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Review Article

Use of Curcumin in Psoriasis

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Abstract

Curcumin is a polyphenol derived from the golden spice turmeric, which is widely used for different purposes, such as culinary spice and alimentary addictive, make - up and, finally, as a natural product for the treatment of different diseases, especially for the chronic inflammatory ones. Recently, curcumin has been proposed as a valid and safe therapeutic option for psoriasis.

Introduction

The traditional medicine, based on the administration of natural and herbal products for the treatment of several human diseases, has been employed by many different cultures throughout history, becoming today a real multi millionary industry, with a recorded cost of USD 10 billion/year [1].

Among the numerous herbal compounds available for the medical purpose, there is Curcumin, a polyphenol derived from the golden spice turmeric ("Curcuma longa"), of the Zinzigiberaceae family, characterised by many properties [2].

Since ancient time, Curcumin has been widely used for different purposes, such as culinary spice and alimentary addictive (e.g. ice cream, yogurt, orange juice, biscuits, popcorn, cakes, cereals, sauces, gelatins), make - up and, finally, as natural product for the treatment of different diseases, especially for the chronic inflammatory ones [3].

Although, its well - known effectiveness as a therapeutic herb, curcumin pharmacological properties have been scientifically proved only in the last century [4][5]. Today, it is clear how the wide range of use of curcumin in medicine is the result of its numerous properties, such as antioxidant, anti-inflammatory, anti - proliferative, anti-carcinogenic and anti-microbial ones [6][7].

In medicine, curcumin is used for the treatment of different diseases [3], like rheumatoid arthritis, eye diseases (e.g. chronic anterior uveitis, conjunctivitis), urinary tract infections, menstrual alterations, liver and gastrointestinal disorders (e.g. abdominal pain, inflammatory bowel disease) [3][8][9][10]. Furthermore, curcumin is used as adjuvant therapy for the treatment of skin cancers, chicken pox and wound healing [5][6].

Even if it may be assumed with diet, curcumin

is now formulated into tablets, at a different dosage, often associated to particular adjuvants (e.g. piperine, phospholipids), which lead to improving its absorption and bioavailability [11].

Curcumin and psoriasis

Psoriasis is a chronic, inflammatory, cell-mediated disease, which involves the skin, and sometimes joints, bones, tendons, ligaments, nails, and mucosal membranes. Although it may represent with different clinical variants, the most commonly described is the “vulgaris” one, which is characterised by erythematous round or oval lesions, covered by white-silvery scales. Cutaneous lesions are usually localised on the elbows, knees, scalp and lumbar-sacral region in a symmetric pattern, even if they can affect different body areas [12].

Despite the availability of different topical and systemic therapeutic options for the treatment of psoriasis [13][14][15][16][17], none of them provides excellent clinical results without the risk of side effects (Table 1).

Table 1: Common antipsoriatic therapies

Drugs		MoA
TOPICAL	Corticosteroids	Immunosoppressive; anti-inflammatory; anti-proliferative; vasocostriction
	Soothing: urea, allantoin, lanolin	Anti-inflammatory
	Keratolytics: salicylic acid 3 - 6%, Alpha - Hydroxy acids (lactic acid, propylene glycol), emollients, bath	↓ cell – to - cell cohesion in the stratum corneum → Help to remove accumulated scales or hyperkeratosis
	Anthralin (Dithranol, 1, 8 – Dihydroxy – 9 - anthrone)	Anti - proliferative effect; anti-inflammatory effect
	Tars (coal tars and wood tars)	Keratoplastic; anti-acanthotic; photosensitizing (absorption spectrum of 330-550 nm); vasocostrictive
	Retinoids: tarazotene	Normalize the abnormal differentiation of keratinocytes; antiproliferative affects on keratinocytes; ↓ expression of inflammatory markers on keratinocytes (e.g. HLA - DR, ICAM - I)
	Derivatives and analogues of vitamin D3: calcipotriol, tacalcitol, calcitriol	Regulation of epidermal hyperproliferation; enhancement of normal keratinisation; immunomodulating; anti-inflammatory; angiogenesis inhibition
	Calcineurin inhibitors: Tacrolimus, Pimecrolimus	Immunosuppression
PHOTOTHERAPY	PUVA therapy	Cell cycle arrest; immunosuppression
	UVB, nbUVB, excimer laser	Cell cycle arrest; immunosoppression
SYSTEMIC	Methotrexate	Antiproliferative; anti-inflammatory
	Acitretin	Normalize the abnormal differentiation of keratinocytes; antiproliferative affects on keratinocytes
	Cyclosporin A	Inhibition of CD4 T cells
	Fumaric acid esters	Immunomodulation
	Hydroxyurea	Regulation of proliferating cells
	Sulfasalazine	Antiinflammatory
	Mycophenolate mofetil	Immunomodulator
	6 - Thioguanine	Cell cycle arrest
BIOLOGICS	Etanercep, Infliximab, Adalimumab	Anti TNFα

In the last years, an increasing number of studies underline the potential use of curcumin in the treatment of psoriasis. Many are the evidence which supports its therapeutic efficacy. The first one is that curcumin, with its antioxidative property, may reduce the oxidative stress of psoriatic lesions [18]. More recently, two different studies showed how curcumin therapeutic efficacy might also be related to its ability in inhibiting the phosphorylase kinases, which are increased in psoriatic patients [19][20]. Also interesting are the results, achieved by Varma et Al., about the use of curcumin at 25 and 50 μM concentrations in the treatment of psoriatic - like cells (HaCaT cells), in vitro. The authors showed how curcumin was able to inhibit the proliferation of psoriatic - like cells, by the down-regulation of pro-inflammatory cytokines, such as interleukin - 17, tumour necrosis factor - α, interferon - γ and interleukin - 6. Moreover, curcumin significantly enhanced the skin - barrier function by the up-regulation of involucrin (iNV) and filaggrin (FLG) [21].

Recently, Kang D. et Al. have proved, on mice models, another important effect of curcumin, consisting in the inhibition of the potassium channels (subtypes Kv1.3) expressed on T cells, which seem to be involved in the onset of psoriasis. The anti-inflammatory properties of curcumin, have been confirmed by the finding that mice, showed in their serum a decrease of more than 50% level of inflammatory factors, including TNF - α, IFN - γ, IL - 2, IL - 12, IL - 22 and IL - 23 [22].

No study in vivo have shown side effects of curcumin in the treatment of psoriatic patients [23][24], and the U.S. Food and Drug Administration (FDA) has defined curcumin as “generally regarded as safe” (GRAS).

In conclusion, curcumin is a polyphenol derived from the golden spice turmeric (“Curcuma longa”). Because of its numerous properties (e.g. anti - oxidant, anti -proliferative, anti-inflammatory, antiviral, antibacterial and antifungal properties), curcumin has been used for the treatment of different diseases [25]. Recently it has been proposed for the treatment of psoriasis, where its efficacy seems to be the result of different mechanism of actions. Even if different studies, both in vitro and in vivo, have shown its efficacy and safe profile, further placebo-controlled studies are needed before recommending oral curcumin as a valid treatment for psoriasis.

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