

# Retinoids

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**Abstract:- Retinoids are synthetic compounds related to vitamin A but with enhanced biologic activities, hence they are predominantly used for disorders of Keratinization.**

**Keywords:- Retinoids.**

## I. INTRODUCTION

Retinoids are synthetic compounds related to vitamin A but with enhanced biologic activities, hence they are predominantly used for disorders of Keratinization.

The beneficial effects of retinoids in disorders of keratinization was discovered by Gunter Stüttgen and Rudolf Baer [1].

Retinoids act through a family of nuclear receptors Retinoic acid receptors and RXR receptors with their subtypes  $\alpha$ ,  $\beta$  and  $\gamma$ . Adapalene acts on RAR  $\beta$  and  $\gamma$  receptors while Tazarotene acts mainly on RAR $\gamma$  receptors. Bexarotene acts selectively on RXR receptors important for immunomodulation.

Topical retinoids thin the stratum corneum by decreasing the number of cell layers, thereby potentiating the penetration of topical agents, but this also leads to increased sensitivity to sun. (Photosensitivity reactions). Topical retinoids inhibit the production of keratohyaline granules by follicular keratinocytes and this in turn inhibits the comedone formation. Topical retinoids modulate in vitro macroaggregation of keratin filaments and thus decreasing the coherence of keratinocytes in the comedone. Some retinoids such as tretinoin increase the mitotic activity of the ductal keratinocytes, leading to increased turnover of the infundibular keratinocytes and accelerated protrusion of the comedone. [2]

Topical retinoids act primarily by binding with specific receptors in the nucleus. Both adapalene and tretinoin inhibit the expression of AP-1, a transcription factor activator protein, an important regulator of the expression of growth factors (i.e., vascular endothelial growthfactor) and degradative enzymes such as matrix metalloproteinases- (MMPs) involved in inflammatory responses. [2]

In India, tretinoin (0.025%, 0.05%, 0.1%, as cream, gel, and solution), adapalene (0.1% gel), tazarotene (0.05% gel, 0.1% cream), and isotretinoin (0.05% gel) are available.

### ➤ Indications of oral retinoids<sup>[3]</sup>

1. Lichen planus.
2. Leukoplakia.
3. Acne vulgaris.
4. Pustular psoriasis, erythrodermic psoriasis, Severe and recalcitrant Psoriasis.
5. Keratinization disorders.e.g. ichthyosis, Dariers disease, Keratoderma, Pityriasis rubra pilaris, Porokeratosis.
6. Rosacea, Pyoderma faciale.
7. Precancerous conditions:actinic keratosis, epidermodysplasia verruciformis, xeroderma pigmentosum.
8. Granulomatous disease,e.g sarcoidosis,granuloma annulare.
9. Extracellular Matrix alterations,e.g Scleromyxedema, follicular mucinosis.
10. Miscellaneous e.g, Graft vs Host disease, TAD ( Transient Acantholytic dermatosis).

Classification	Chemical structure	Retinoid
First Generation Retinoids	Monoaromatic	Isotretinoin tretinoin
Second Generation Retinoids	Monoaromatic with replaced rings	Etretinate acitretin
Third Generation Retinoids	Polyaromatic (Arotenoids)	Bexarotene adapalene Tazarotene

Table 1. Classification of retinoids [3]

## II. CONTRAINDICATIONS

*Absolute* : Pregnancy and Lactation.

*Relative* : Hyperlipidemia, children, Diabetes Mellitus, Liver disease, raised intracranial pressure, suicidal ideations.

Cutaneous and Mucosal (Type I)	
Oral Mucosa	cheilitis
Nasal mucosa	Dryness
Ocular mucosa	Dry eyes, Blepharconjunctivitis
Hair	Telogen effluvium, Hair thinning
Nail	Fragile nails, onycholysis, Paronychia
Skin	Dryness, Palmoplantar Peeling, exfoliative dermatitis ( Bexarotene), Photosensitivity, Facial Dermatitis, skin infections, Pyogenic granuloma like lesions.
Retinoid Dermatitis	Ill-defined skin eruptions with retinoids (uncommon)
Systemic (Type II)	
Teratogenicity	Retinoid embryopathy
Neurologic	Headache (Pseudotumor cerebri), Depression, seizures, Altered mood.
Ocular	Delayed Dark adaptation, Photophobia, Blurring of vision.
Metabolic	Hypertriglyceridemia, Hypothyroidism (Bexarotene)
Gastrointestinal	Nausea, Diarrhea, abdominal Pain, Elevated liver enzymes and Bilirubin.
Musculoskeletal system	Premature epiphyseal closure, Diffuse interstitial skeletal Hyperostosis( DISH), tendon and Ligament calcification.
Hematological system	Leukopenia and agranulocytosis ( Bexarotene), thrombocytopenia.

Table 2. Side effect of Retinoids

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## III. MONITORING GUIDELINES FOR ORAL RETINOIDS

Monthly for every 3 months, Liver function tests, Lipid profile, Complete blood count with Platelets (with Bexarotene) and Renal function tests.<sup>[4]</sup> Tolerability of retinoids depend on its formulation.<sup>[5]</sup>

Drug	Erythema	Burning	Flare	Scaling
Adapalene	+	+	+	+
Tazarotene	++	+	+	+
Isotretinoin	++	+	+	++

Table 3. Cutaneous tolerability of retinoids

## IV. CONCLUSION

Retinoids are of therapeutic use but costlier. It's availability in Indian market proves a challenge to promote treatment and it's affordability.