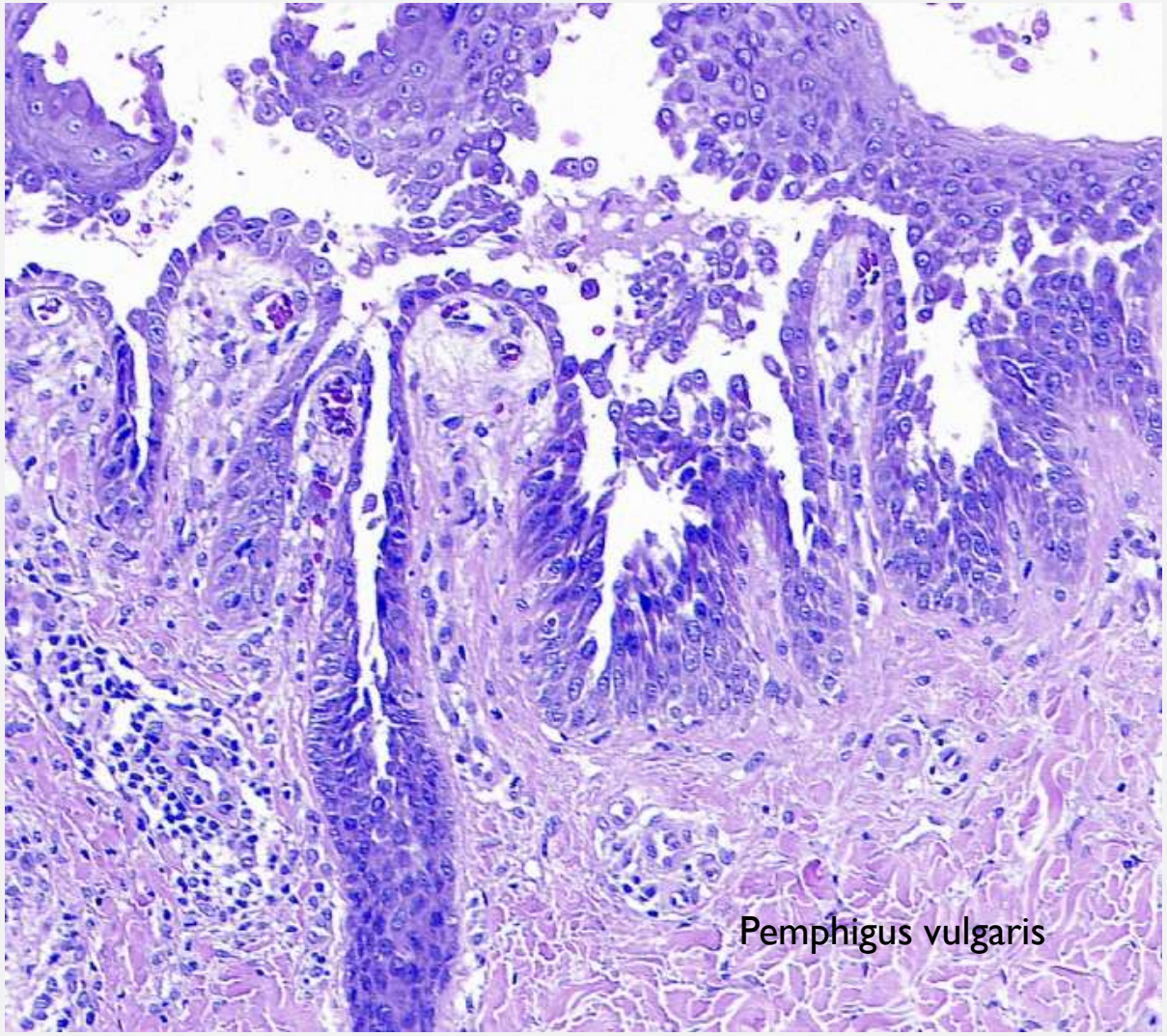
- Akantholyse
- Akanthose
- Degeneration
- Dyskeratose
- Exozytose
- Flammenfiguren
- Fibrose/Sklerose
- Granulom
- Hyperkeratose
- Karyorrhexis
- Orthokeratose
- Papillomatose
- Parakeratose
- Spongiose
- …



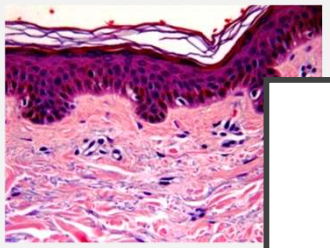
ABC

- Akantholyse

interzellulärer Kohäsionsverlust, Abrundung der Keratinozyten, Kerne pyknotisch



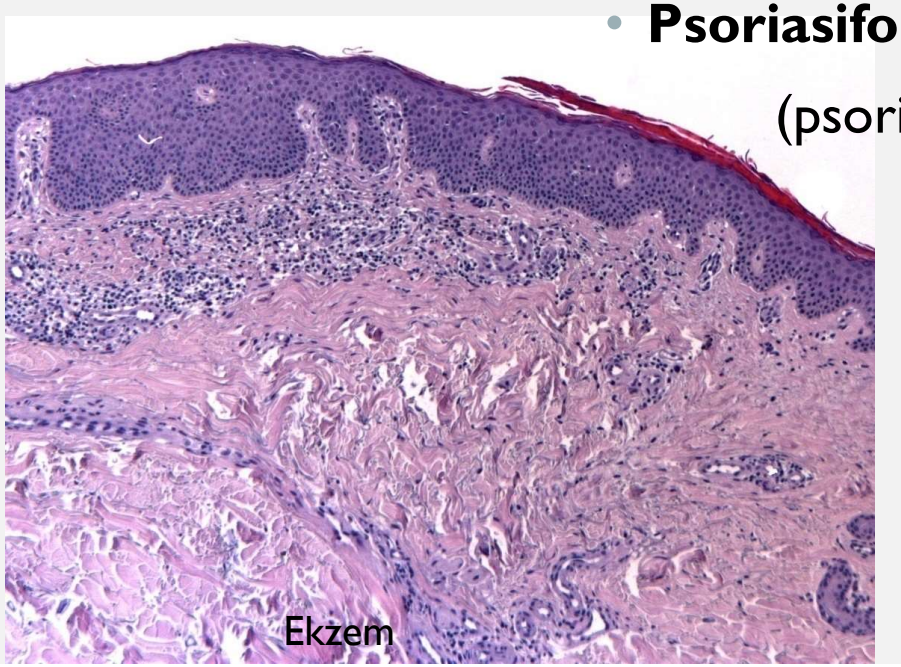
Pemphigus vulgaris



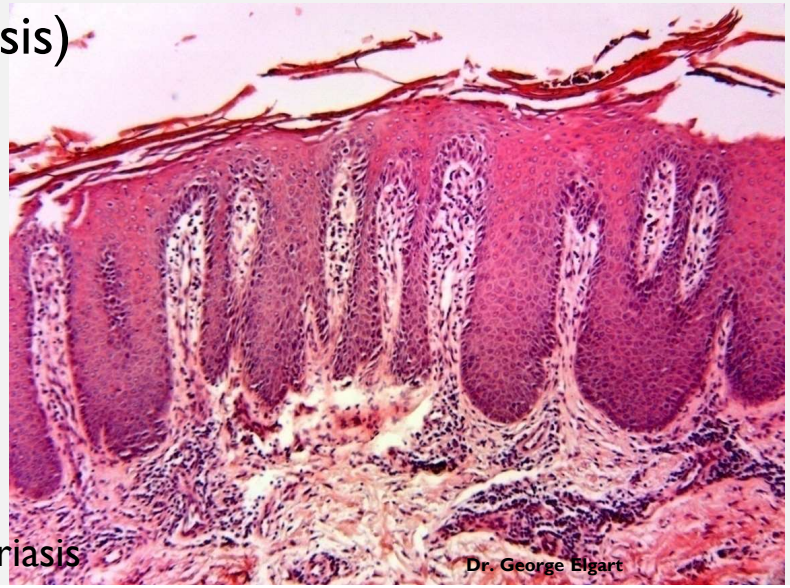
ABC

- Akanthose: verbreitertes Stratum spinosum
  - **Ekzematoid:** breitbasig, unregelmäßig
  - **Psoriasiform** mit Papillomatose

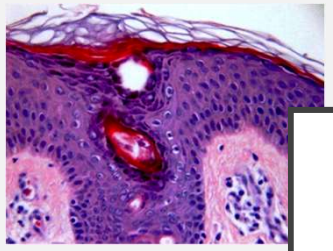
(psoriasiform ≠ Psoriasis)



Ekzem



Psoriasis

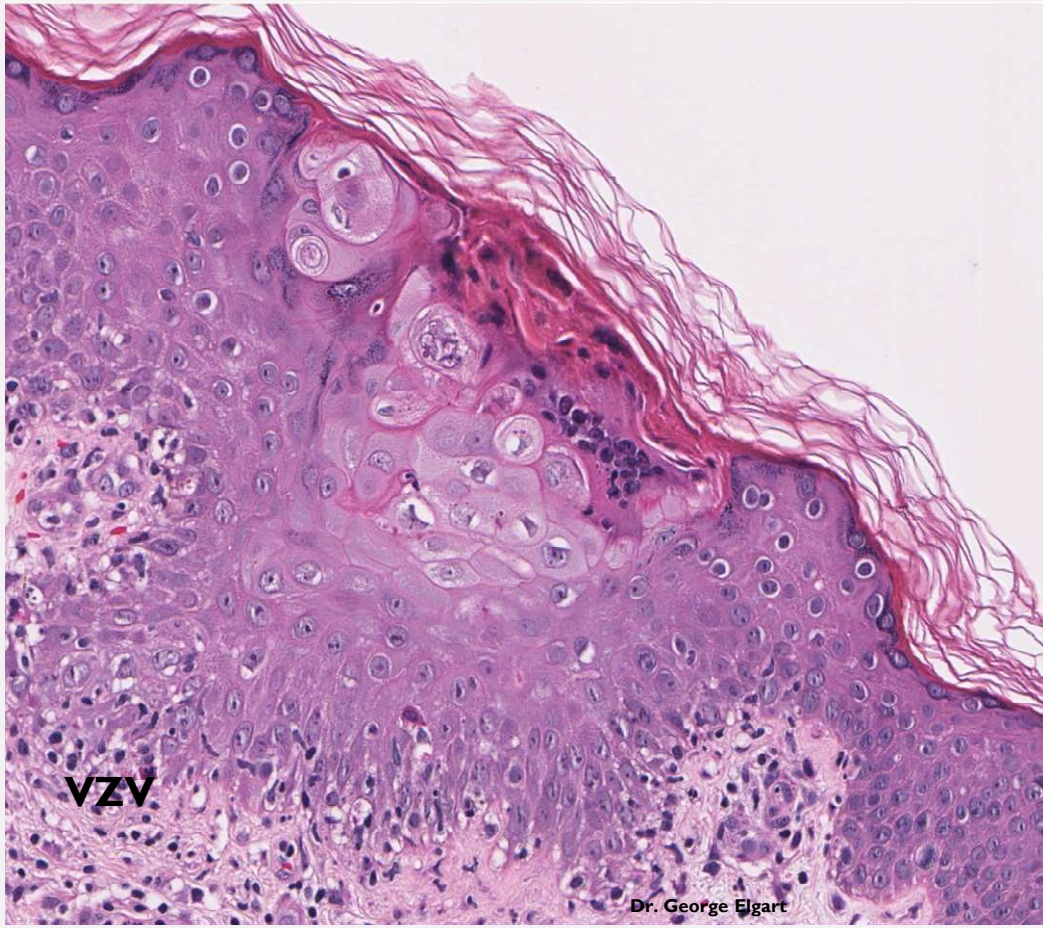


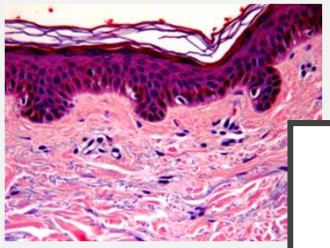
ABC

- Degeneration/ballonierende Degeneration

intrazelluläres Ödem (hydropisch): aufgetriebene, blasse Keratinozyten (Nekrose und Akantholyse folgend)

im Rahmen eines zytopathischen Effekt von Virusinfektionen auftretend (HSV, VZV, Pocken, …)



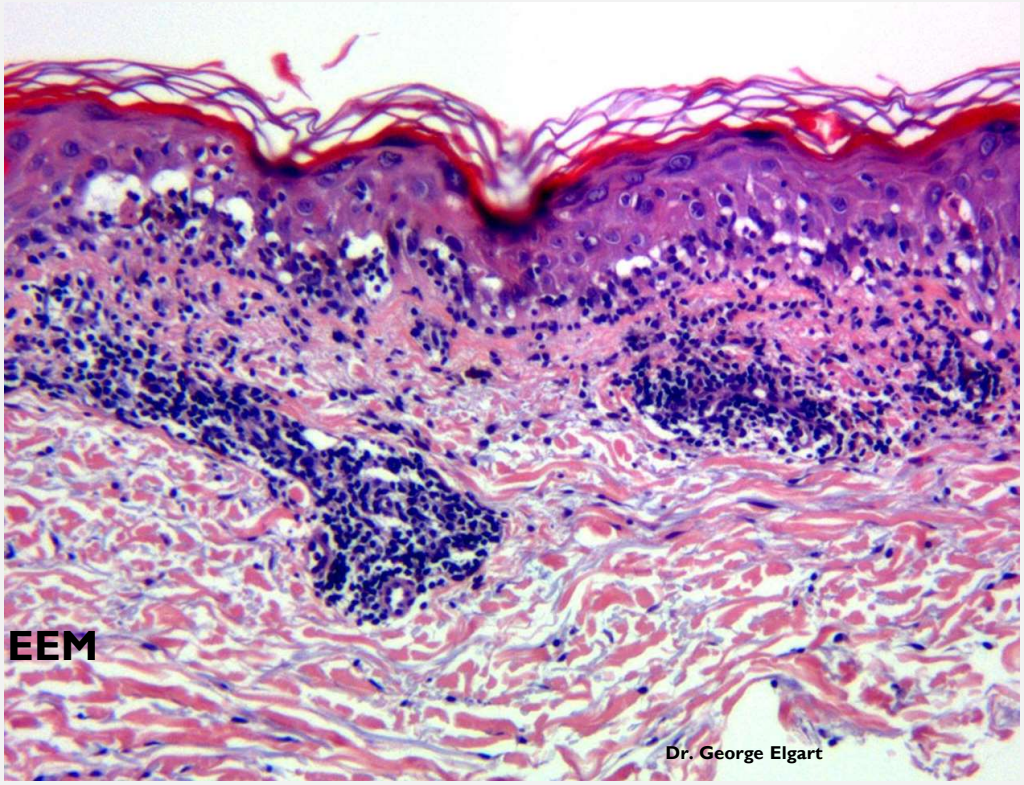


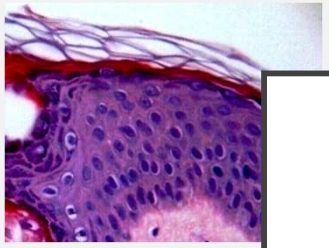
ABC-EINSCHUB

- Degeneration/vakuolisierende Degeneration

meist in BMZ/Junktionszone Zelltod von Keratinozyten

häufig im Rahmen des Interface-Prozess, aber auch bei anderen Dermatosen vorkommend





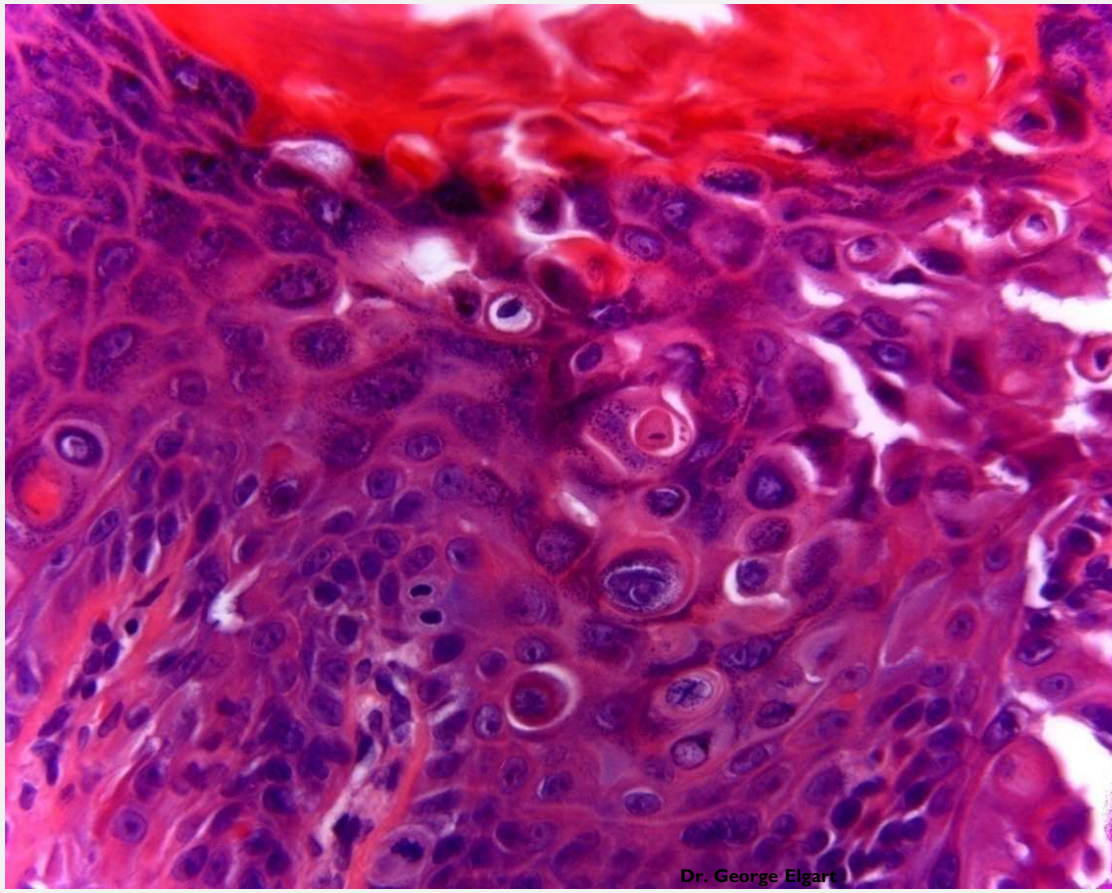
ABC

- Dyskeratose

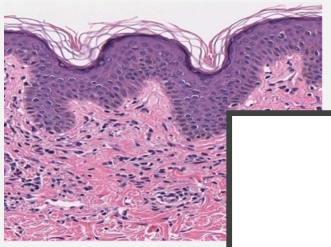
vorzeitige Apoptose mit zellulärer Kondensation, Assoziation mit suprabasaler Spaltbildung und Akantholyse

- Corps ronds/Cytoid bodies

„tropfen“ in weiterer Folge in den Papillarkörper ab, werden dann als „Civatte-bodies“ bezeichnet



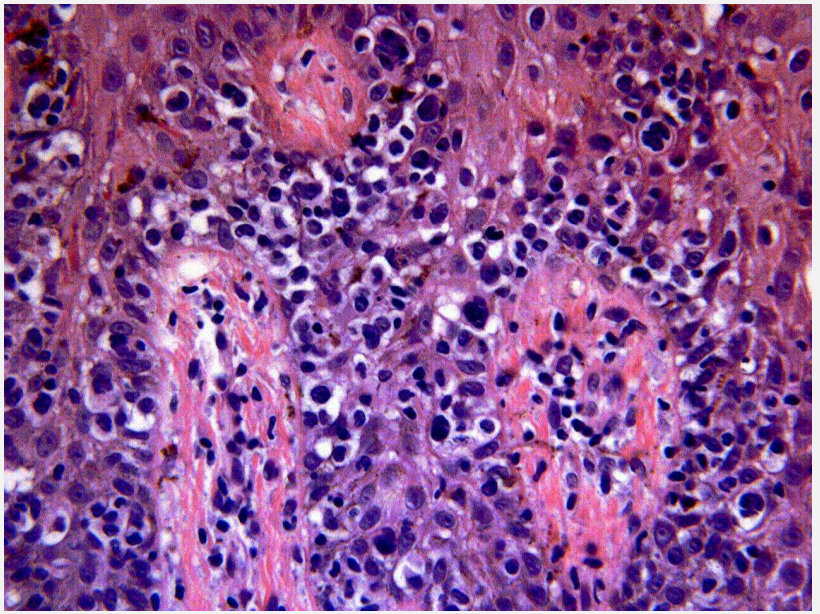
Warty dyskeratoma



ABC

- Epidermotropismus

direktionale Migration von Lymphozyten in die Epidermis mit Aggregationstendenz, keine (wesentliche) Spongiose



Mycosis Fungoides, Pautrier-Mikroabszesse

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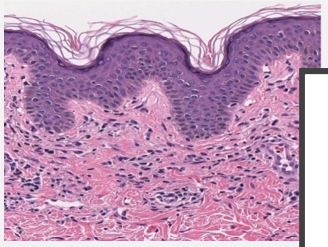
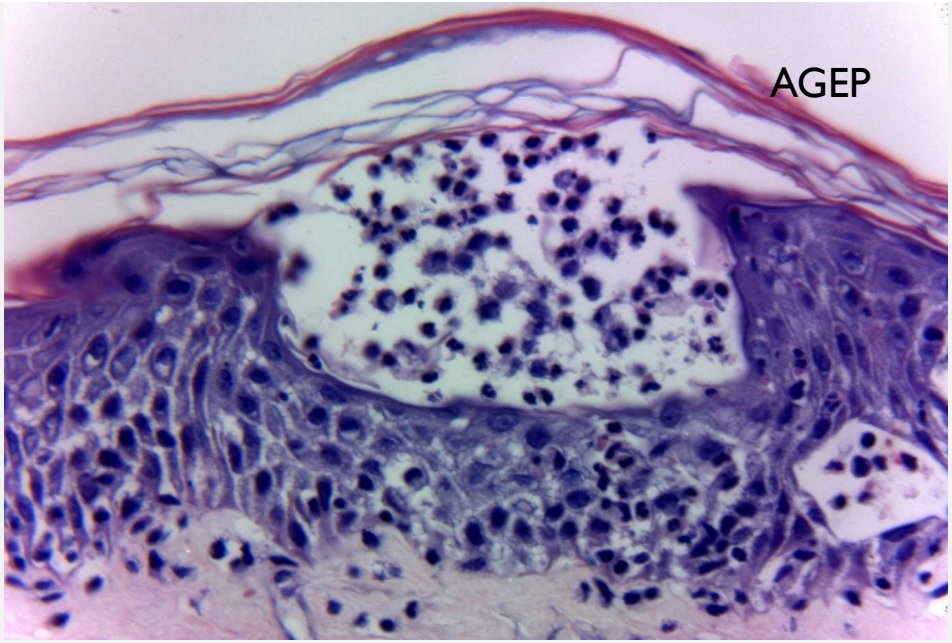


ABC

- Exozytose

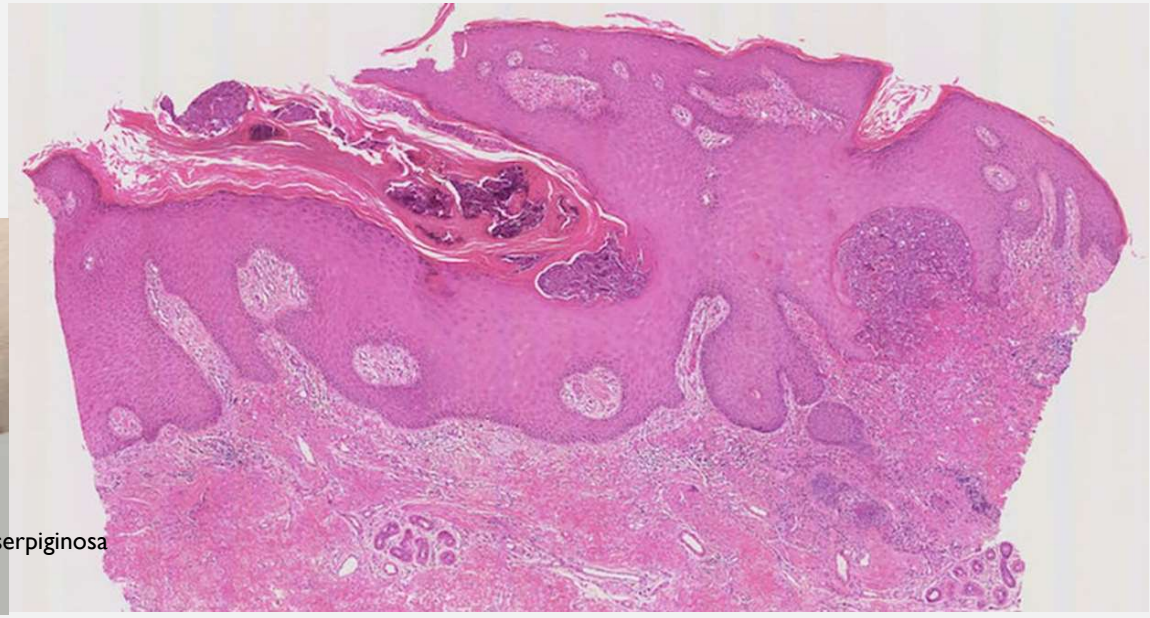
transepidermale Migration von Zellen, z.B. Neutros -> Pusteln

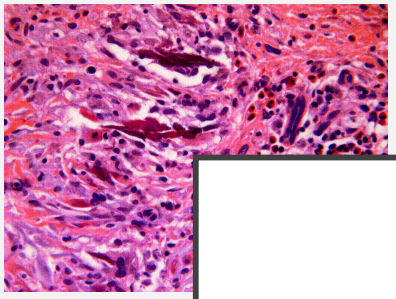
„Ausschleusen“ – z.B. von Kollagen im Rahmen von perforierenden Kollagenosen



Reaktiv perforierende Kollagenose

Elastosis perforans serpiginosa



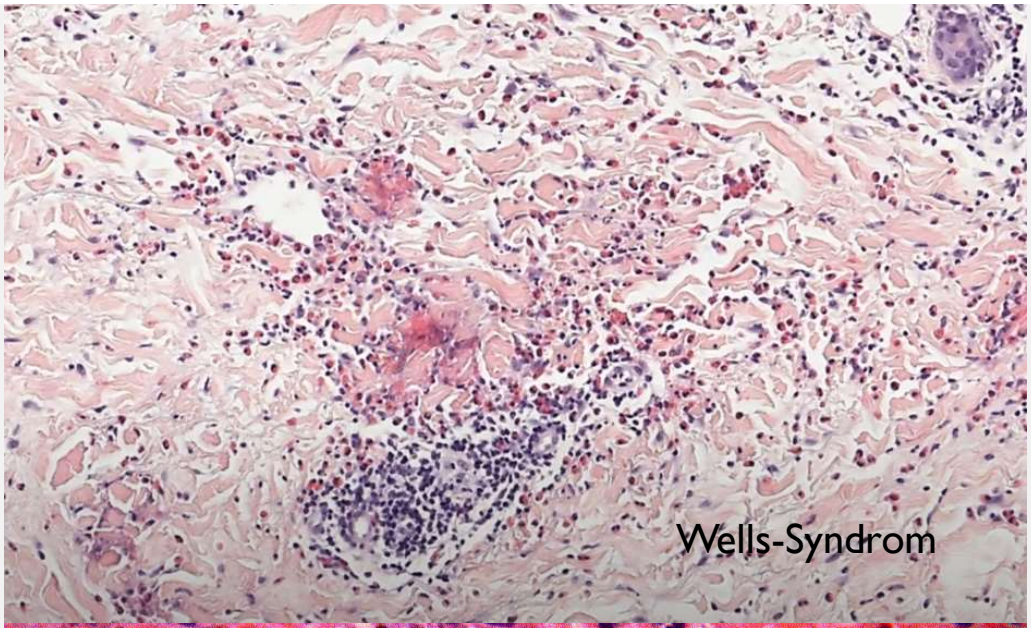


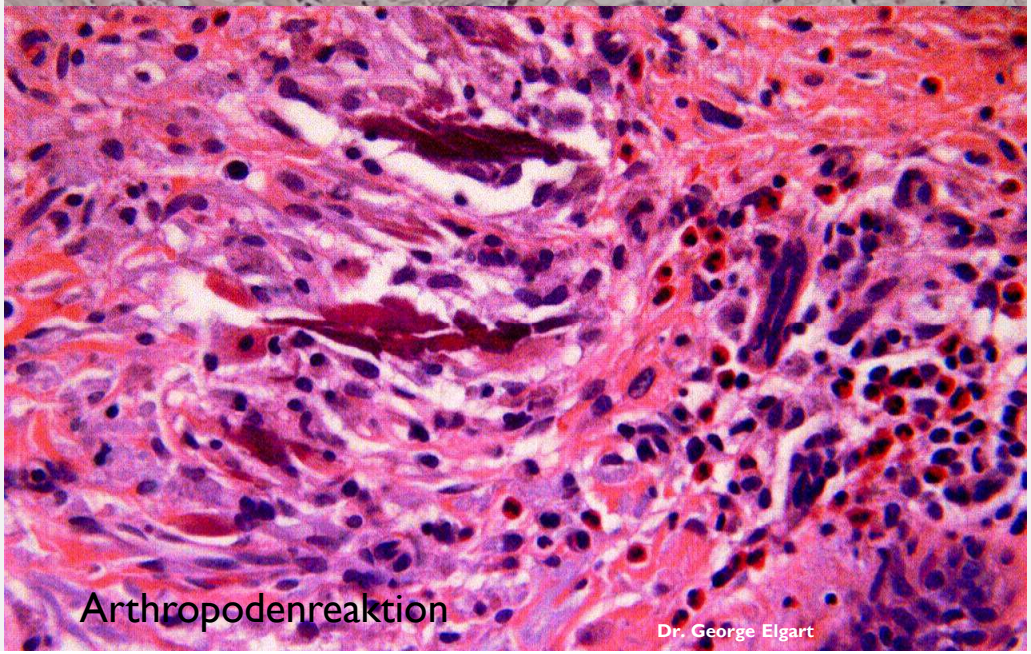
ABC

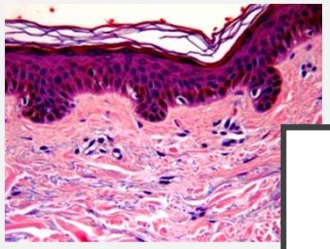
- Flammenfiguren

Gewebsreaktion auf die Freisetzung von "eosinophil major basic protein" (MBP) eosinophiler Granulozyten -> degenerierte, verstärkt eosinophile kollagene Faserbündel

z.B. Wells-Syndrom (eosinophile Cellulitis)



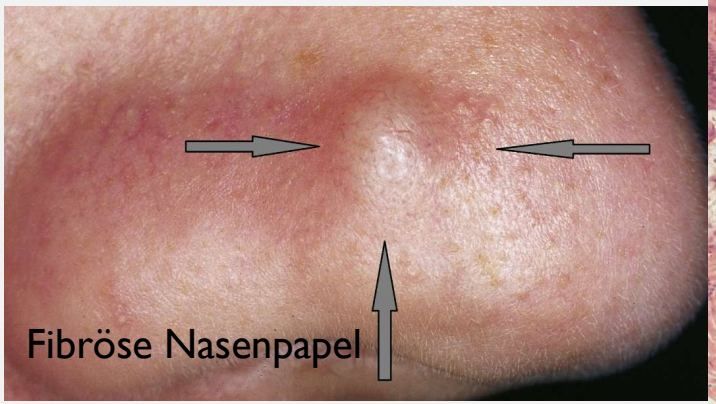




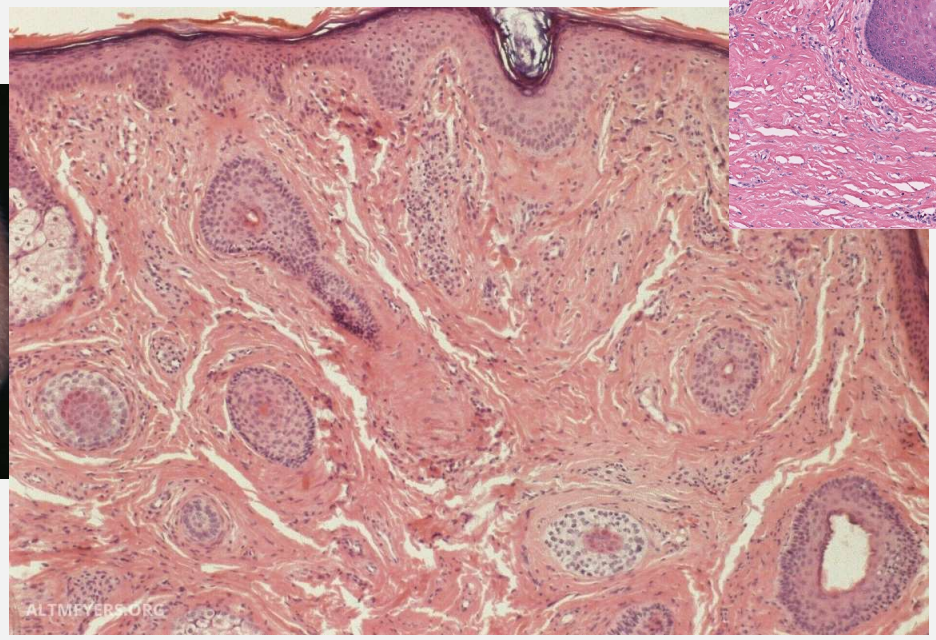
ABC

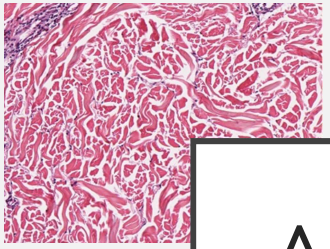
- Fibrose

zellreiche Bindegewebsvermehrung,
mit Verhärtung einhergehend



Altmeyer

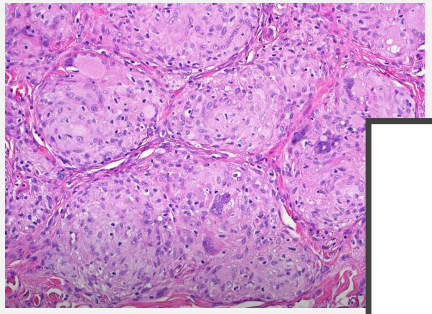




ABC-EINSCHUB

- Sklerose

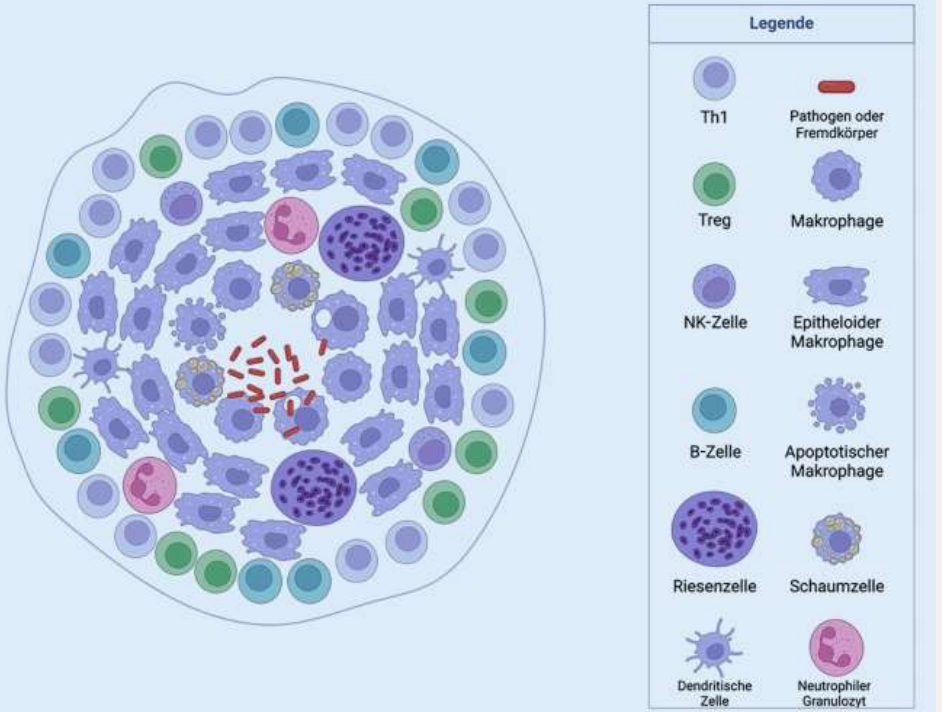
zellarme Bindegewebsvermehrung,
dicke, hyalinisierte Kollagenfasern

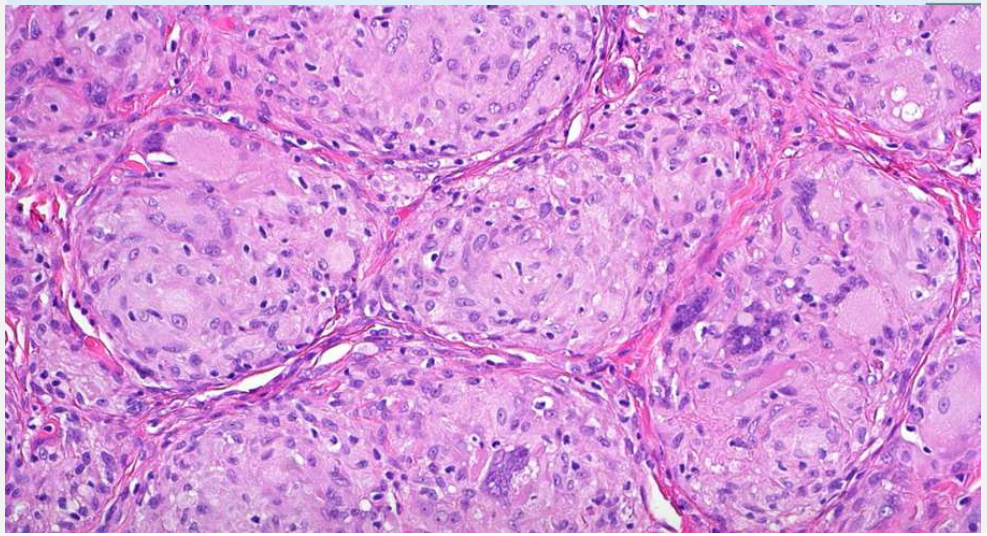


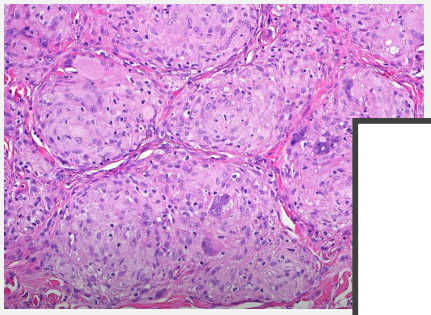
ABC

- Granulomatöse Entzündung

  Noduläre Aggregationen von Makrophagen, Lymphozyten, Fibroblasten, Plasmazellen… um ein Pathogen (Fremdkörpergranulom, TBC, …), oder eben auch kein Pathogen (Granuloma anulare, Sarkoidose, …)

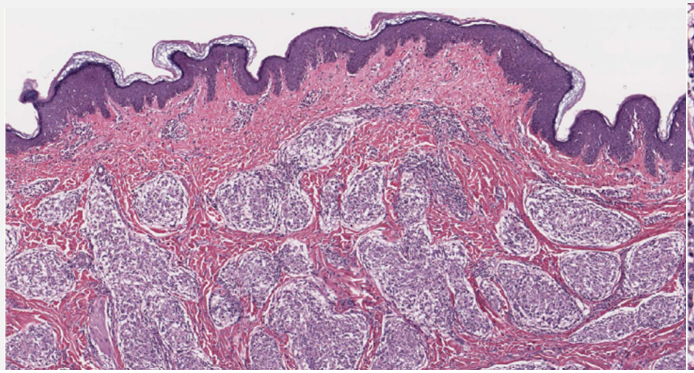


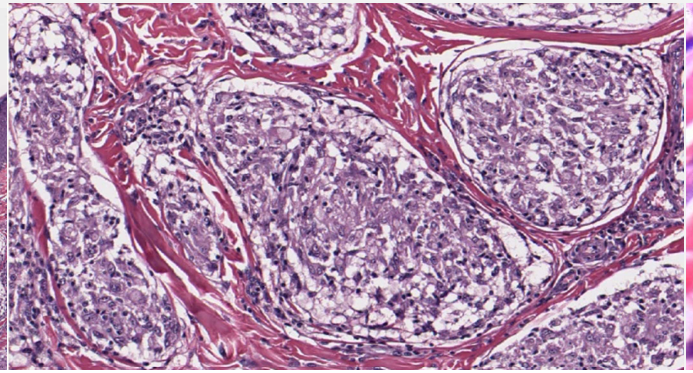


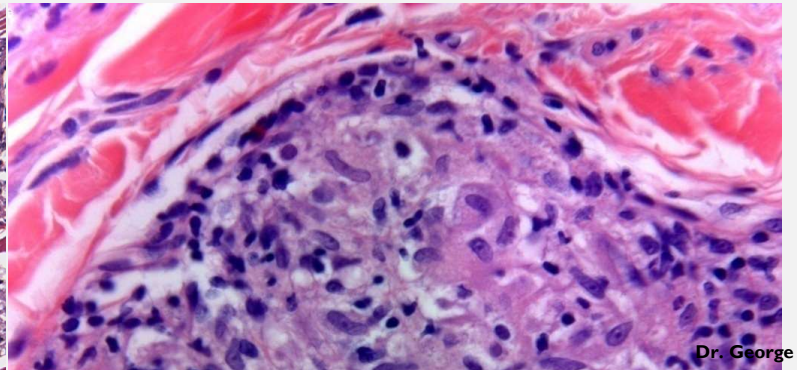


ABC

- Granulomatöse Entzündung
  - sarkoidal (kein Lymphozyten- und Plasmazellsaum - „nackt“, epitheloidzellige Makrophagen)
  - tuberkuloid (Lymphozyten; nicht immer verkäsend)
  - necrobiotisch (Kollagenolyse! Epitheloidzellen, Lymphozyten, RZ, Muzin)
  - suppurativ (Neutophile zentral/perifokal)
  - Fremdkörper-assoziiert







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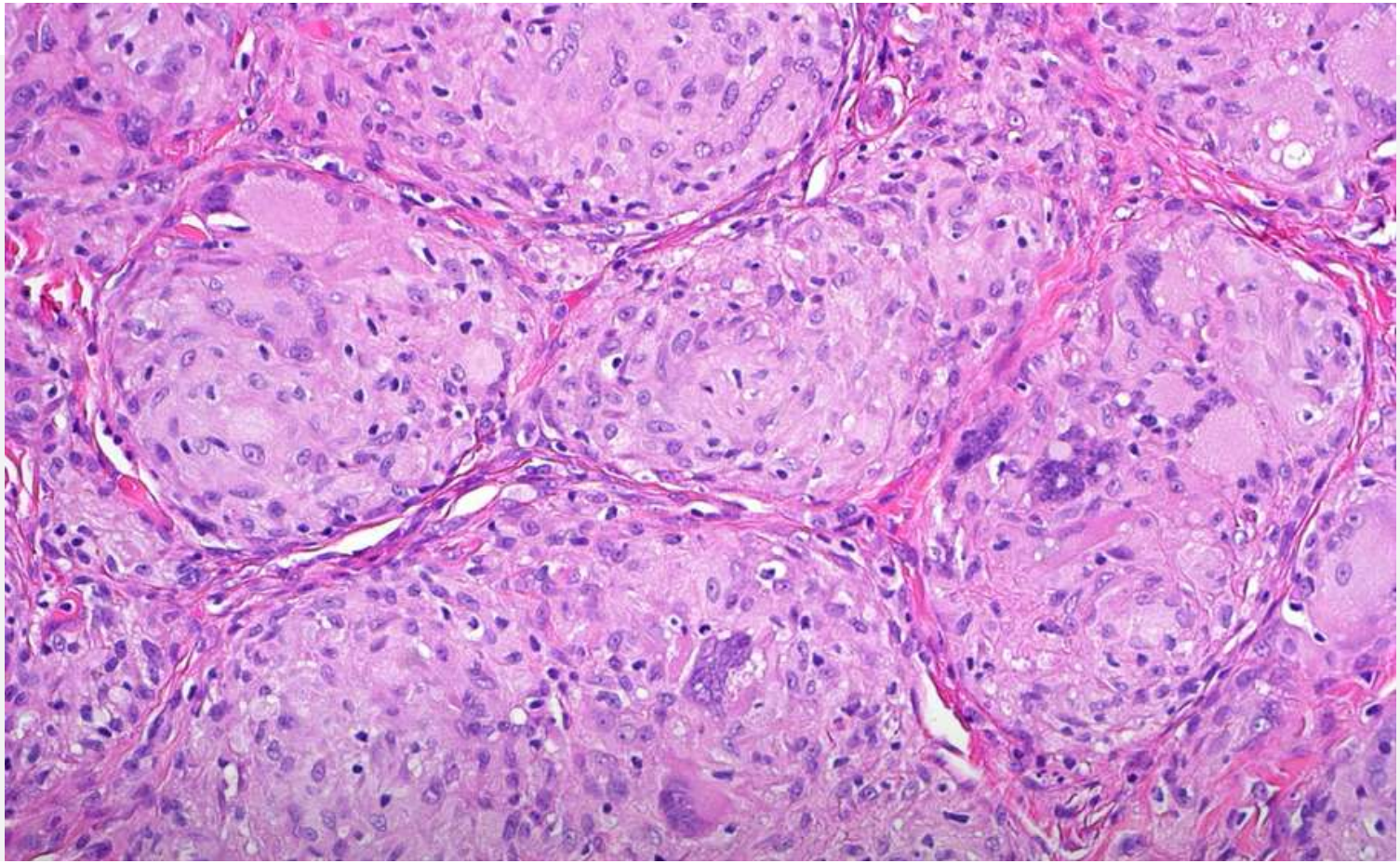
Transformierte/aktivierte Makrophagen in Granulomen => „Histiozyt“

Epitheloide Histiozyten („epitheloid“ - Ähnlichkeit mit Epithelzellen) große vesikuläre Kerne, reichlich eosinophiles Zytoplasma, sind länglich, sekretorische Eigenschaften. (z.B. Angiotensin-Converting-Enzym - Aktivität dieses Enzyms im Blut kann als Marker für eine Sarkoidose dienen)



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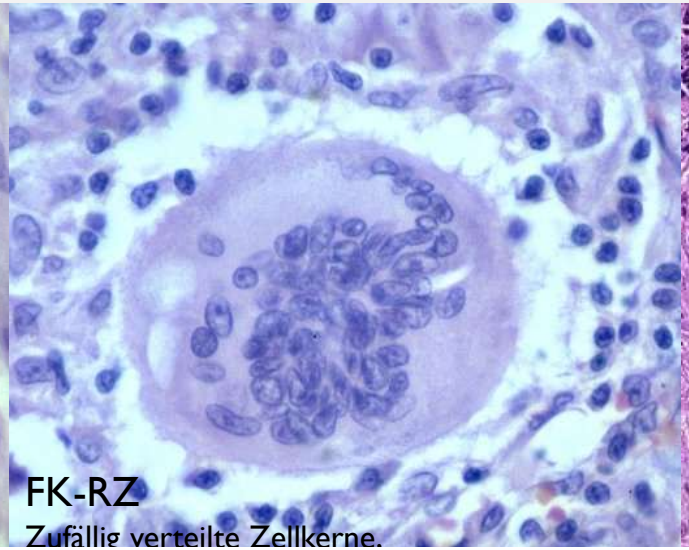
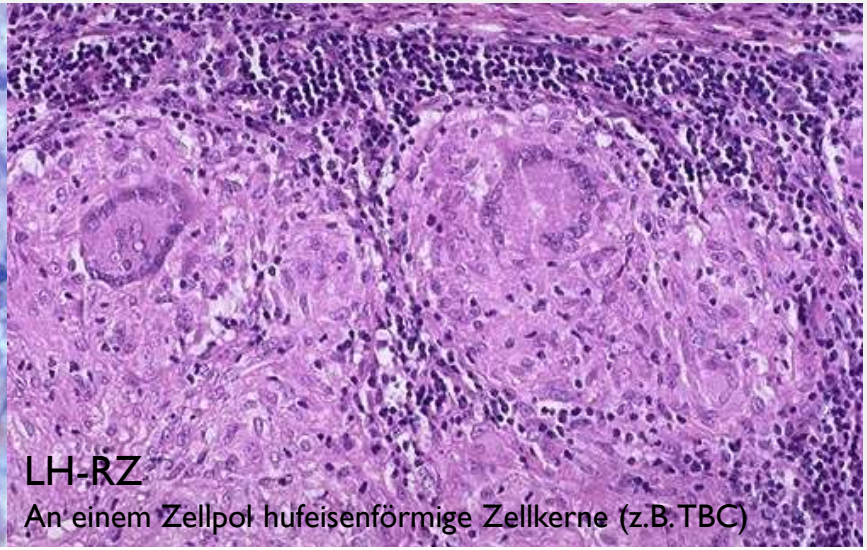
Langhans-Riesenzellen: an einem Zellpol hufeisenförmig ausgerichtete Zellkerne (typisch für die Tuberkulose, kommen auch bei anderen Granulomen vor)

Touton-RZ
Zentraler Ring mit Zellkernen,



FK-RZ
Zufällig verteilte Zellkerne.



LH-RZ
An einem Zellpol hufeisenförmige Zellkerne (z.B. TBC)

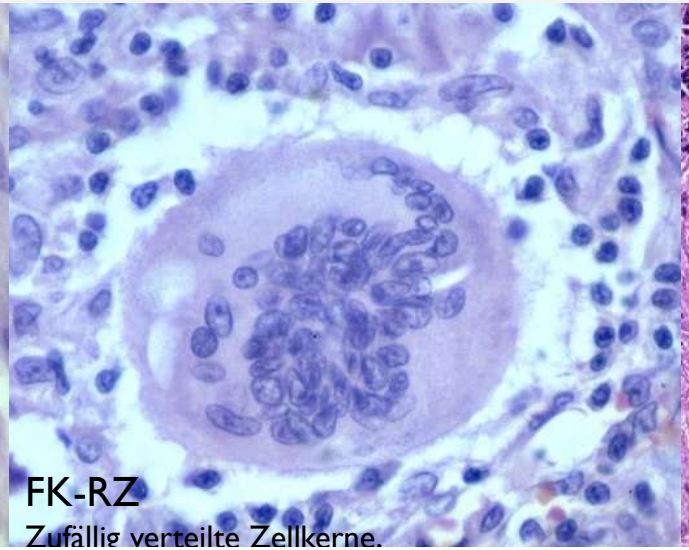
Transformierte/aktivierte Makrophagen in Granulomen => „Histiozyt“

Epitheloide Histiozyten („epitheloid“ - Ähnlichkeit mit Epithelzellen) große vesikuläre Kerne, reichlich eosinophiles Zytoplasma, sind länglich, sekretorische Eigenschaften. (z.B. Angiotensin-Converting-Enzym - Aktivität dieses Enzyms im Blut kann als Marker für eine Sarkoidose dienen)

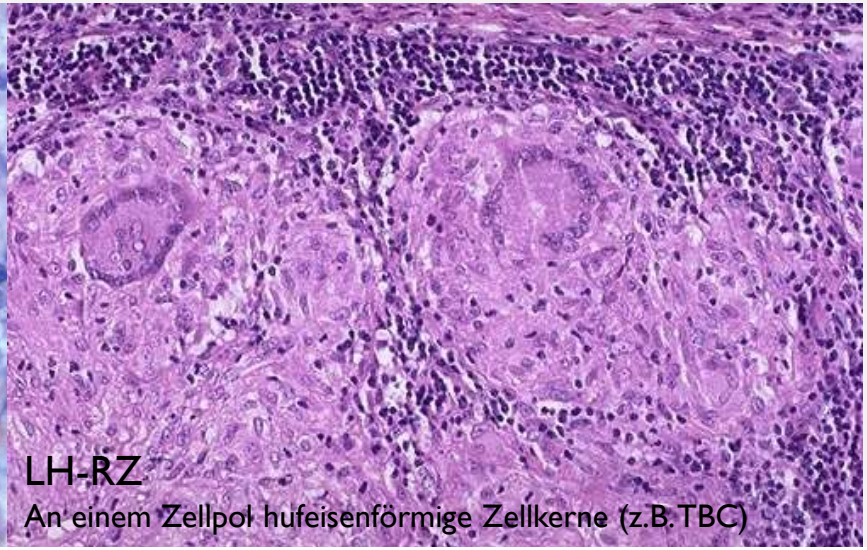
Langhans-Riesenzellen: an einem Zellpol hufeisenförmig ausgerichtete Zellkerne (typisch für die Tuberkulose, kommen auch bei anderen Granulomen vor)

Riesenzellen vom Fremdkörpertyp: Sogenannte “Fremdkörper-Riesenzellen” sind vielkernige Riesenzellen mit zufällig verteilten Zellkernen im Zytoplasma. Ihr Auftreten ist typisch bei Fremdmaterial.

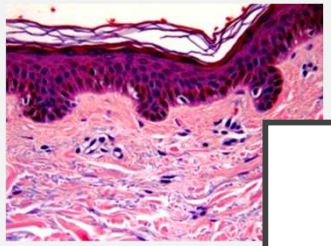
Touton-RZ
Zentraler Ring mit Zellkernen,



FK-RZ
Zufällig verteilte Zellkerne.



LH-RZ
An einem Zellpol hufeisenförmige Zellkerne (z.B. TBC)

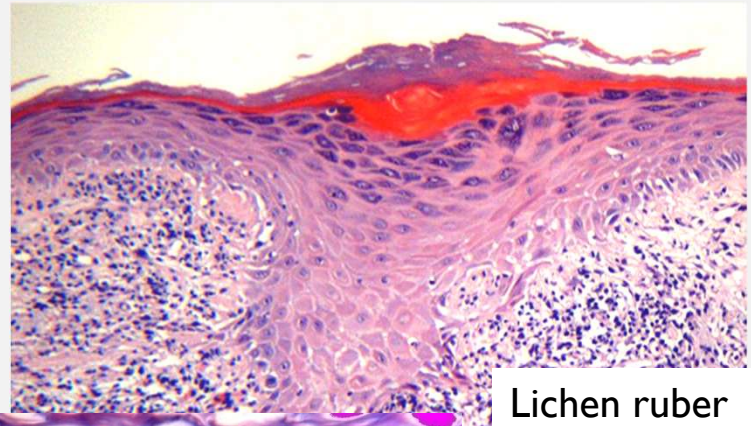


ABC

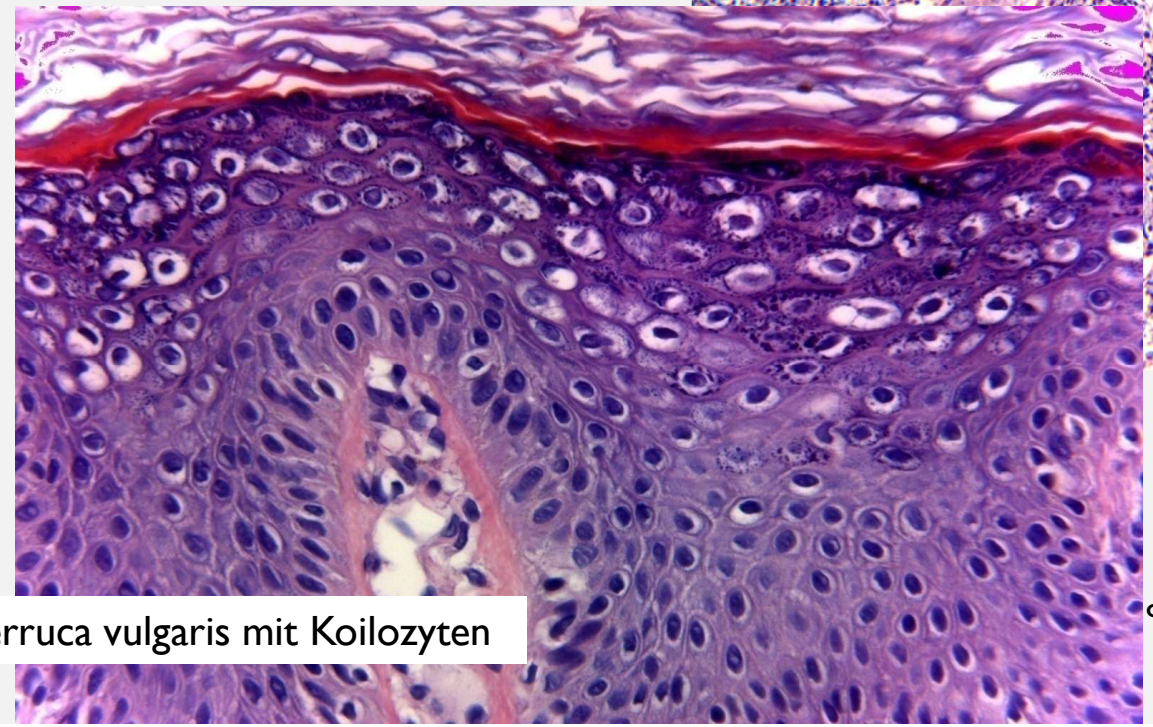
- Hypergranulose

verbreitertes Stratum granulosom

Viral -> HPV / entzündlich ->LR



Lichen ruber



Verruca vulgaris mit Koilozyten

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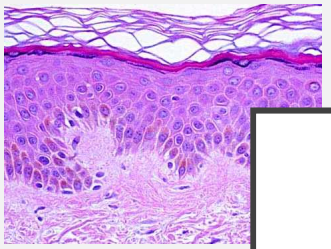


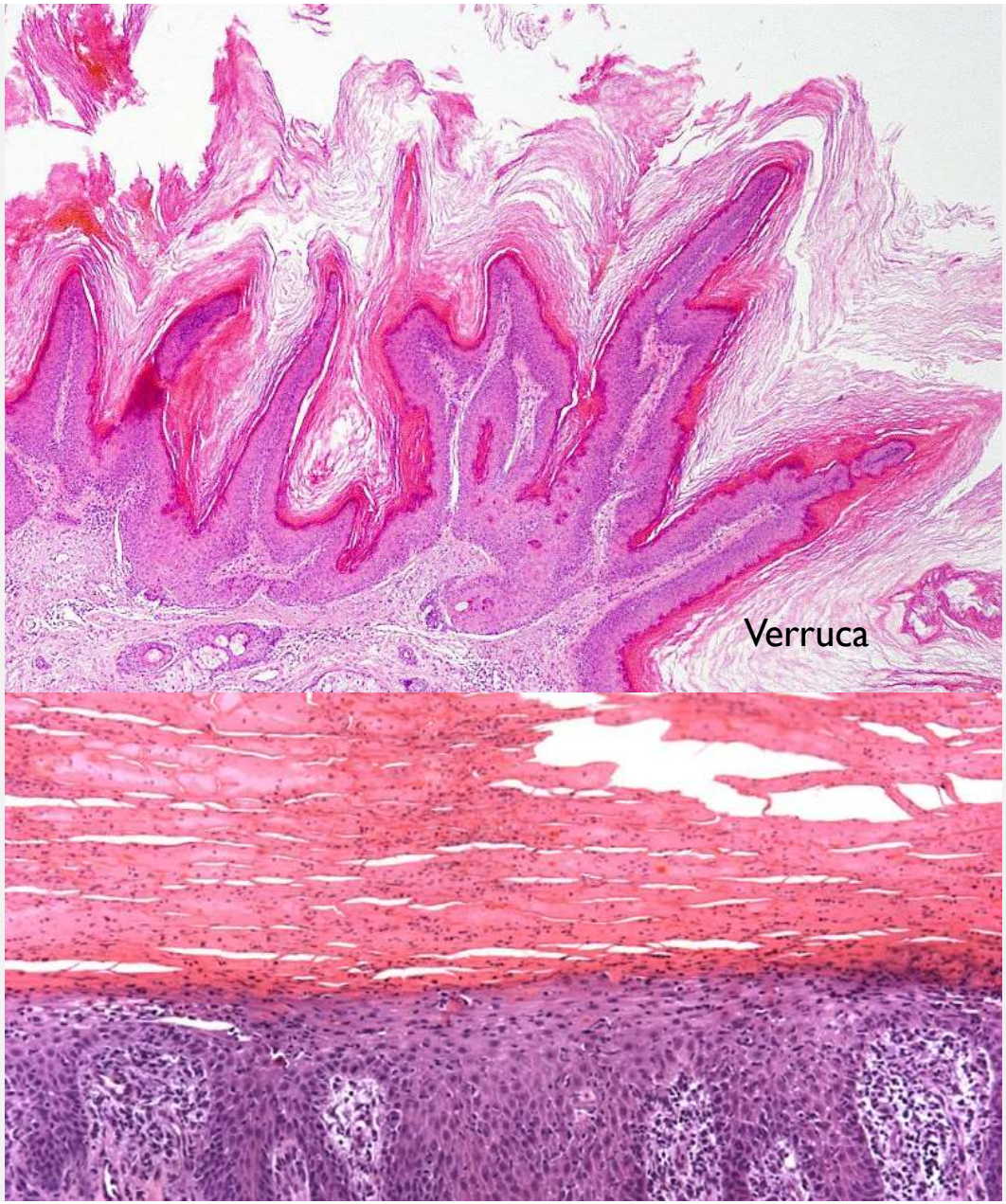
ABC

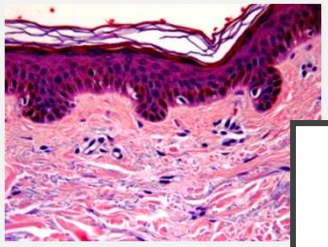
- Hyperkeratose

verbreitertes Stratum corneum (korbgeflechtartig, lamellär, kompakt);

- Hyperparakeratose

mit Zellkernresten



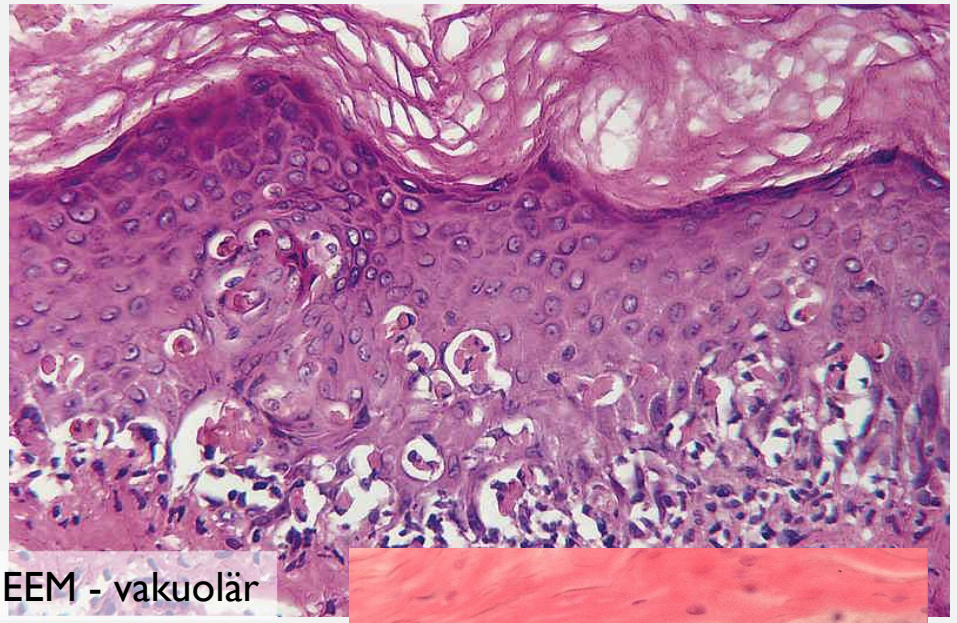


ABC

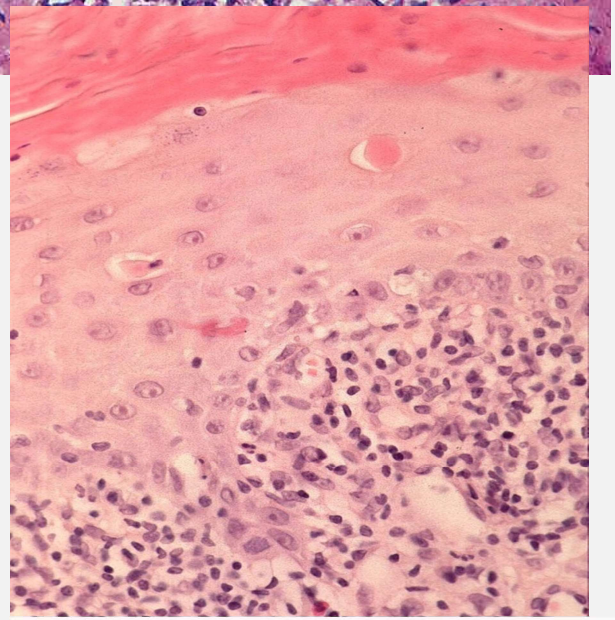
- Interface-Dermatitis

Lymphozten gegen die BMZ gerichtet

Degeneration und Nekrose basaler Keratinozyten, vakuolisierte Junktionszone / interzelluläre Vakuolen mit "durchlässiger" Basalzellschicht, meist apoptotische Keratinozyten (Corps ronds/Civatte bodies/Dyskeratosen)



EEM - vakuolär



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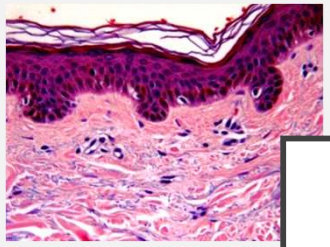
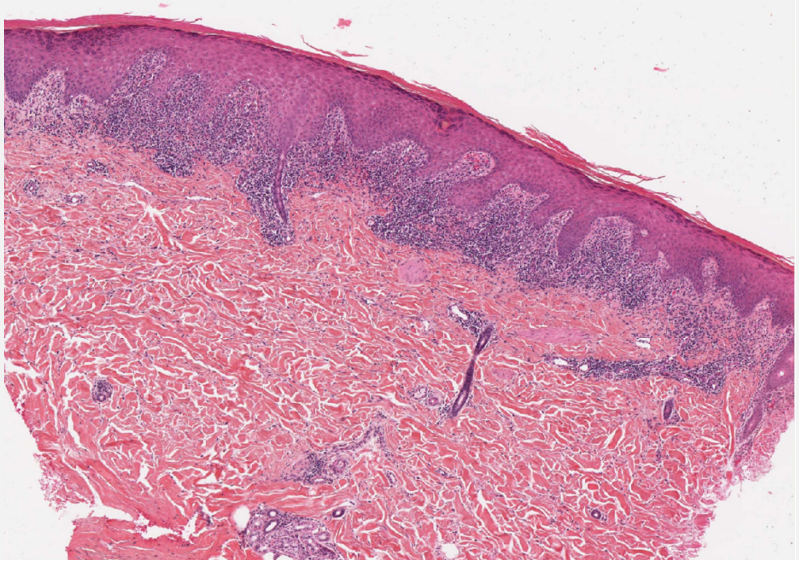
Lichen ruber – lichenoid

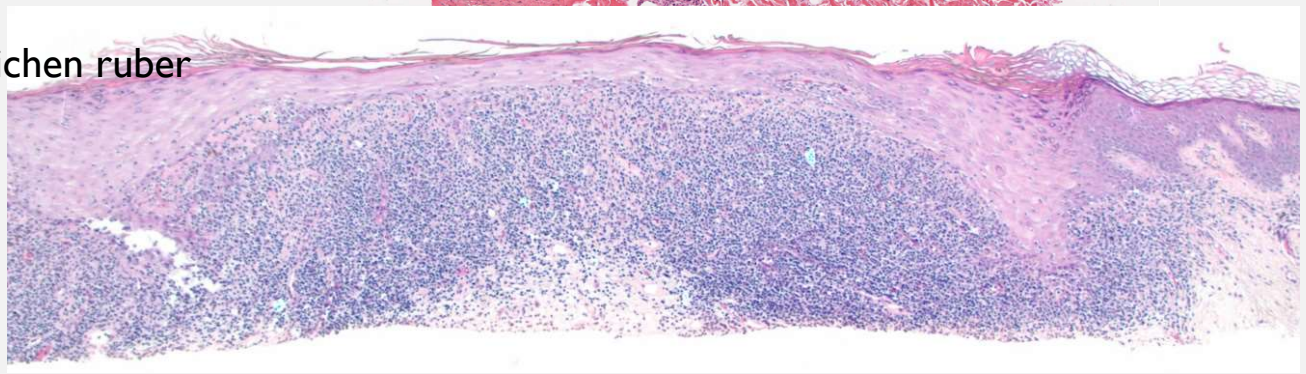


ABC

- Interface Dermatitis zeigt oft ein lichenoides Infiltrat: bandförmig, lymphozytär



Lichen ruber



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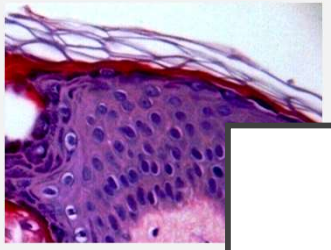
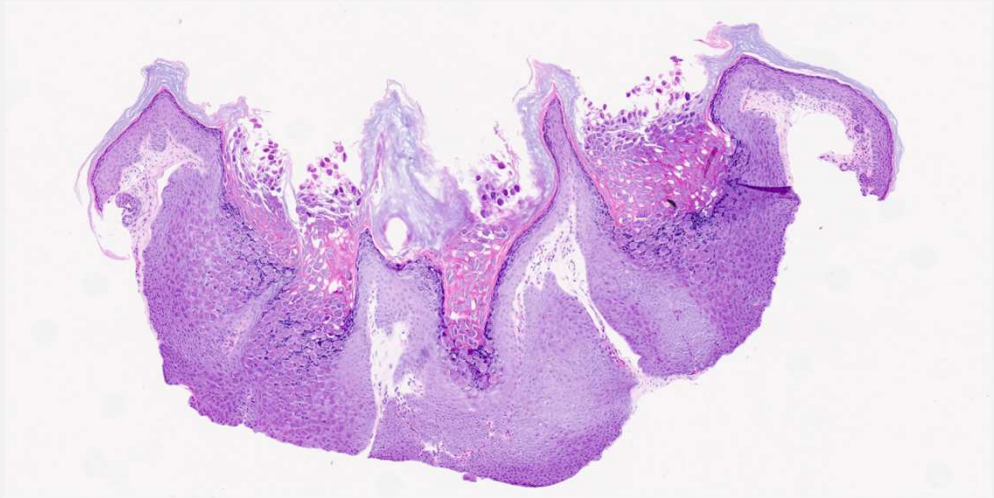
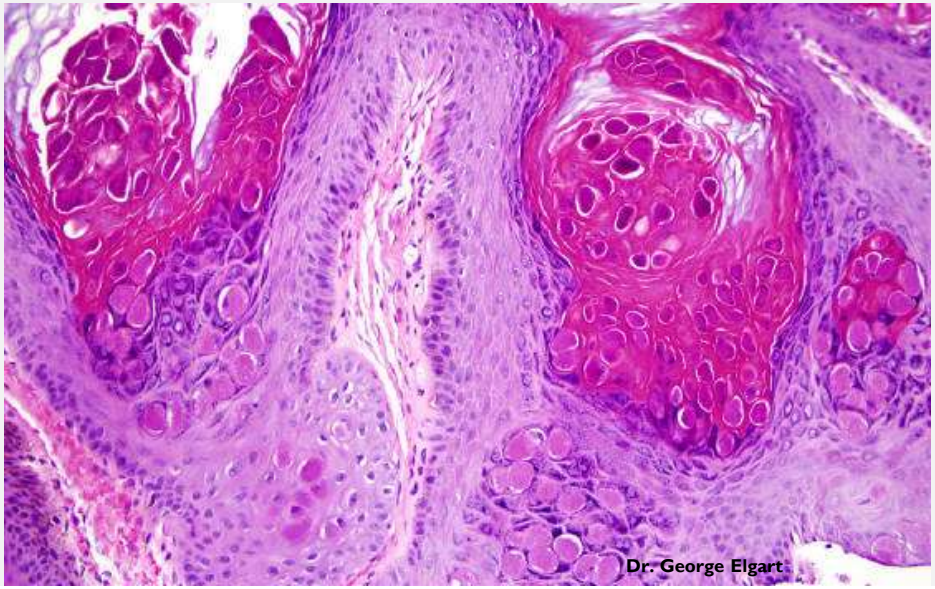
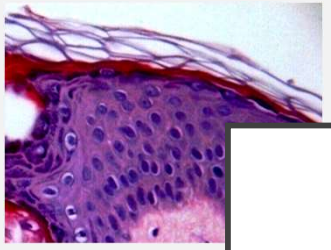


ABC

- Intrazytoplasmatische Einschlusskörper
  intrazytoplasmatische Ansammlung von Fremdmaterial oder zelleigenen Proteinen (Molluscum contagiosum)







ABC

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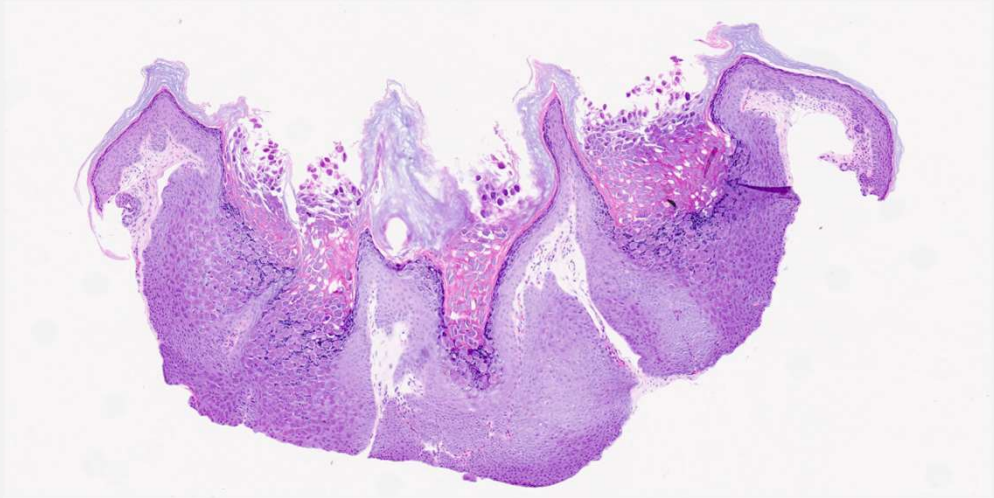
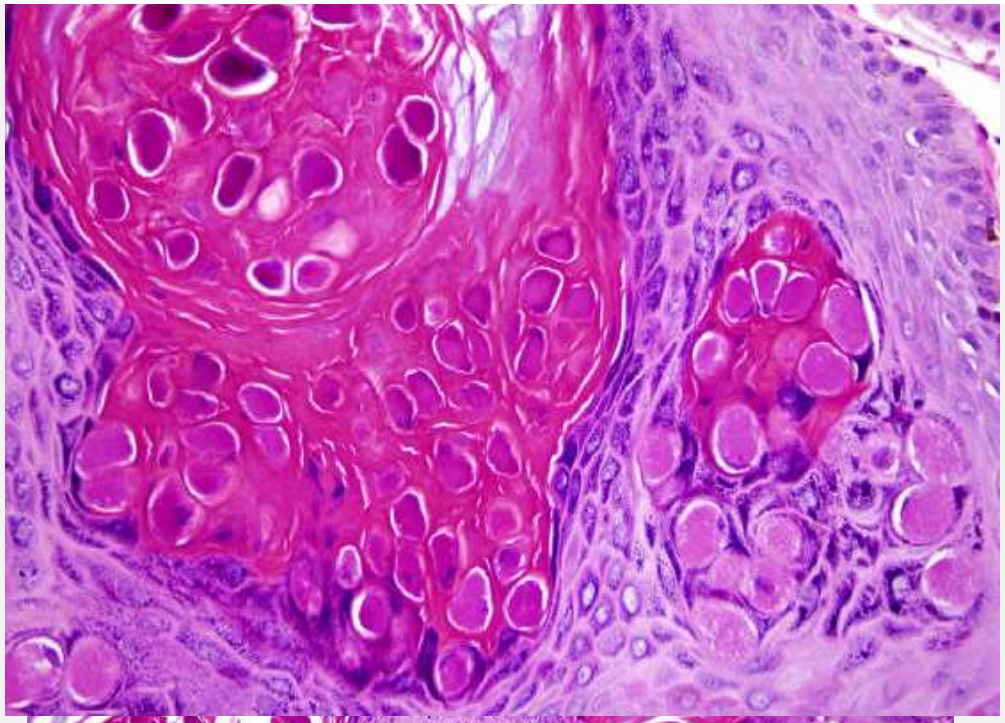
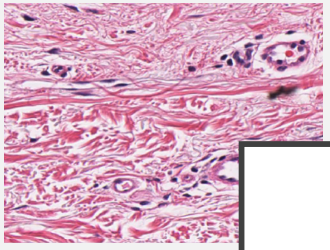


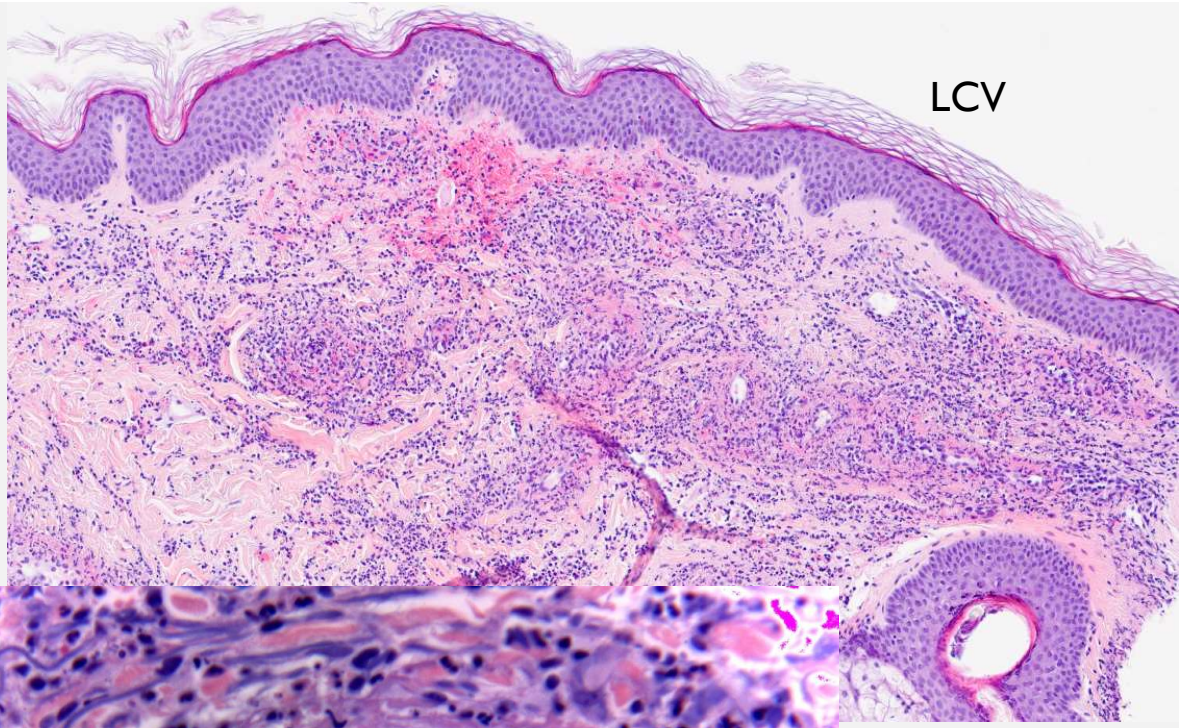


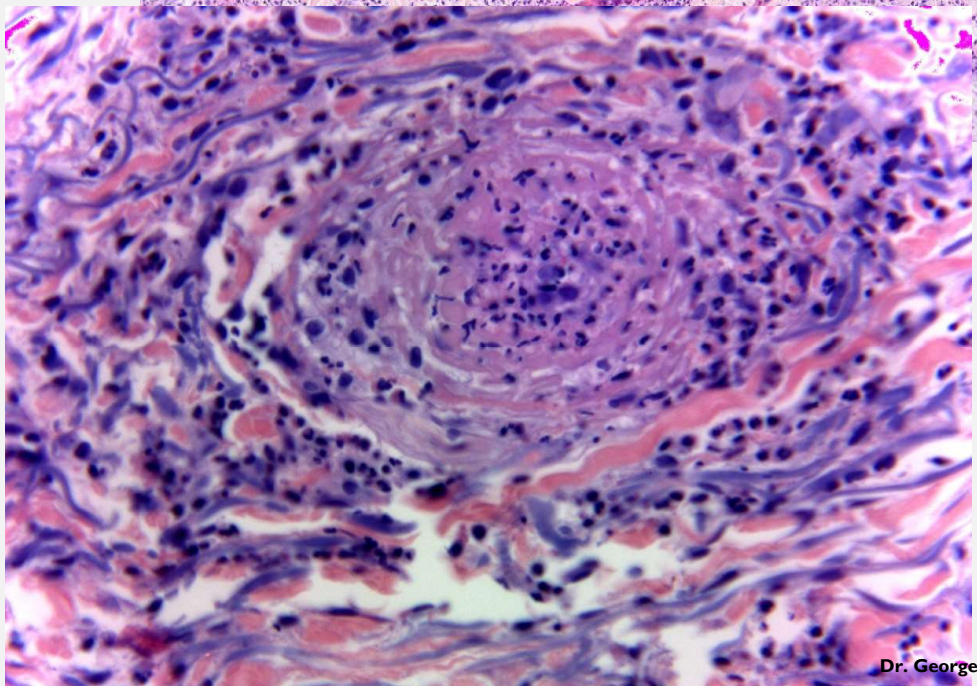


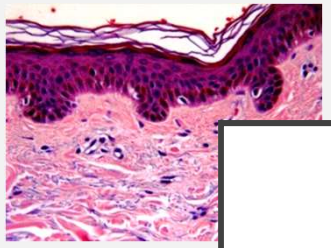
ABC

- Karyorrhexis (Kernstaub)

  Neutrophilentrümmer im Intersititum





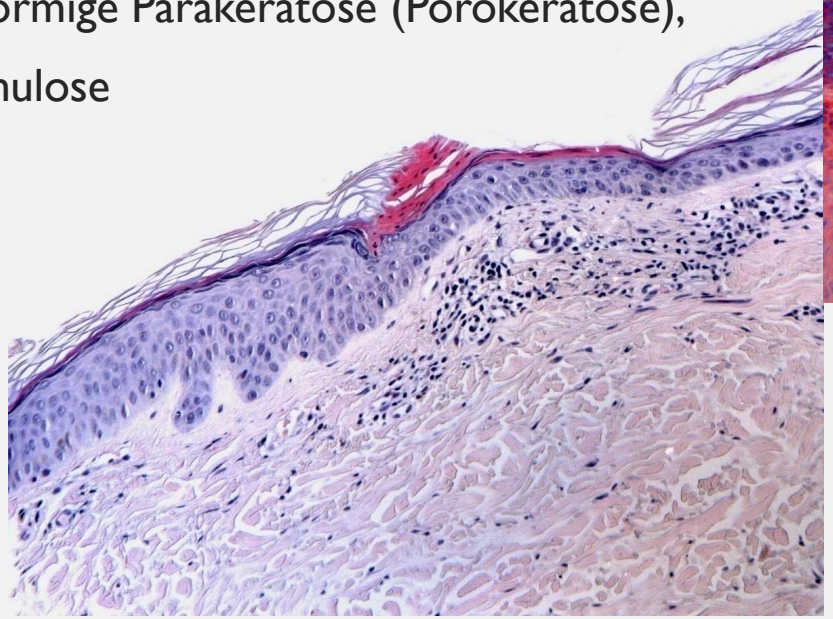


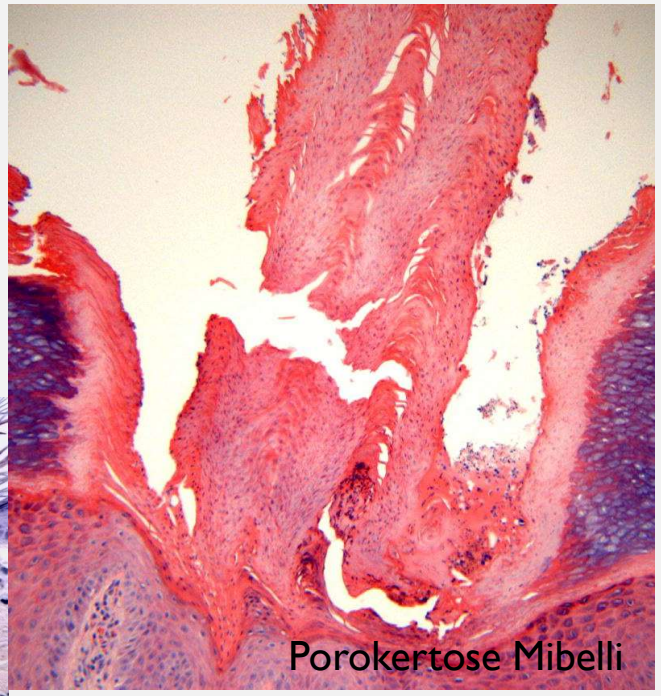
ABC

- Kornoide Lamelle

umschriebene säulenförmige Parakeratose (Porokeratose),

darunter Hypo-/ Agranulose





Porokertose Mibelli

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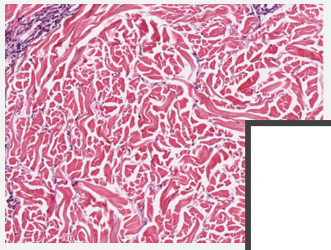


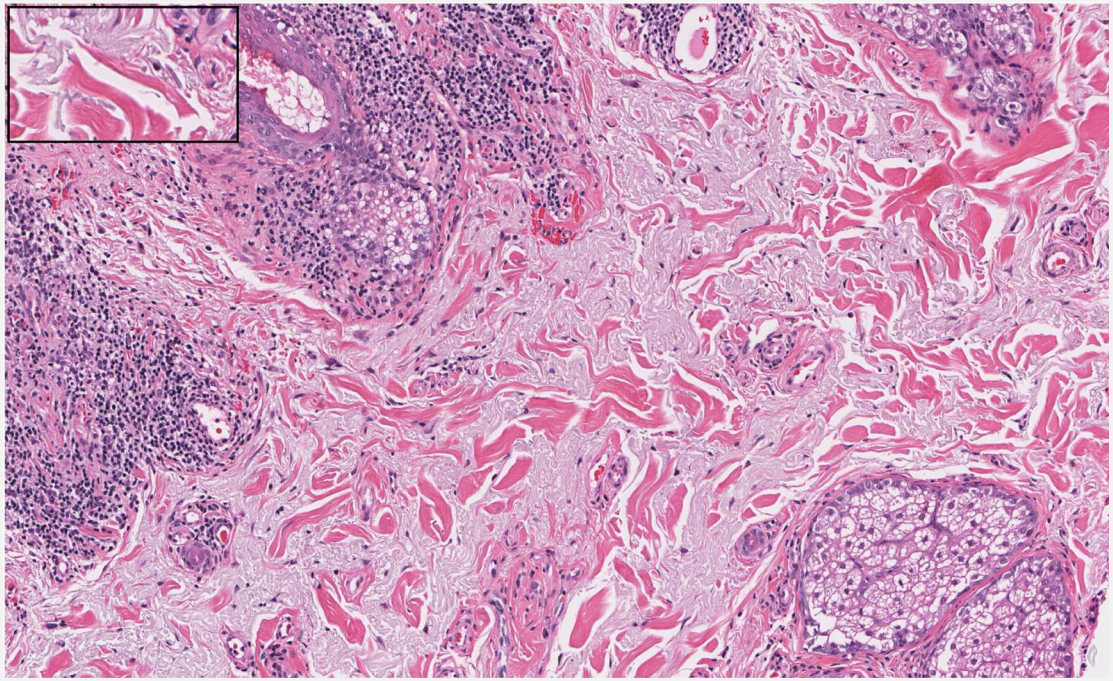
ABC

- Muzin (muzinös od. myxoid)

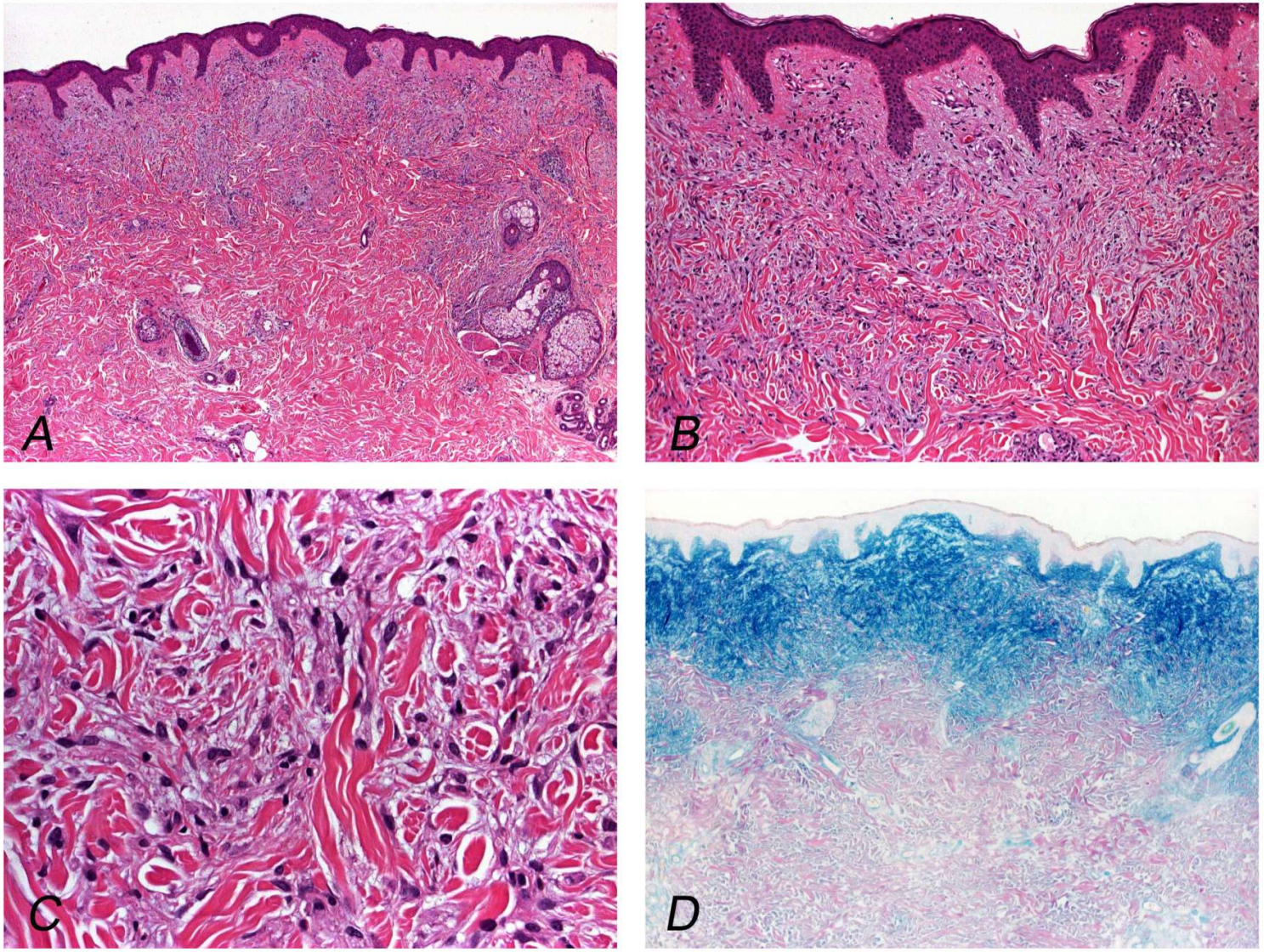
Interstitielle Mucopolysaccharid-Ablagerung

Färbt mit Alcian blau und

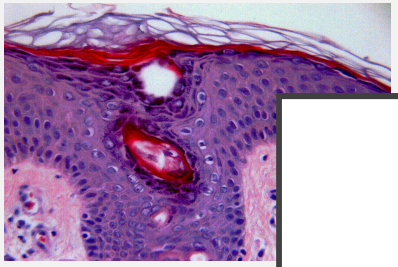
deutet auf chronische Entzündungen hin



CDLE



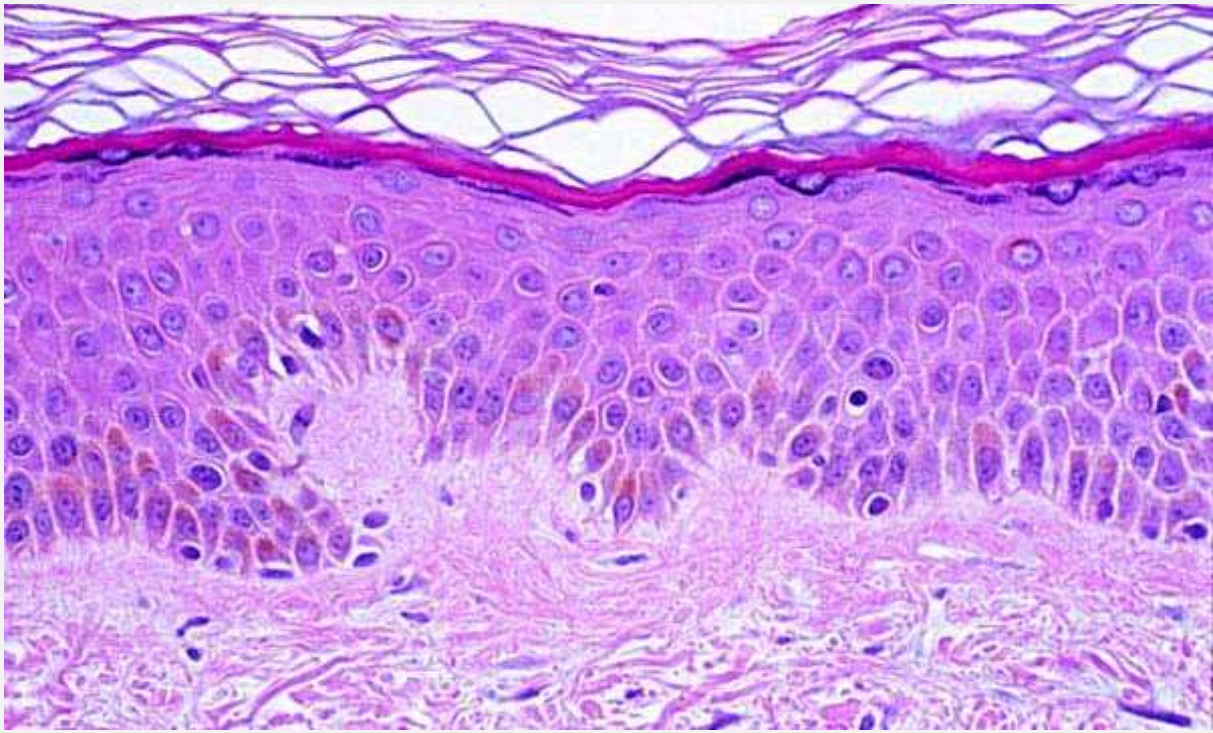
Skleromyxödem



ABC

- Orthokeratose

  regelrechte Verhornung, korbgeflechtartig



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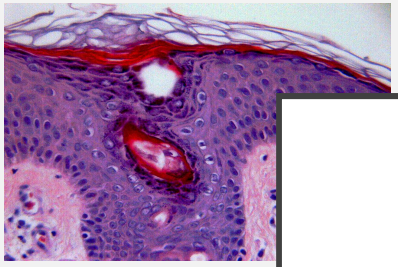
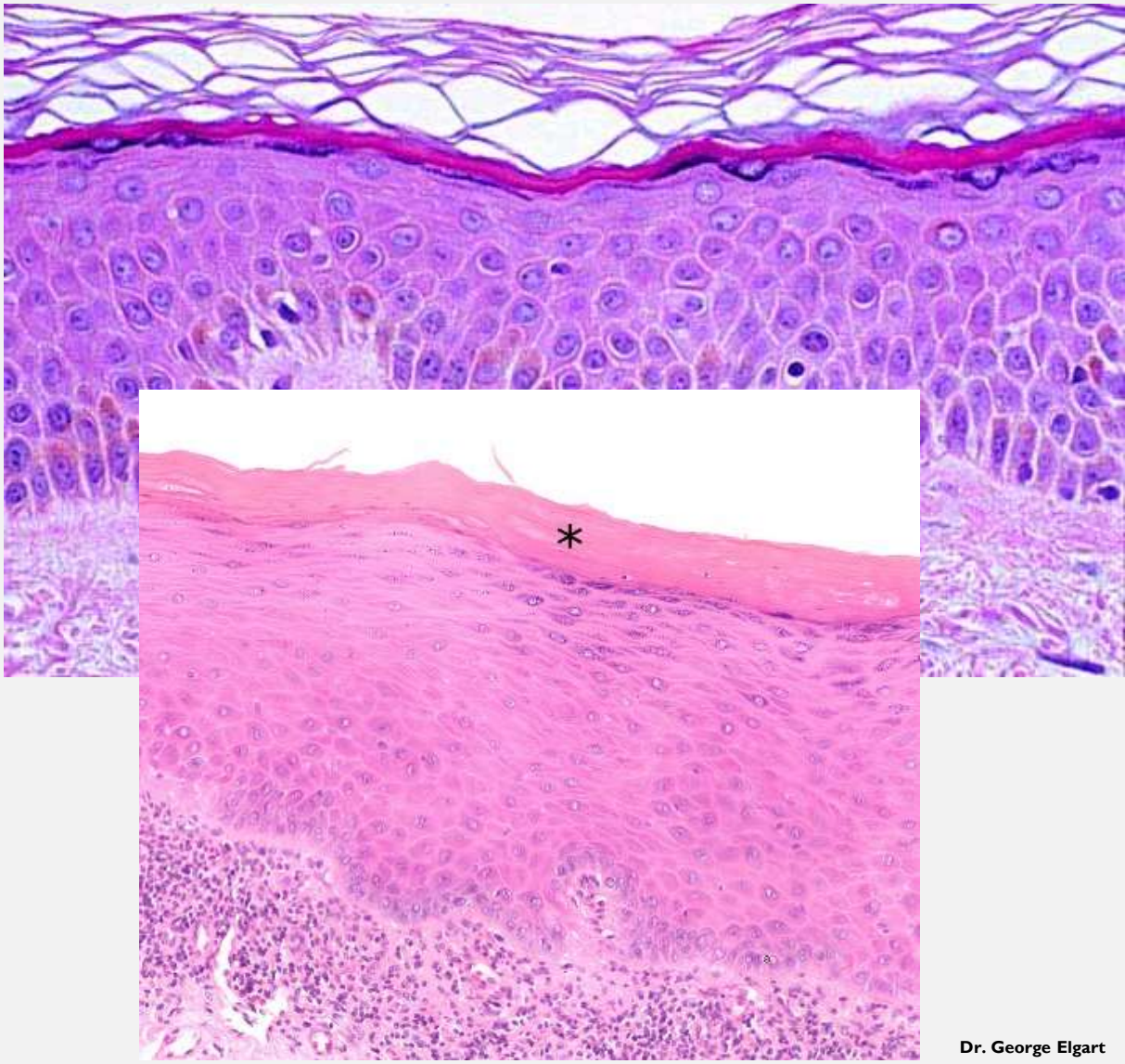


ABC

- Orthokeratose

  regelrechte Verhornung, korbgeflechtartig

- **kompakte** Orthokeratose *
  dicht zusammengelagerten Keratinozyten, Vorkommen an Händen und Füßen, aber auch als Reaktion auf chronisches Reiben wie beim z.B. beim Lichen simplex chronicus oder auch beim Lichen ruber panus



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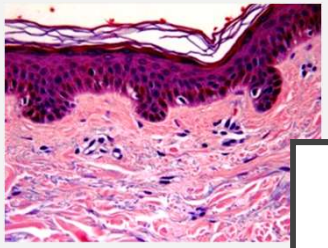
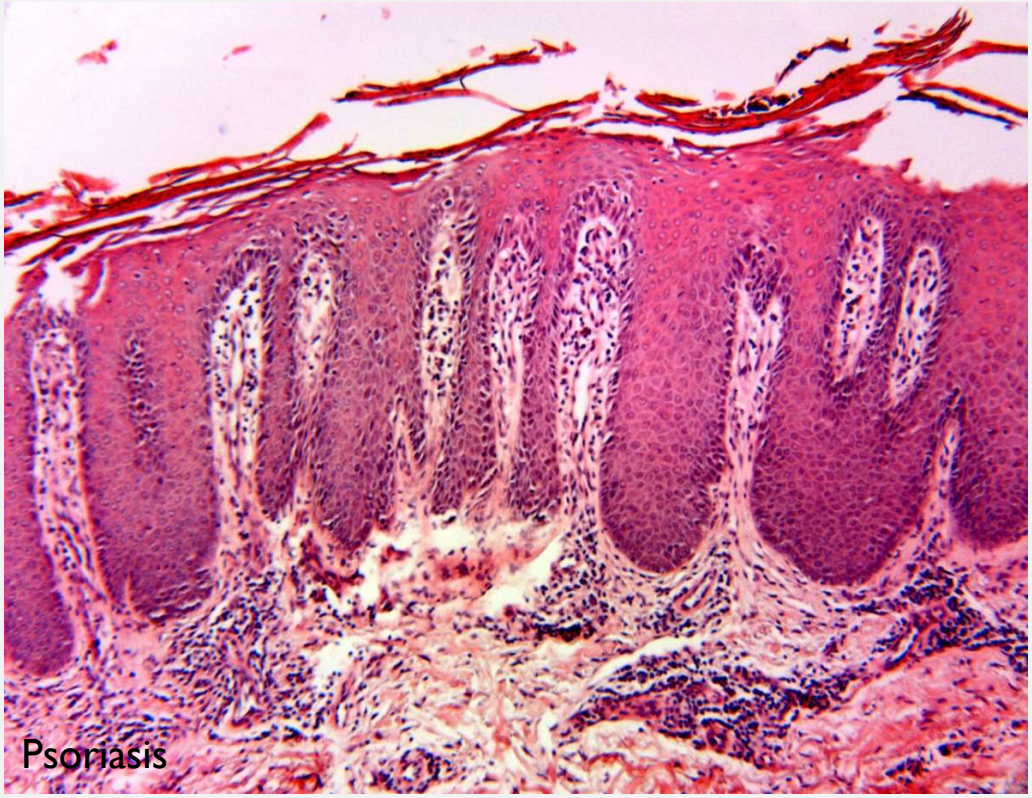


ABC

- Papillomatose

verbreiteter und hochgezogener Papillarkörper, verschmälerte suprapapilläre Epidermis



Psoriasis

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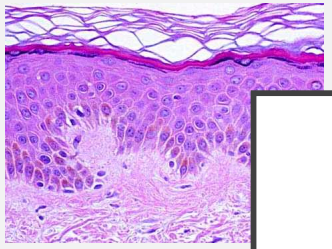
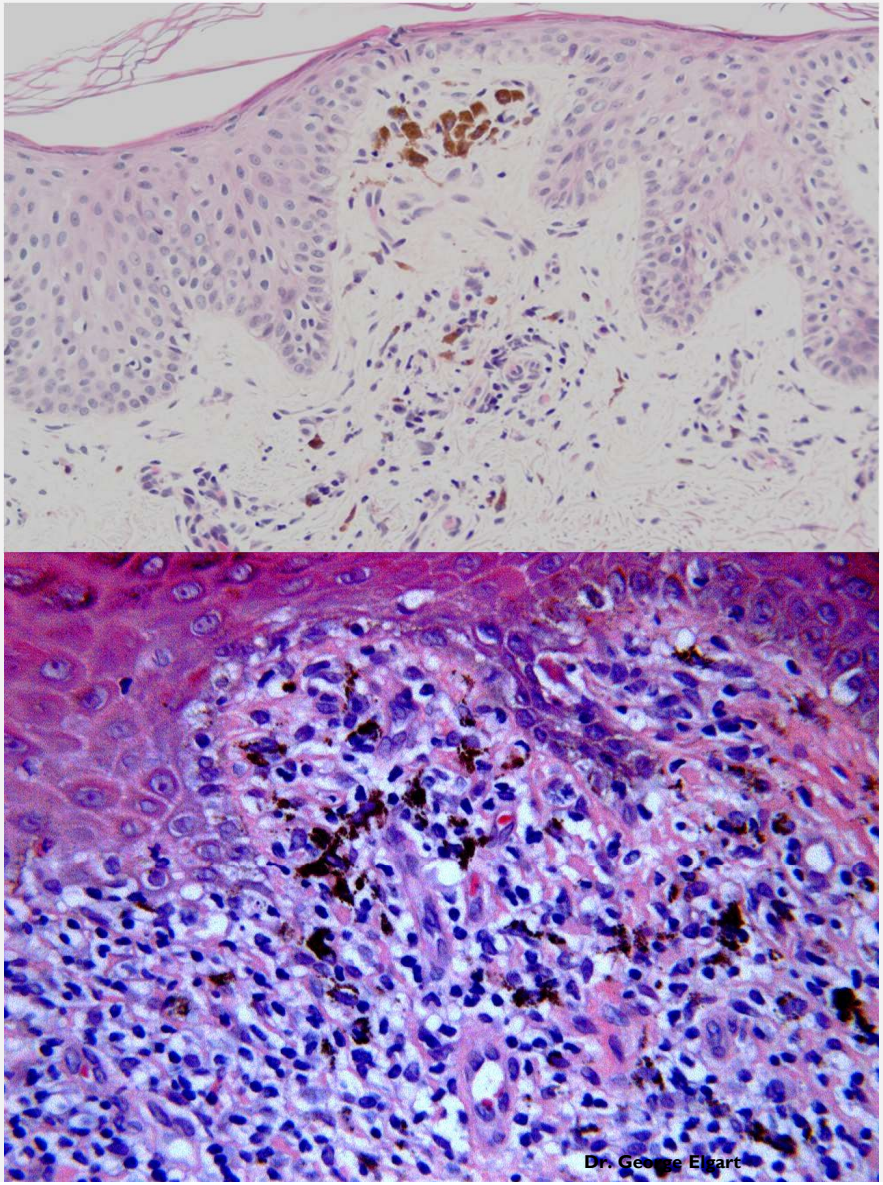
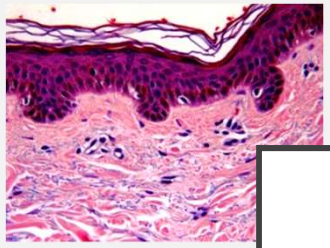


ABC

- Pigmentinkontinenz

Melaninablagerung intrazellulär in Makrophagen =>
Melanophagen im (papillären) dermalen BG



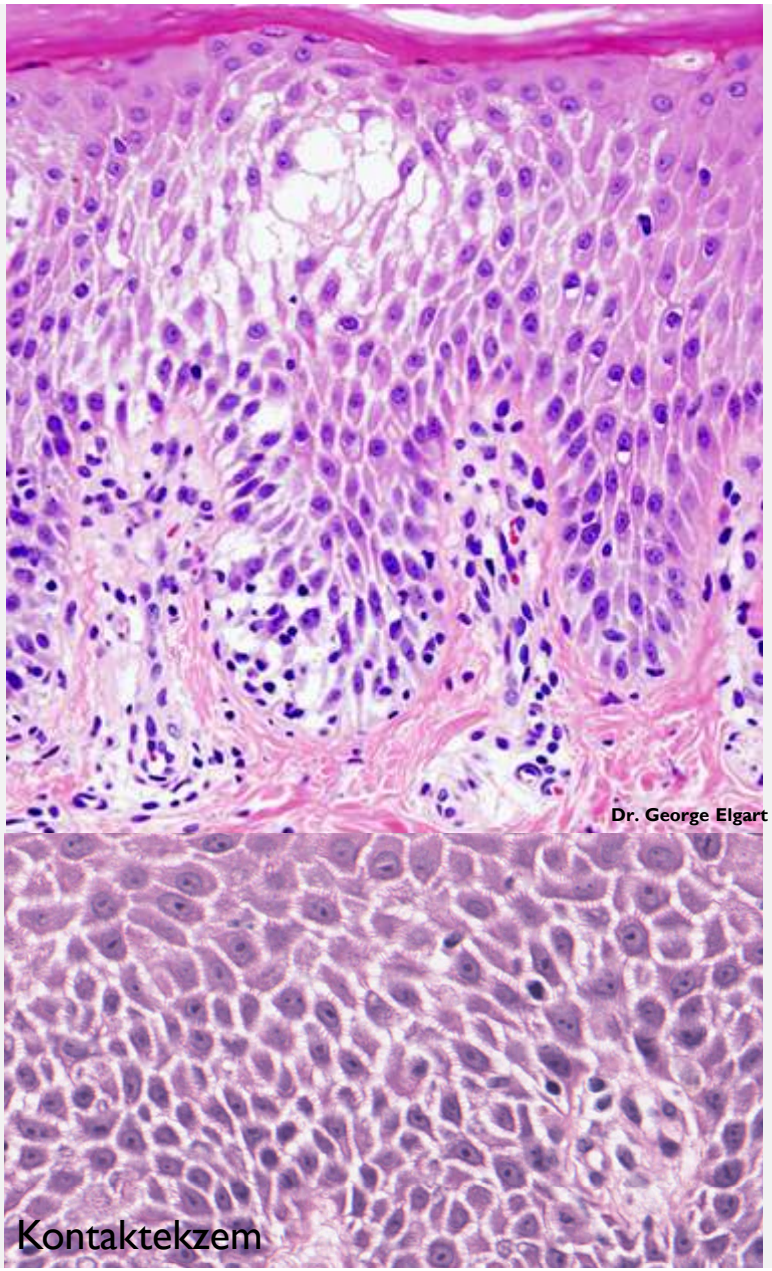


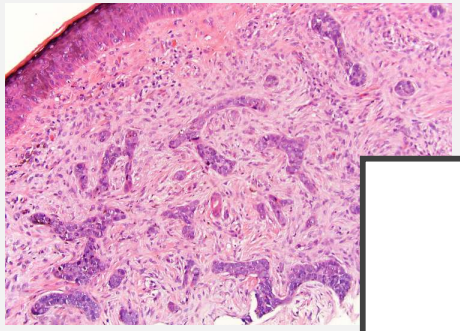
ABC

- Spongiose

  erweiterte Interzellularräume, verlängerte Interzellularbrücken, ev. spongiotische Vesikelbildung

  oft in Assoziation mit Parakeratose, intracornealen Serumeinschlüssen, intraepidermalen Lymphozyten



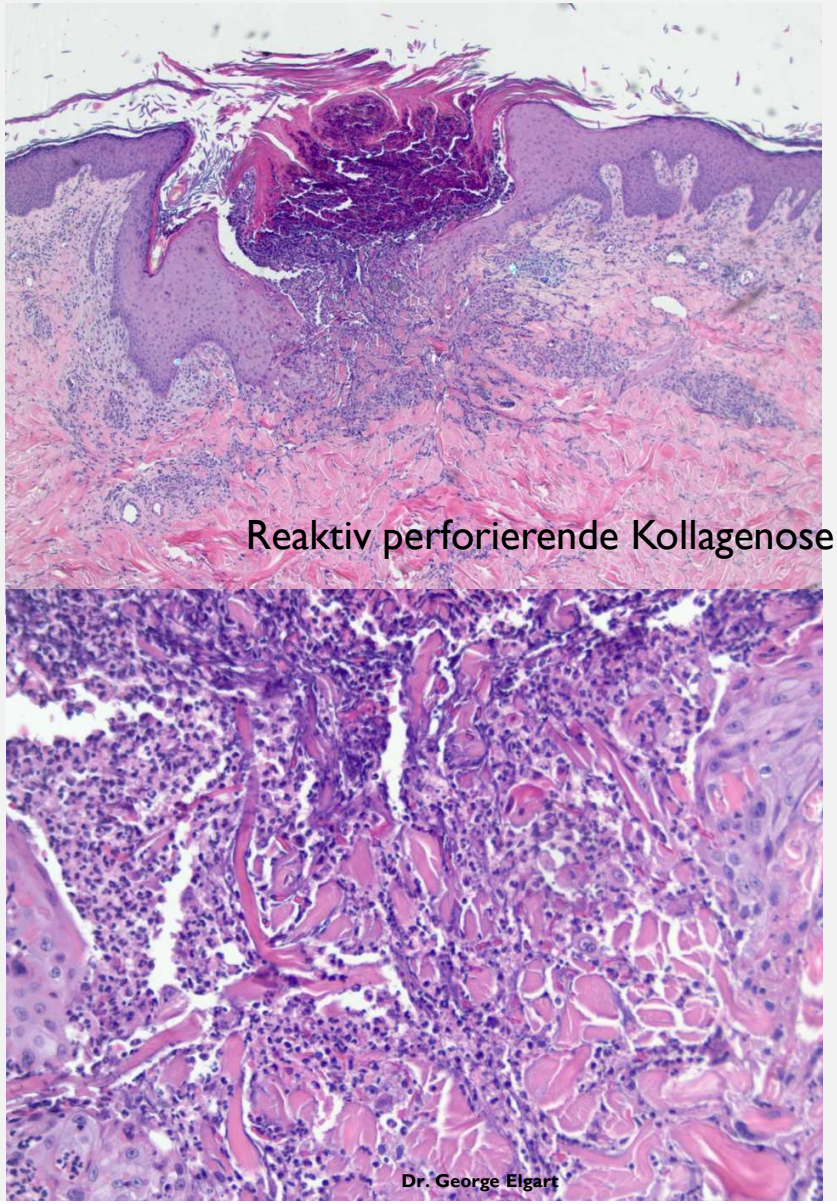


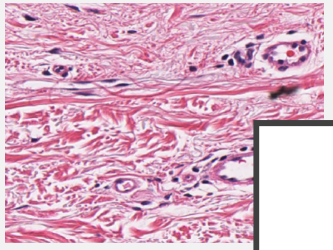
ABC

- Transepidermale Elimination

  via **inter**zelluläre epidermale Poren, Haarfollikel oder interzellulärem passivem Transport während epidermaler Reifung

  Körpereigenes und -fremdes Material (Kollagen, elastischen Fasern, Erythrozyten, Amyloid, Kalziumsalzen, Knochen, FK, Debris, Fungi, Muzin)

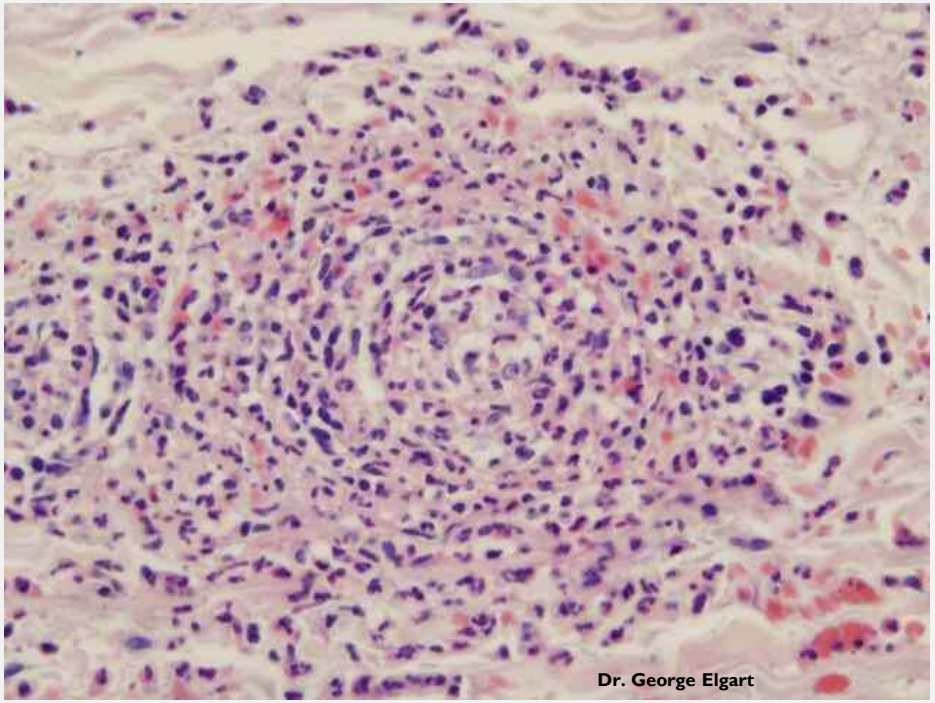


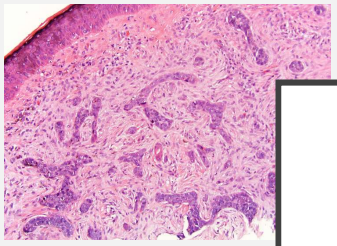


ABC

- Vaskulitis

Verquellung der Gefäßwände mit Fibrineinlagerungen, Endothelzellschwellung, intramurale entzündliche Durchsetzung der Gefäßwände, luminale Thromben (akutes Stadium)

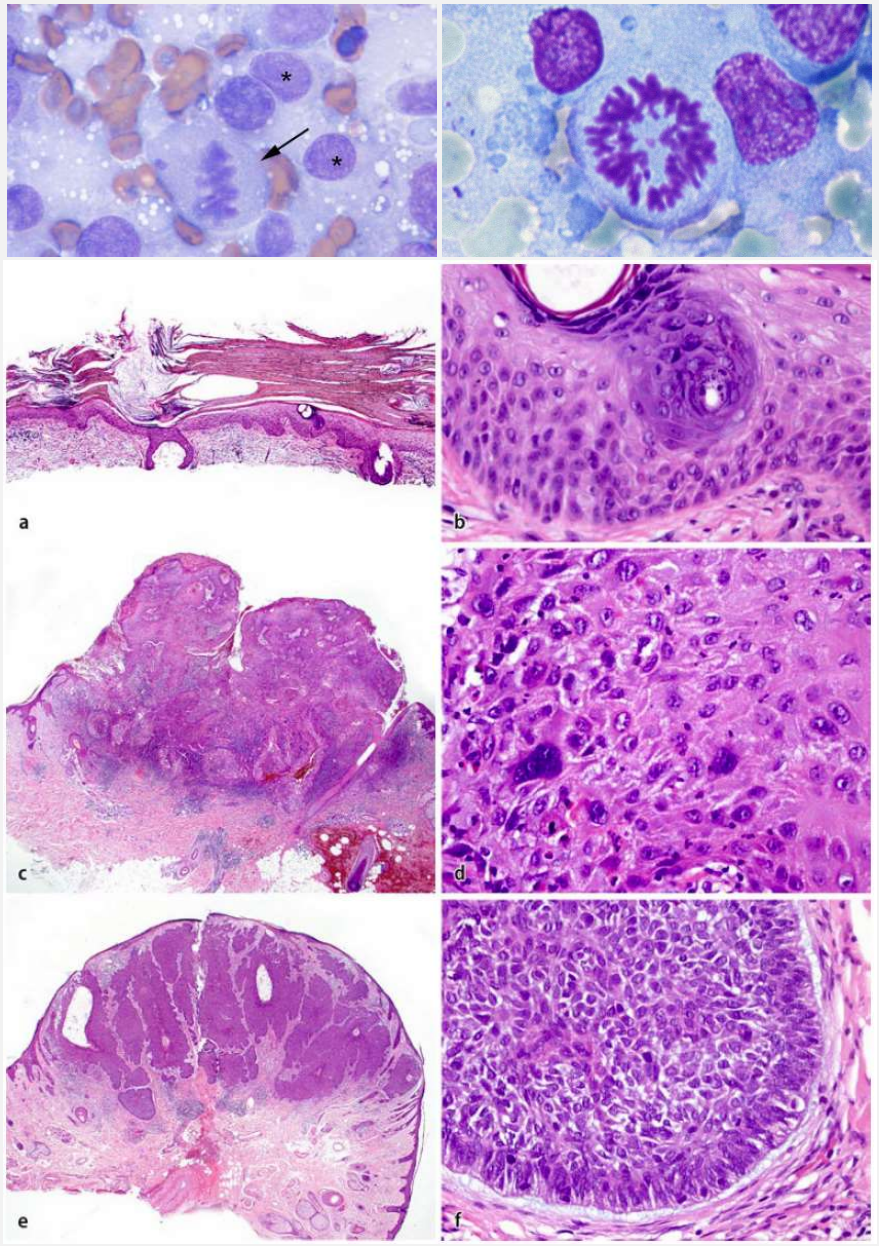




ABC

Malignitätskriterien

- Asymmetrie
- Unscharfe Begrenzung
- Ulzeration, Nekrosen
- Zell- und Kernpleomorphie
- Kern-Plasma-Relation
- Dicht gedrängt stehende Zellkerne (crowding)
- Vermehrte (suprabasale) Mitosen, atypische Mitosen (X-, Y-, Ring-förmig)



Böer-Auer, Metze 2013

DIAGNOSTISCHER ALGORITHMUS

A. Bernard Ackerman
1936-2008

SUPERFICIAL PERIVASCULAR DERMATITIS (Cont.)

- **Spongiotic only**
  - **Lymphocytes predominate**
    - No other findings → Allergic contact dermatitis/ Nummular dermatitis/ Dyshidrotic dermatitis/ Id reaction/ Photoallergic dermatitis, early
    - Hyphae in cornified layer → Dermatophytosis
    - Spongiosis centered in acrosyringia → Miliaria rubra
    - Spongiotic simulation of Pautrier's collections → Gianotti-Crosti syndrome
    - Mounds of scale-crust → Pityriasis rosea/ Erythema annular centrifugum
    - Mounds of scale-crust at ilps of infundibular ostia → Seborrheic dermatitis
    - Individual necrotic keratinocytes, foci of parakeratosis → Lichen striatus
    - Scant spongiosis, slight parakeratosis → Pityriasis alba
    - Few lymphocytes in epidermis, scant spongiosis, elongated mounds of scale-crust → Mycosis fungoides, macule/patch
  - **Eosinophils prominent**
    - Variable numbers of eosinophils in upper half of dermis, slight spongiosis → Pruritic urticarial papules and plaques of pregnancy
    - Eosinophils in dermis and sometimes in epidermis → Allergic contact dermatitis/ Nummular dermatitis/ Dyshidrotic dermatitis/ Id reaction, early
    - Eosinophils as solitary units in diffuse fashion in epidermis → Bullous pemphigoid/ Herpes gestationis/ Pemphigus vulgaris, urticarial
    - Eosinophils in collections in foci of prominent spongiosis → Incontinentia pigmenti
    - Eosinophils in collections in foci of scant spongiosis → Toxic erythema of the newborn
    - Eosinophils in focus of prominent spongiosis above apex of wedge-shaped dermal infiltrate → Arthropod assault, superficial
- **Psoriasiform**
  - **Lymphocytes predominate**
    - Prominent spongiosis, scale-crust → Allergic contact dermatitis/ Nummular dermatitis/ Dyshidrotic dermatitis/ Id reaction
    - Scale-crusts at ilps of follicular ostia → Seborrheic dermatitis
    - Scale-crusts not at ilps of follicular ostia → Nonbullous congenital ichthyosiform erythroderma
    - Periadnexal infiltrate of lymphocytes, necrotic keratinocytes → Lichen striatus
- **Lichenoid**
  - **Lymphocytes predominate**
    - Periadnexal infiltrate of lymphocytes, necrotic keratinocytes, spongiosis with numerous eosinophils → Lichen striatus / Bullous pemphigoid/ Herpes gestationis, urticarial
    - Lymphocytes as solitary units, at least, in epidermis, spongiosis scant, wiry bundles of collagen in upper part of dermis → Mycosis fungoides, patch/plaque
- **Psoriasiform lichenoid**
  - **Lymphocytes predominate**
    - Periadnexal infiltrate of lymphocytes, necrotic keratinocytes → Lichen striatus
    - Spongiosis with numerous eosinophils → Bullous pemphigoid/Herpes gestationis, urticarial
    - Lymphocytes as solitary units, at least, within epidermis, spongiosis scant, wiry bundles of collagen in upper part of dermis → Mycosis fungoides, patch/plaque
- **Psoriasiform only**
  - **Lymphocytes predominate**
    - Spiraled capillaries in thin dermal papillae, rete ridges of uniform length, some rete ridges thinned → Psoriasis
    - Rete ridges of uneven lengths, parakeratosis, no spiraled capillaries in dermal papillae → Allergic contact dermatitis/ Nummular dermatitis/ Dyshidrotic dermatitis, late
    - Checkerboard pattern of orthokeratosis and parakeratosis → Pityriasis rubra pilaris
    - Scale-crust at ilps of infundibular ostia → Seborrheic dermatitis
    - Hyphae in cornified layer → Dermatophytosis
    - Pseudohyphae in cornified layer → Candidiasis
    - Hyperkeratosis, hypergranulosis, coarse collagen bundles often perpendicular to skin surface in thickened papillary dermis → Lichen simplex chronicus/ Prurigo nodularis/ Acanthoma fissuratum/ Pressure papule from prosthesis/ Sutler's nodules/ Chondrodermatitis nodularis helicis
- **Lichenoid**
  - **Lymphocytes predominate**
    - Lymphocytes along adnexal structures in reticular dermis, individual necrotic keratinocytes → Lichen striatus
    - Wiry bundles of collagen in haphazard array in upper part of dermis, lymphocytes numerous in epidermis with scant spongiosis → Mycosis fungoides, plaque
    - Stubby zones of parakeratosis and no granular zone beneath them → Inflammatory linear verrucous epidermal nevus
  - Histiocytes and plasma cells predominate → Syphilis, secondary

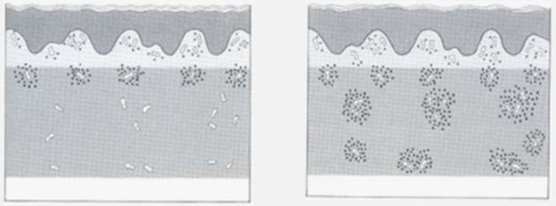
SUPERFICIAL AND DEEP PERIVASCULAR DERMATITIS

- **NO EPIDERMAL INVOLVEMENT**
  - **Perivascular only**
    - **Lymphocytes predominate**
      - No other change → Polymorphous light eruption, early/ Erythema figuratum/ Erythema chronicum migrans/ Pernio/ Erythema nodosum (no subcutaneous fat in superficial biopsy specimen)
      - Marked edema in papillary dermis → Polymorphous light eruption
      - Abundant mucin in reticular dermis → Discoid lupus erythematosus, tumid
      - Nuclei of lymphocytes crenulated → Chronic lymphocytic leukemia/ B-cell lymphoma
    - **Eosinophils prominent** — Wedge-shaped infiltrate → Arthropod assault and simulators of it*
    - **Plasma cells prominent** → Erythema chronicum migrans / Scleroderma
    - **Histiocytes and lymphocytes prominent** → Leprosy, indeterminant
  - **Perivascular and interstitial**
    - **Neutrophils prominent**
      - Neutrophils splayed between collagen bundles in focus in reticular dermis → Suppurative folliculitis (periphery of lesion)
      - Neutrophils in and around eccrine glands → Neutrophilic eccrine hidradenitis
      - Wedge-shaped infiltrate → Flea bite
      - Sparse infiltrate, neutrophils splayed between collagen bundles in reticular dermis → Cellulitis
      - Rims of homogeneous material around venules in upper part of dermis → Erythropoietic protoporphyria
    - **Eosinophils prominent**
      - Wedge-shaped infiltrate → Arthropod assault and simulators of it* / Erythema chronicum migrans
      - "Flame figures" in variable numbers → Wells' syndrome
    - **Eosinophils and neutrophils** — Sparse infiltrate → Urticaria
    - **Plasma cells present** — Eosinophils sometimes present also → Erythema chronicum migrans
    - **Neutrophils, eosinophils, and plasma cells** — "Bottom heavy" infiltrate often, hints of crowded, thickened bundles of collagen sometimes → Scleroderma, early
    - **Histiocytes predominate**
      - Mucin in center of palisades → Granuloma annulare
      - Degenerated collagen early, thickened collagen late in center of palisades → Necrobiosis lipoidica
      - "Bottom heavy" infiltrate often, eosinophils and neutrophils in conjunction with degeneration of collagen bundles focally → Interstitial granulomatous dermatitis with arthritis
      - Few lymphocytes in epidermis, scant spongiosis → Mycosis fungoides, granulomatous
- **INTERFACE**
  - **Vacuolar**
    - **Lymphocytes predominate**
      - Basement membrane sometimes thickened, smudged interface, thinned epidermis → Discoid lupus erythematosus
      - Individual necrotic keratinocytes, ballooning, parakeratosis → Mucha-Habermann disease
    - **Neutrophils and eosinophils prominent** — Individual necrotic keratinocytes, ballooning → Fixed drug eruption
  - **Lichenoid**
    - **Lymphocytes predominate**
      - Eosinophils sometimes, focal parakeratosis → Lichenoid drug eruption
      - Individual necrotic keratinocytes sometimes → Lichenoid photodermatitis
      - Individual necrotic keratinocytes, ballooning, spongiosis → Mucha-Habermann disease
      - Thickened basement membrane, smudged appearance of interface, thinned epidermis focally → Discoid lupus erythematosus
      - Thinned epidermis, prominent granular layer, parakeratosis → Graft vs. host reaction
      - Abnormal lymphocytes in wedge-shaped infiltrate, often plasma cells, eosinophils, and neutrophils, as well as small lymphocytes → Lymphomatoid papulosis
      - Lymphocytes in epidermis, scant spongiosis → Mycosis fungoides, plaque
    - **Neutrophils, eosinophils, and plasma cells prominent** — Abnormal lymphocytes in wedge-shaped infiltrate → Lymphomatoid papulosis
- **BALLOONING**
  - **Ballooning only** — Lymphocytes predominate → Hydroa aestivale/Hydroa vacciniforme
  - **Interface** — Lymphocytes predominate
    - Steel-gray nuclei, margination of chromatin → Herpesvirus infection
    - Individual necrotic keratinocytes, neutrophils, and eosinophils among predominant lymphocytes → Fixed drug eruption
  - **Spongiosis** — Lymphocytes predominate — Individual necrotic keratinocytes and neutrophils as solitary units in epidermis → Toxic shock syndrome
- **SPONGIOTIC**
  - **Spongiotic only**
    - **Lymphocytes predominate**
      - Sparse perivascular infiltrate of lymphocytes → Photoallergic dermatitis, early
      - Moderately dense perivascular infiltrate of lymphocytes → Polymorphous light eruption
    - **Eosinophils prominent** — Wedge-shaped infiltrate, eosinophils in reticular dermis mostly / Eosinophils in papillary dermis mostly → Arthropod assault and simulators of it* / Bullous pemphigoid/Herpes gestationis, urticarial
  - **Psoriasiform** — Lymphocytes predominate
    - Spongiosis prominent → Photoallergic dermatitis
    - Spongiosis scant → Mycosis fungoides, plaque
  - **Lichenoid** — Lymphocytes predominate
    - Neutrophils and eosinophils in addition to lymphocytes, spongiosis and ballooning prominent → Fixed drug eruption
    - Neutrophils often in addition to lymphocytes, prominent spongiosis → Dermatophytosis
    - Plasma cells prominent, scant spongiosis → Acrodermatitis chronica atrophicans
    - Plasma cells not prominent, scant spongiosis → Mycosis fungoides, plaque
  - **Psoriasiform lichenoid** — Lymphocytes predominate — Lymphocytes in epidermis, scant spongiosis → Mycosis fungoides, plaque
- **PSORIASIFORM**
  - **Psoriasiform only** — Lymphocytes predominate
    - Hyphae in cornified layer → Dermatophytosis
    - Innumerable mites, progeny of mites, and detritus of mites → Norwegian scabies
    - Mixed-cell infiltrate with predominance of lymphocytes, signs of lichen simplex chronicus, including multinucleate and stellate-shaped fibrocytes → Persistent light eruption, persistently rubbed (actinic reticuloid)
    - Mounds of parakeratosis → Pityriasis rosea, herald patch
  - **Lichenoid**
    - **Lymphocytes predominate**
      - Periadnexal infiltrate, individual necrotic keratinocytes → Lichen striatus
      - Wiry bundles of collagen in upper part of dermis, lymphocytes in epidermis → Mycosis fungoides, plaque
    - **Histiocytes and, sometimes, plasma cells predominate** → Syphilis, secondary

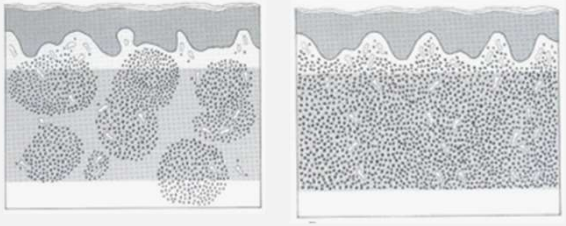
*Arthropod assault and simulators of it include insect bite, scabies, cutaneous larva migrans, cercarial dermatitis, reactions to caterpillar hairs, and coral dermatitis.

PATTERN DIAGNOSIS BY AB ACKERMAN

- Perivaskuläre und interstitielle Dermatitis

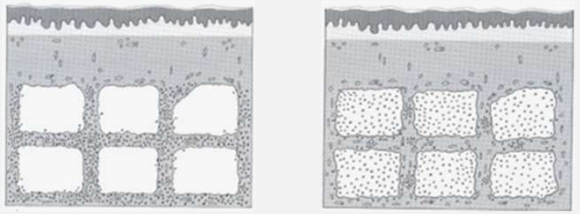


- Noduläre und diffuse Dermatitis



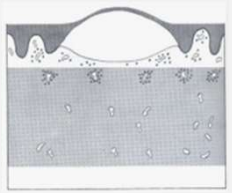
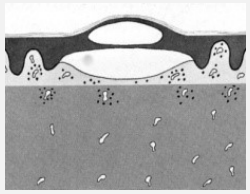
- Vaskulitis

- Panniculitis (septale/lobuläre)

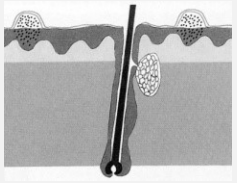


PATTERN DIAGNOSIS AB ACKERMAN

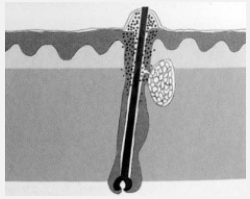
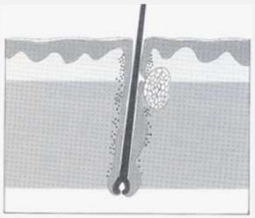
- Vesikuläre Dermatitis

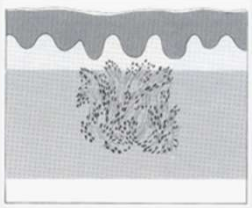
- Pustulöse Dermatitis



- Periinfundibulitis/Perifollikulitis

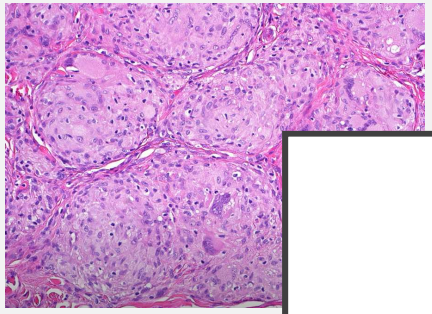



- Fibrosierende Dermatitis



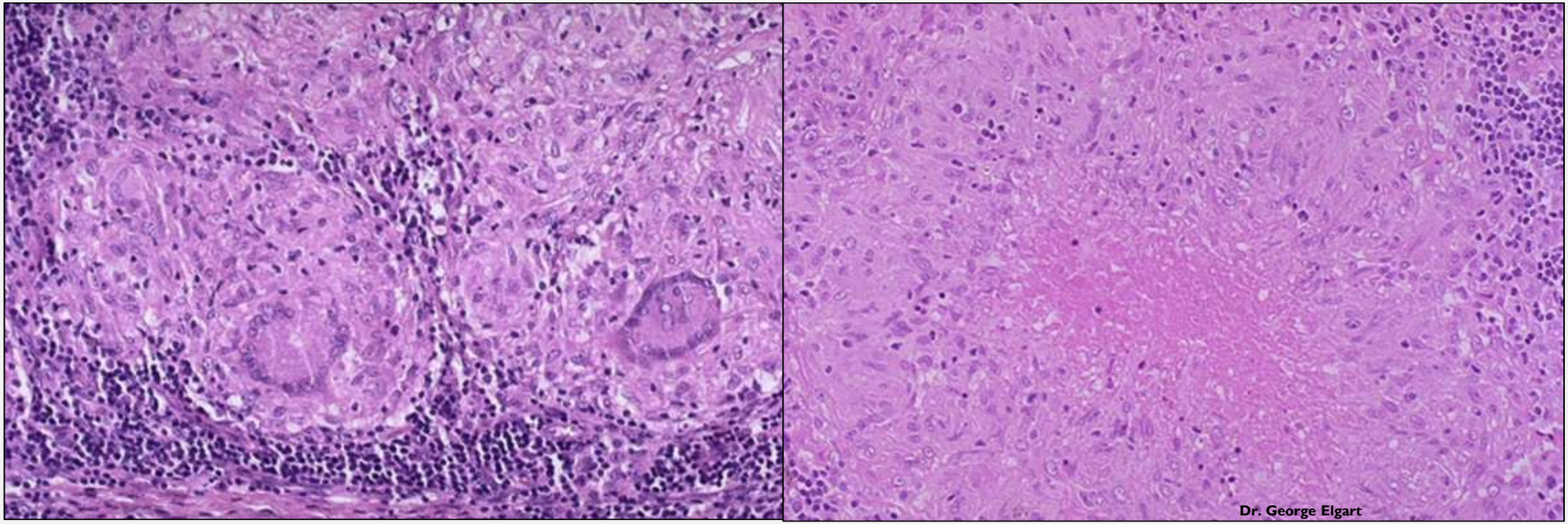
Danke für Eure Aufmerksamkeit!
Gibt's Fragen?

nina.frischhut@i-med.ac.at



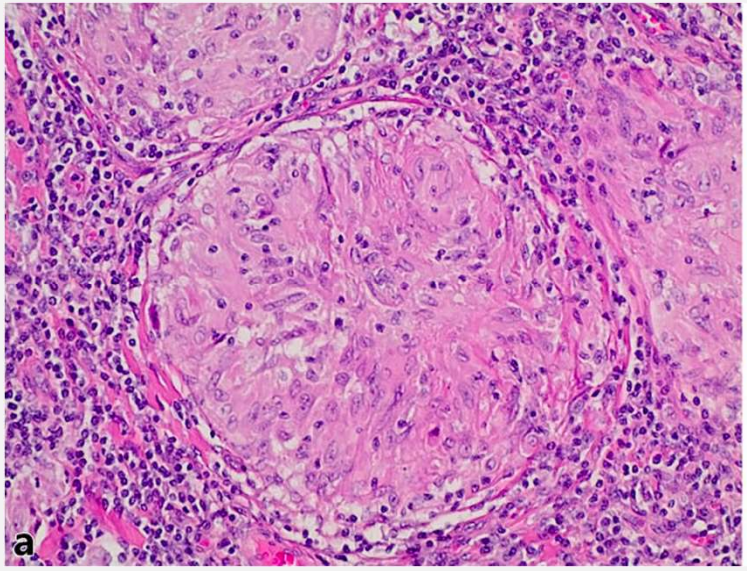
ABC

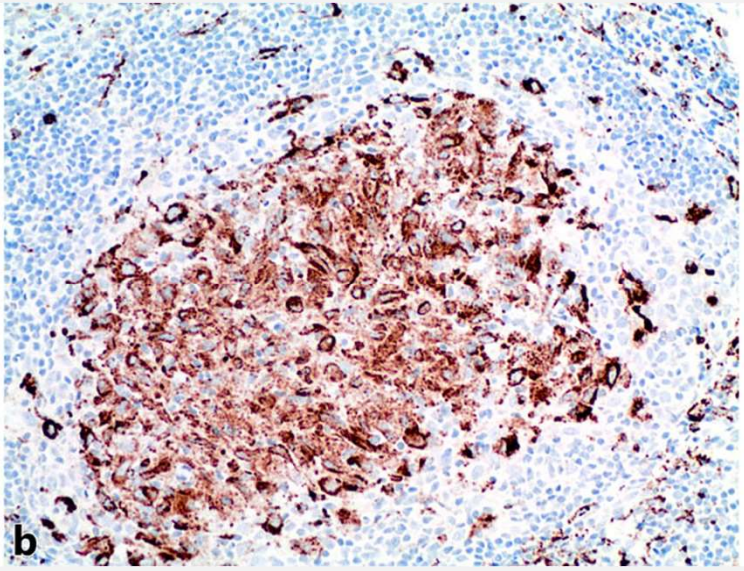
- Granulomatöse Entzündung
  - tuberkuloid (Lymphozytensaum; nicht immer verkäsend)

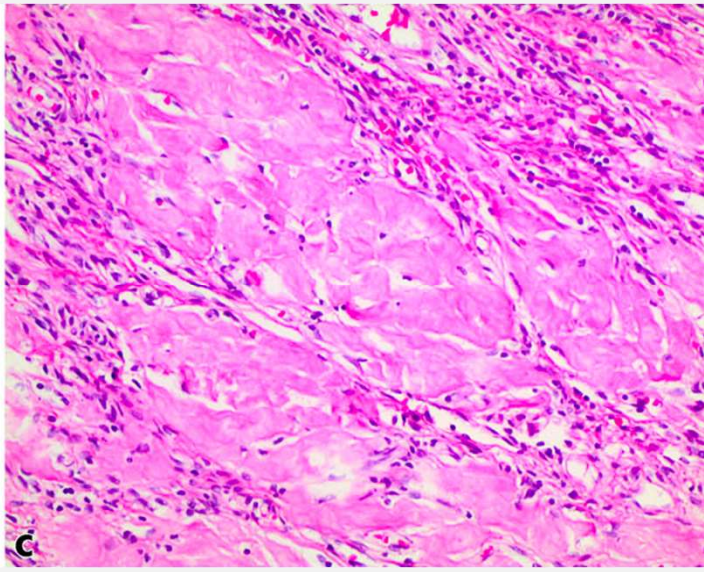


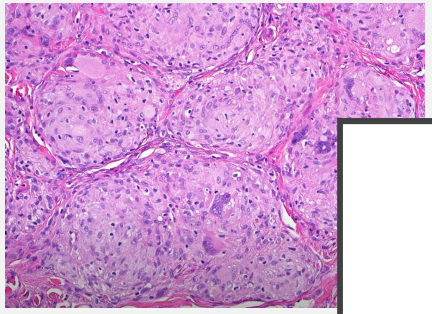
Tuberkulose, LH-RZ, Verkäsung

GRANULOME VOM SARKOIDOSETYP. A DAS TYPISCHE BILD EINES EPITHELOIDZELLGRANULOMS MIT KNOTENARTIG ORGANISIERTEN EPITHELOIDZELLEN. B DIE CD68-IMMUNFÄRBUNG
C NACH ABKLINGEN EINER GRANULOMATÖSEN REAKTION BLEIBEN KOLLAGENFASERREICHE NARBEN. IN FORTGESCHRITTENEN FÄLLENWERDEN DIE LYMPHKNOTEN DURCH NARBENGEWEBE ERSETZT

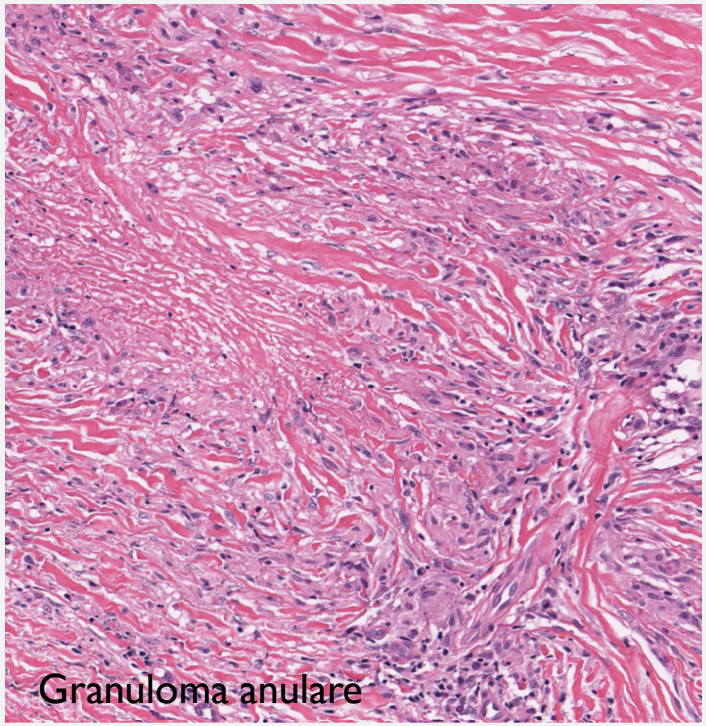








ABC

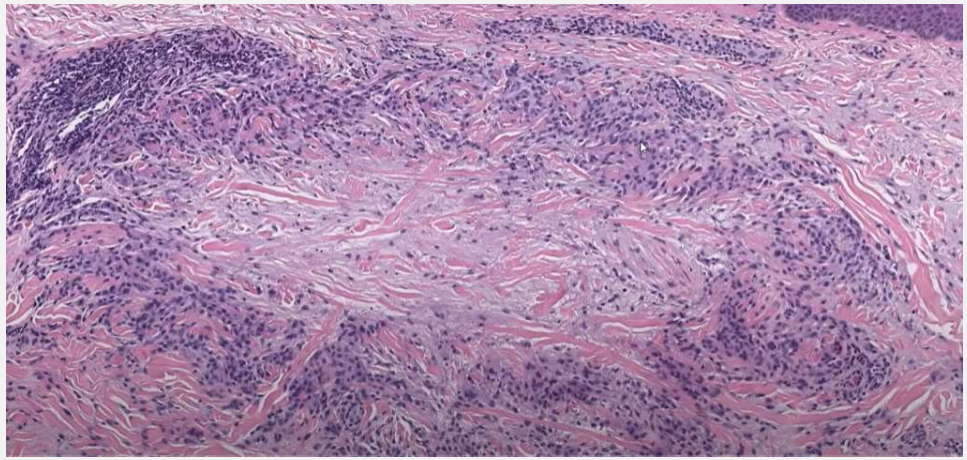


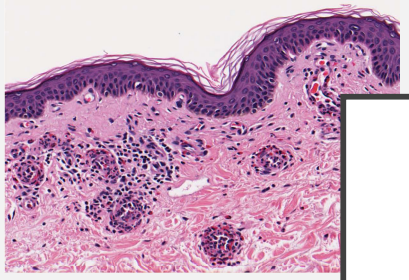
Granuloma anulare

- Granulomatöse Entzündung

  necrobiotisch (Pallisaden von parallel angeordneten Epitheloidzellen, Lymphozyten, RZ, Muzin)

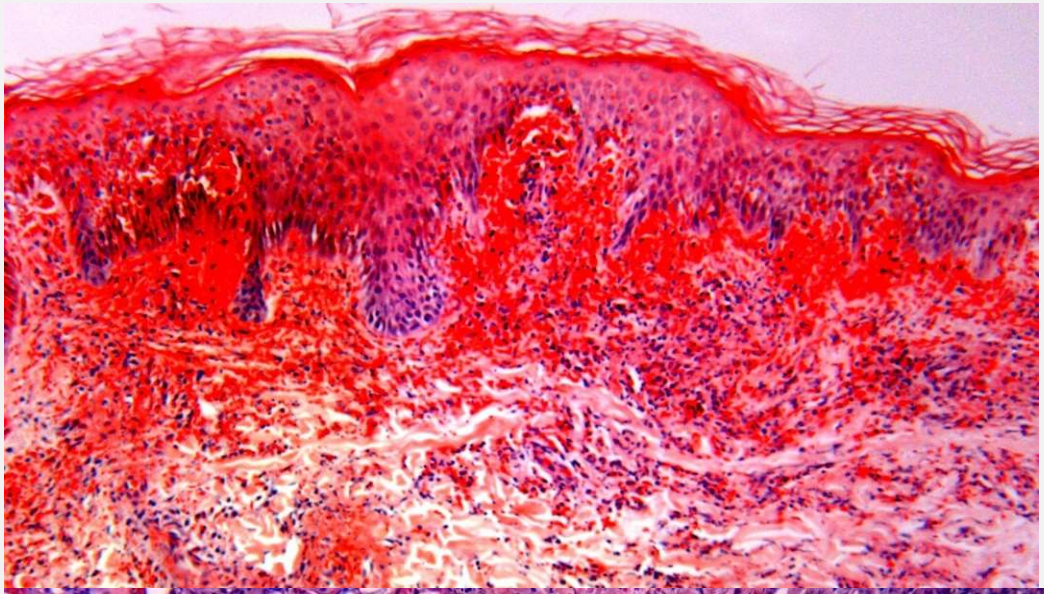
  - Granuloma anulare, Necrobiosis lipoidica, Rheumaknoten.

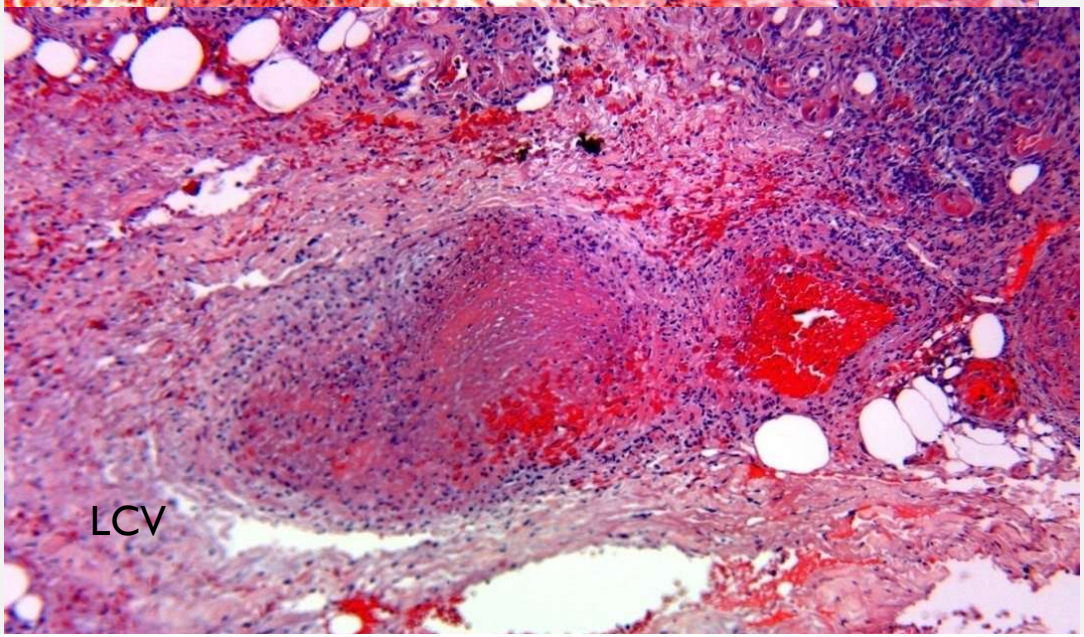




ABC

- Hämorrhagie
  intradermale oder intraepitheliale Erythrozyten-Extravasate





Tab. 4 Wichtige histochemische und immunhistochemische Färbungen	
Histochemie	
Perjodsäure-Schiff (PAS)	Pilze, Basalmembranverbreiterung bei Interfacedermatitiden
Alcian Blau Kolloidales Eisen	Muzin
Eisenfärbung	Hämosiderin
Elastica-/Van-Gieson	Darstellung von Arterien, Narben, Bindegewebserkrankungen
Versilberung	Pilze, Bartonella, Spirochäten
Ziehl-Neelsen-Färbung/Fite-Färbung	Säurefeste Stäbchen/*Mycobacterium leprae*
Immunhistochemie	
Melan A, S100, HMB 45	Melanozytäre Tumoren
Pan-Zytokeratin	Epitheliale Tumoren, Zytokeratin-Amyloid
BER EP4	Follikuläre Tumoren
Zytokeratin 20	Merkel-Zell-Karzinom, Merkel-Zellen in benignen follikulären Tumoren
CD34	Dermatofibrosarcoma protuberans, Gefäßtumoren
CD31	Gefäßtumoren
Podoplanin	Lymphogene Gefäßtumoren
S100, Neurofilament	Neuronale Tumoren
Actin, Desmin, Caldesmon	Myozytäre Tumoren
Ki67	Proliferationsmarker
CD3	T-Zellen
CD20	B-Zellen
CD30	CD30-positive Lymphome
CD68	Makrophagen/granulomatöse Infiltrate

Böer-Auer, Metze 2013