# Acne vulgaris

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DEPARTMENT OF DERMATOLOGY

# Acne vulgaris

## (*Acne vulgaris, juvenilis*)

It is an adolescent disease manifesting as inflammation of pilosebaceous units

Acne is very common and affects approximately 85% of young people

Lower incidence in Asians and Africans

# Localisation of skin lesions

face - 99%

back - 90%

chest - 78%

shoulders, buttocks (less  frequently)

# Course of acne

peak morbidity:

females: 14-17 years of age

males: 16-19 years of age

More severe in males than in females

duration: 3-5-10 years (or even longer)

**Recently, we have observed more frequent incidence of acne in patients younger than 11 years old and a longer persistence of lesions in patients older than 30 yo**

Ritvo et al. BioPsychoSocial Medicine 2011, 5:11
http://www.bpsmedicine.com/content/5/1/11

BIOPSYCHOSOCIAL MEDICINE

RESEARCH Open Access

# Psychosocial judgements and perceptions of adolescents with acne vulgaris: A blinded, controlled comparison of adult and peer evaluations

Eva Ritvo[1*], James Q Del Rosso[2], Mark A Stillman[3] and Christopher La Riche[4]

*If you had to choose one, is this person more likely to be a leader or a follower?*

| | | |
|---|---|---|
| A leader | 49% | 29% |
| A follower | 51% | 71% |

# Acne and QoL

- Negative influence on quality of life comparable with other serious diseases:
  - Asthma
  - Epilepsy
- Depression and anxiety
- Lower employment rate
- Lack of self acceptance

# Genetic aspects

Certain role of genetic background and familial predisposition

Most patients with severe acne have parents with a history of severe acne

# Hormonal changes in sexual maturation

**Androgens cause sebaceous gland hypertrophy and stimulate sebaceous gland to produce more sebum**

**…have an important role in acne pathogenesis**

But the most important role plays:

**increased / local expression of androgen receptors**

**and 5a - reductase activity**

→ Total amount of circulating androgens is normal usually !!!!

**Testosterone + 5a - reductase**

↓

**dihydrotestosterone – DHT**

The locally active form of androgens is **dihydrotestosterone** (DHT)

It is formed by the **5a-reductase enzyme from testosterone**

**DHT receptors are localised in:**

**hair follicles, sebaceous glands**

**the 5a - reductase activity is bigger in these areas**

**The most important role in acne play:**

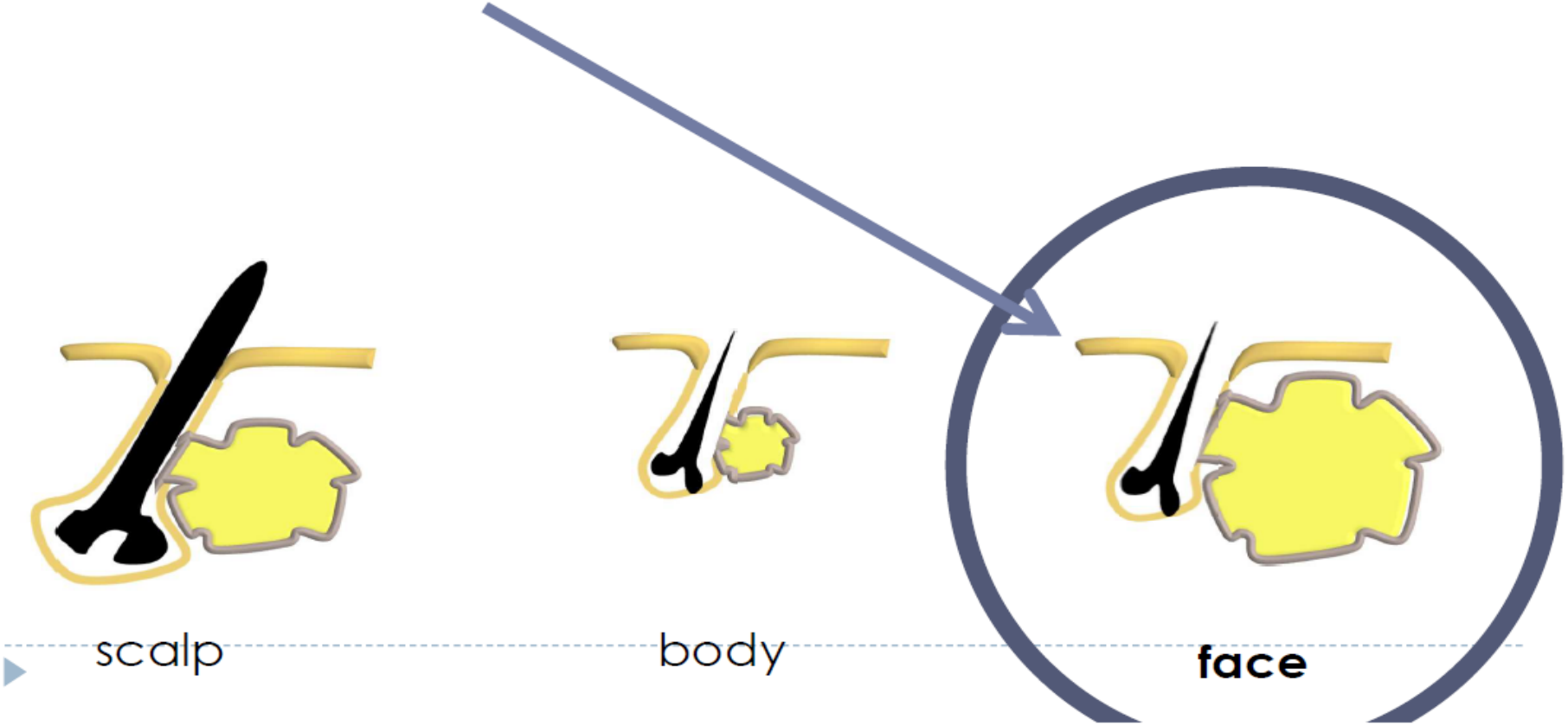
1. The increased, local expression of androgene receptors
2. The 5a - reductase activity

**but**

the total amount of circulating androgens is usually normal

# Acne – pilosebaceus unit

- Only in humans!!!



# Four key elements of pathogenesis:

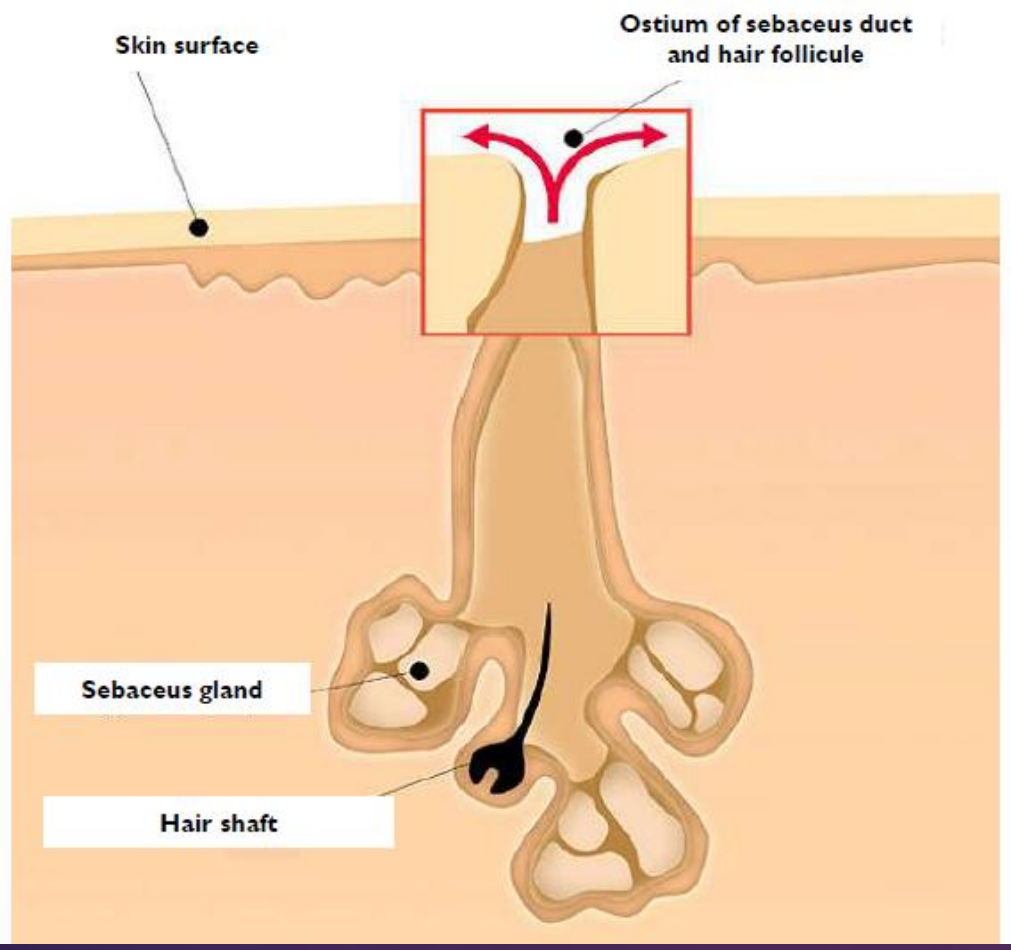
(1) icreased sebum production

(2) follicular epidermal hyperproliferation

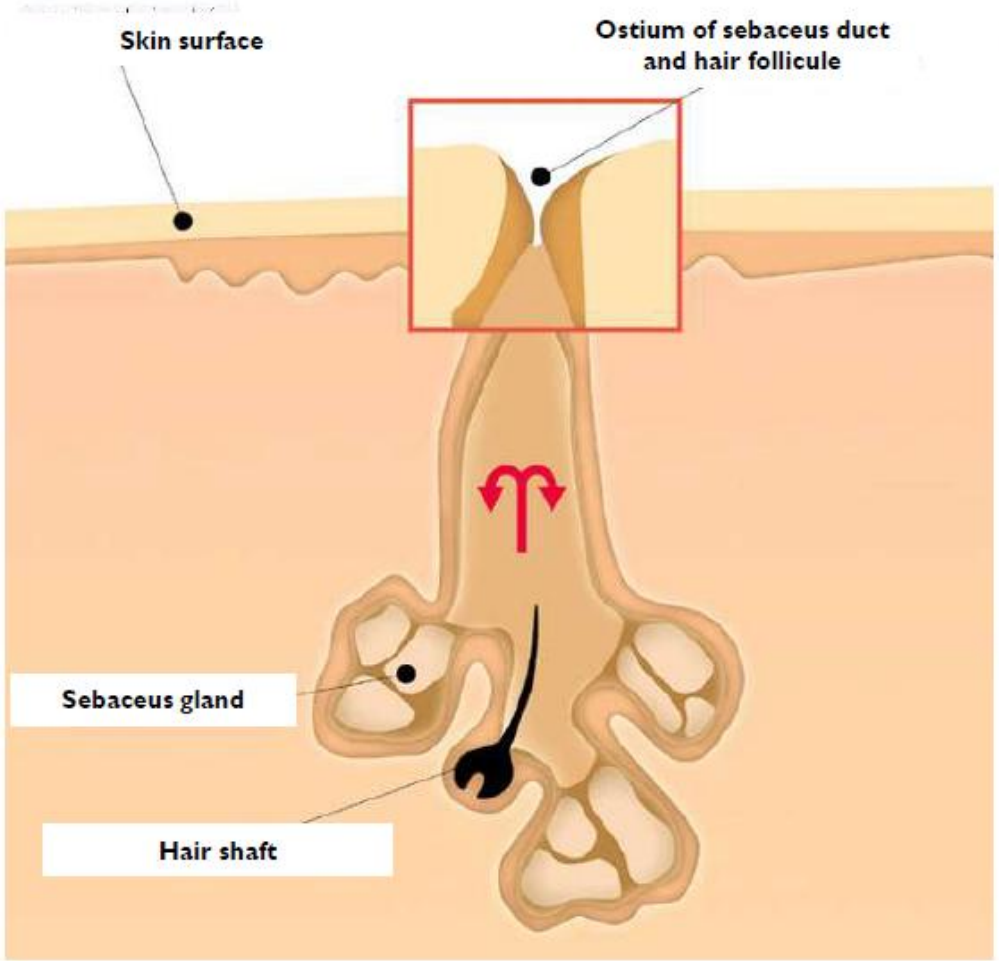
(3) the presence and activity *Propionibacterium acnes*

(4) inflammation

# Progression of changes

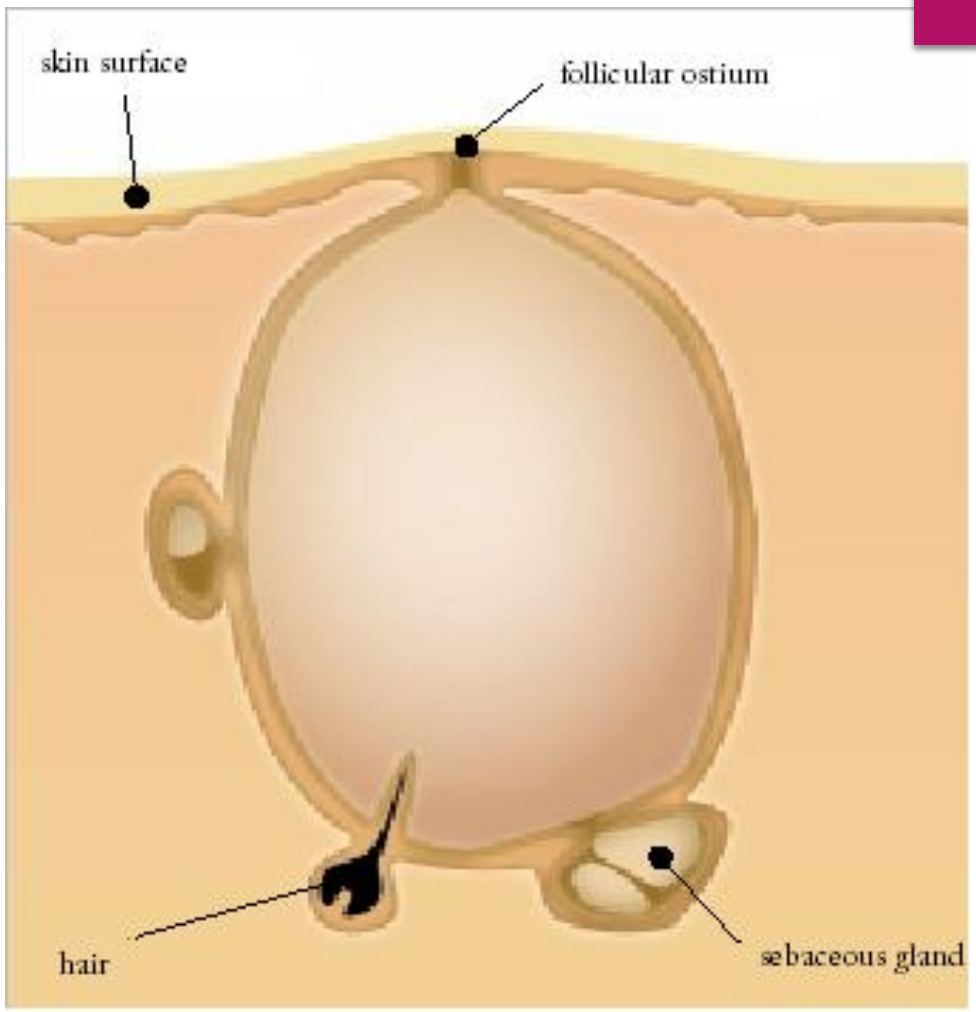



# Progression of lesions



- Keratinocyte proliferation leads to increased keraticocyte adhesion and accumulation of corneocytes at follicular ostium which result in a block of pilosebaceous unit and formation of a microcomedo

- Another key factor in pathogenesis is  bacteria Propionibacterium acnes



# MICROCOMEDO

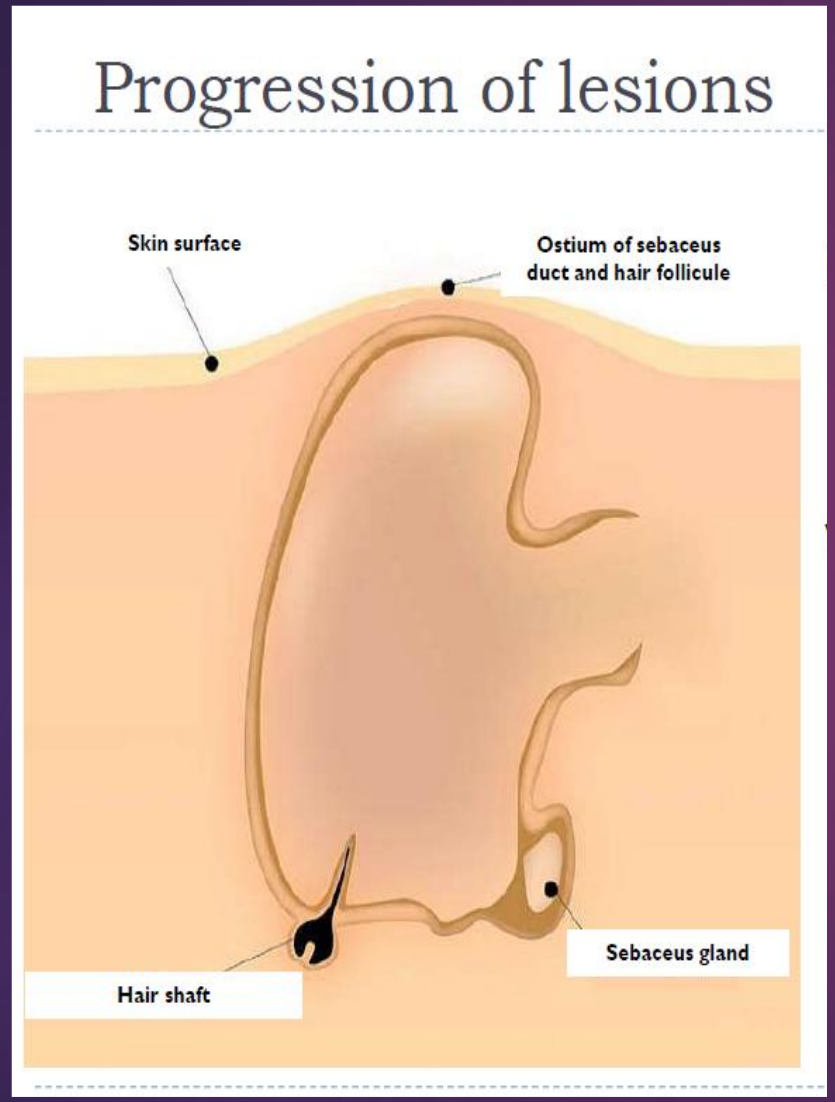
sebum accumulation

⇓ $O_2$

P.acnes PROLIFERATION

↓

**PERFECT CONDITIONS FOR P. acnes PROLIFERATION**




- Mechanism of action

bacterial lipase converts lipids
to fatty acids and produce
proinflamatory mediators
( IL1, TNF alfa)
that lead to
an inflammatory response.

# Acne lesions

**NON-INFLAMATORY LESIONS**

open comedones (blackheads)

closed comedones (whiteheads)

**INFLAMATORY LESIONS**

papules, pustules,

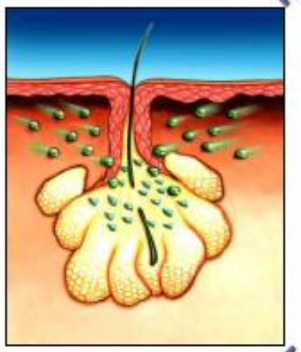
nodules or cysts

# Progression of lesions

**EPIDERMIS**
**(STACKED FOLLICLE)**
1. Hiperprolifferation
2. False differentiation
3. Decreased scalling

**Blackhead**

**Microcomedo**



*P acnes*
Inflammatory
Mediators

**Inflammatory lesion**

**INCREASED SEBUM EXCRECTION & ALTERED SEBUM COMPOSITION**

**Whitehead**

# ACNE FORMS:

*Comedonic Acne*
*(non-inflammatory lesions)*

# ACNE FORMS:

*Papulopustular Acne (inflammatory lesions)*

# ACNE FORMS:

*Nodulocystic Acne*
*(inflammatory lesions*

# The principle of topical treatment:

Preparations should be applied to the whole acne-affected area

Acne as a chronic disease requires long-term treatment - for many months or even years

# Mild acne

## Topical treatment :

1. Topical retinoids
2. Benzoyl peroxide
3. Azelaic acid
4. Topical antibiotics

## Topical retinoids:

adapalen
tretinoin
Izotretinoin
Trifaroten
tazaroten

## Adverse reactions of topical retinoids:

erythema
exfoliation
burning / itching

## Benzoyl peroxide - mechanisim of action:

antimicrobial (anti-inflammatory)

keratolytic action

does not cause drug resistance !!!!

## Topical ANTIBIOTICS

erythromycin and clindamycin (similar efficacy)

mechanism of action

» reduce the concentration of free fatty acids (lipase inhibition)

» reduce the number of P. acnes

adverse reactions

» generally very well tolerated

but

triggering drug resistance

# COMBINATION TOPICAL THERAPY

## BENEFITS OF COMBINATION THERAPY

- drug resistance prevention
- elimination of resistant strains

## combined preparations

**ISOTRETINOIN + erythromycin**

**BENZOYL PEROXIDE + clindamycin**

**ERYTHROMYCIN + zinc**

**ISOTRETINOIN + benzoyl peroxide**

# Infalmmatory acne (papulo-pustular)

# Moderate acne

**Oral antibiotics: tetracyclines, macrolides**

**properties: antibacterial and direct inhibition of:**

**chemotaxis, proinflammatory cytokine production, macrophage activity**

# Moderate acne

**TETRACYCLINES**
**First-line drugs:**

**tetracycline**
**doxycycline**
**lymecycline**

**MACROLIDES (erythromycin, azithromycin)**
**second-line drugs used in case of:**

**tetracycline intolerance**
**in children <10-12 years of age**
**pregnant women**
**nursing mothers**

# Oral antibiotics - side effects

- digestive tract intolerance symptoms
- hiperpigmentation around the teeth in children <12 years of age
- phototoxicity
- candidiasis in genital mucosa

- General antibiotic treatment should last 3 months
- Combination therapy (oral + topical) should be used

# Inflammatory acne
## - **oral** antybiotics (antimiccrobial, antiinflammatory )

- **Tetracyclins**
  - Tetracyclina, Doxycyclina, Minocyclina, Limecyclin
- Macrolides
  - Erythromycin, Azytromycin

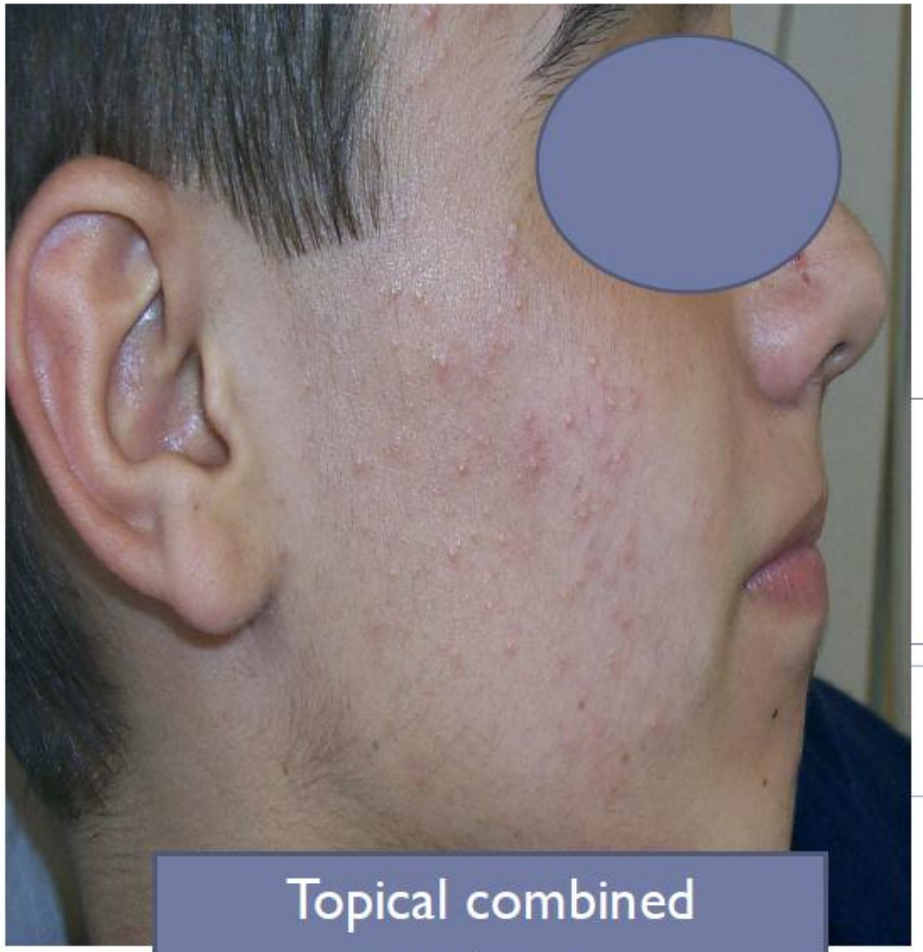
Always in combintation with topical retinoids and/or BPO

**Properties:**

1. **antibacterial**
2. **direct inhibition of chemotaxis, proinflammatory cytokine production, macrophage activity**

# Infalmmatory acne (papulo-pustular)

# Infalmmatory acne (papulo-pustular)



Topical combined treatment

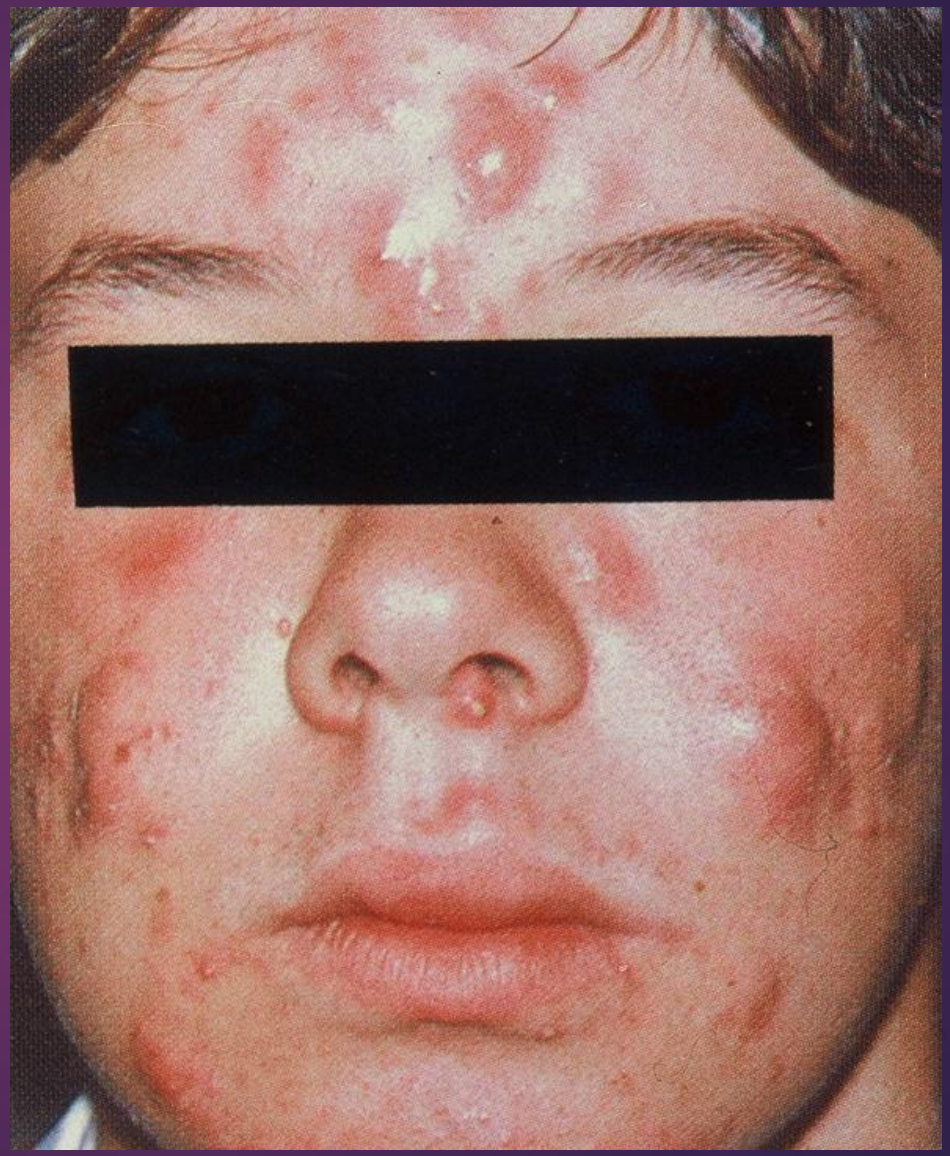
Topical and systemic combined treatment

- In women

## Infalmmatory acne - additional treatment

- Antiandrogens (only females)
  - Oral contraceptives with antiandrogen activity
  - Cyproterone acetate
  - Spironolactone (off label for adult acne)

# Severe acne



# Indications for oral isotretinoin:

severe papulo-pustular acne or nodylocystic acne

acne resistant to antibiotics

psychological aspects (problems with self - acceptance)

acne with significant seborrhea or a high tendency to scarring

## Oral isotretinoin

- The only medication which gives permanent results
- Decreases activity of sebum glands
- Not confirmed data on sebum glands atrophy

**Isotretinoin orally - mechanism of action**

1. Correct of hyperkeratinization
2. Decrease sebaceous gland activity
3. Decrease the follicular bacterial population of *P. acnes.*
4. Has an anti-inflammatory effect

# Oral isotretinoin

oral isotretinoin leads to complete remission in almost all cases, which lasts for months to years in the majority of patients

Recommended dose:

0.5 - 1.0 mg / kg / day

to a total dose of ~ 120 (150) mg / kg

# Oral isotretinoin- Side effects:

Isotretinoin is teratogenic and effective contraception is imperative (while treatment and 1 month after treatment)

Patients may develop elevation of triglycerides or transaminase levels (dose dependent- normalize with reduction in dose of the drug)

Oral isotretinoin- another clinical adverse events (dose dependent):

Dry lips and cheilitis 90-100%

# Erythema, dryness, scaling of the face area 40-60%

# Dryness of the nasal mucosa, bleeding

Xerophthalmia, conjunctivitis, decreased tolerance to contact lenses 10-15%

# Oral isotretinoin- another clinical adverse events / dose dependent /:

Pain in joints and muscles

An eczema-like rash

Hair loss


| | A.comedonica | A.pap.pust. | A.pap.pust | A.pap. pust. nod. | A. conglobata |
|---|---|---|---|---|---|
| 1st Choice | **Topical Retinoid** | **Top. Retinoid plus topical anti-microbial agent** | **Oral Antibiotic plus topical retinoid +/- BPO** | **Oral Antibiotic plus topical retinoid plus BPO** | **Oral Isotretinoin** |
| Alternatives | Alt. Top. Retinoid or Azelaic Acid or Salicylic Acid | Alternative top.Retinoid plus Alternative Antimi-crobial agent / Azelaic Acid | Alternative Oral Antibiotic plus Alternative top. Retinoid +/- BPO / Azelaic Acid | Oral Isotretinoin or Alternat. Oral Anitbiotic plus Alt. Top. Retinoid BPO / Azelaic Acid | High Dose Oral Antibiotic + Topical Retinoid + BPO |
| Alternatives or females | See 1st Choice | See 1st Choice | Oral Antiandrogen plus Top. Retinoid / Azelaic Acid +/- BPO | | |
| Maintenance | Top. Retinoid | | Top. Retinoid +/- BPO | | |

# Acne fulminans

- Very rare form
- It occurs mainly in young men
- Relate to the face, chest, back, shoulders
- Lesions are papules, pustules and nodules, often covered with hemorrhagic crusts
- Skin lesions are accompanied by malaise, elevated body temperature, arthralgia
- Leukocytosis and accelerated ESR are observed

# Acne inversa

**chronic, suppurative, often cicatricial disease of apocrine glands**

**involves the axillae, groins and/or anogenital region**

# Acne exacerbating factors :

- premenstrual period
- foods no more than in 10% of patients!

It is suggested that excessive consumption of dairy products and sugar may cause harmful effects.

- increased humidity (during the summer at ~ 20%)
- drugs (anabolic steroids)
- stress (%?)

# Acne – facts and myths

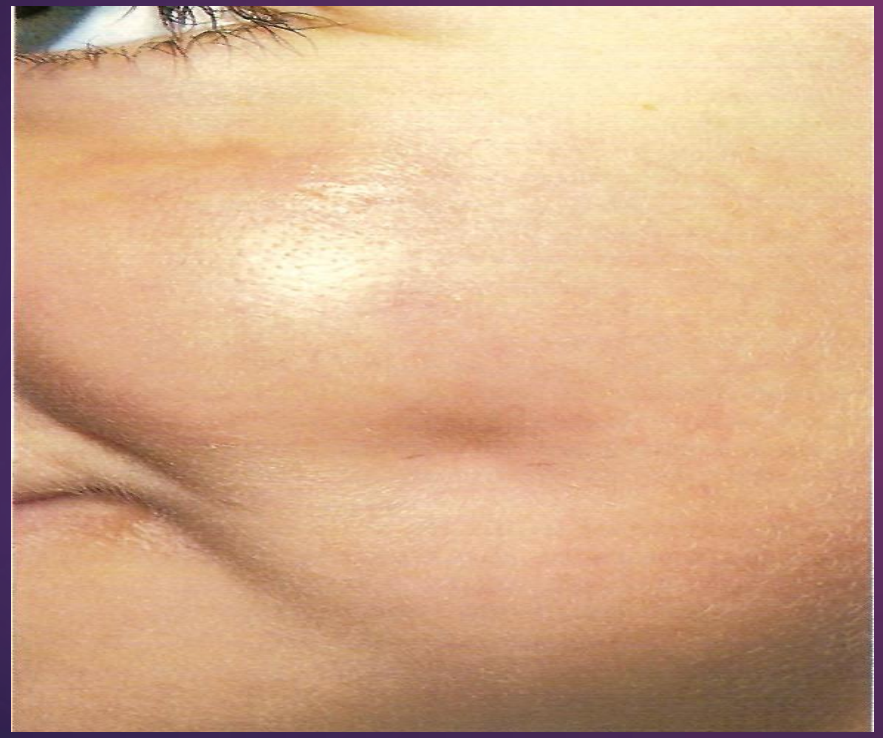
- Diet – glycemic index, milk
- Weather? -> acne Mallorca
- Cosmetics -> cosmetic acne
- Sexual activity
- Microbiological tests – currently not recomended

the remission of acne lesions

hiperpigmentation

scarring hypertrophic scars

atrophic scars



# Scarring in acne

Scarring in acne can affect many of patients

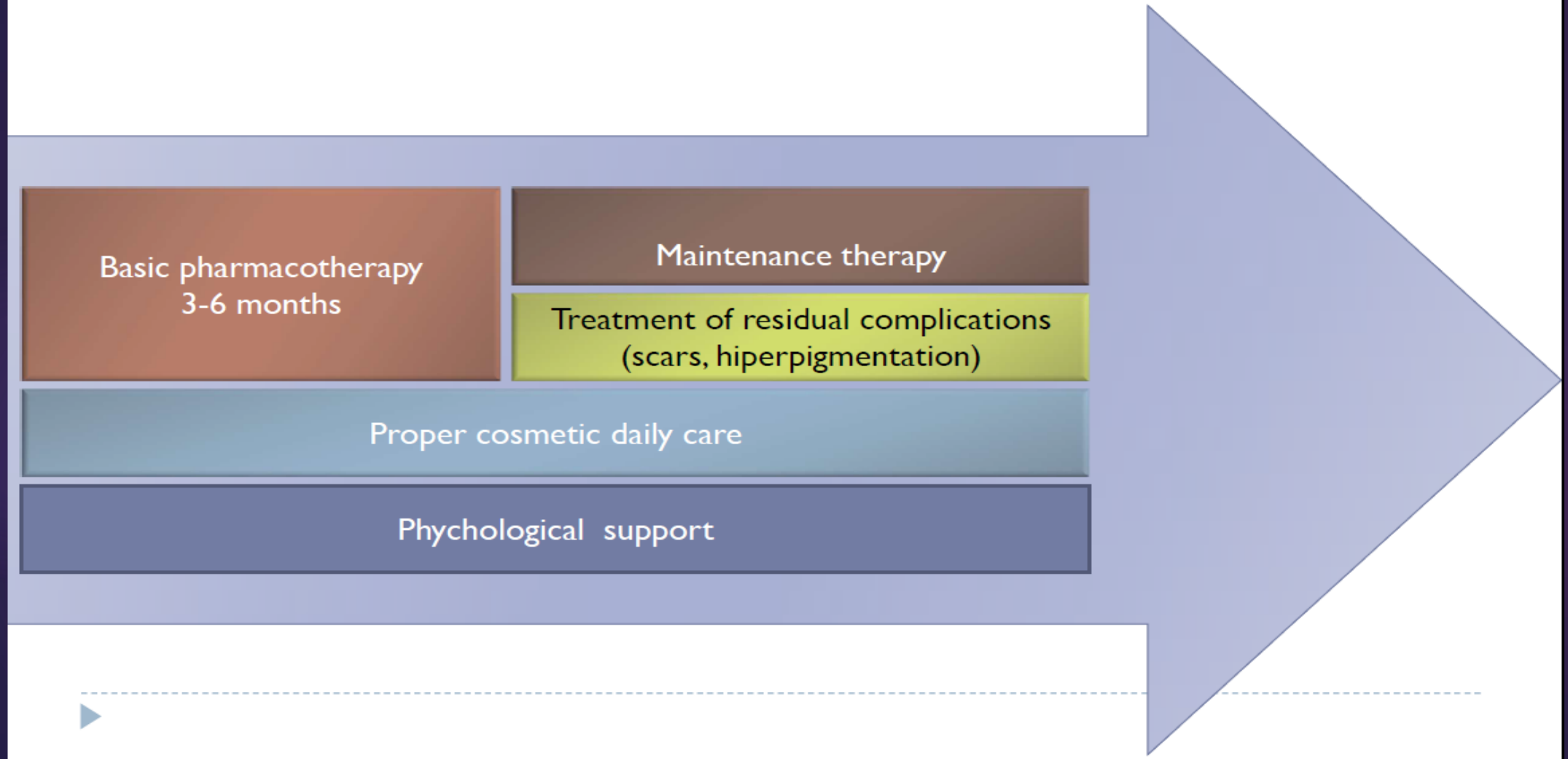
Up to 15% of patients with keloids, in the onset of acne, have relatively superficial lesions

Intensive treatment of inflammatory lesions, even quite superficial, is very important

# Hiperpigmentation
## treatment

- Sunscreens
- Prolonged use of topical retinoids and a-hydroxyacids
- Azelaic acid
- **Chemical superficial peels (low concentration acids + blanching agents)**
- **Microdermabrasion**
- **Fraxel laser**

# Complexed acne treatment



# Thank You