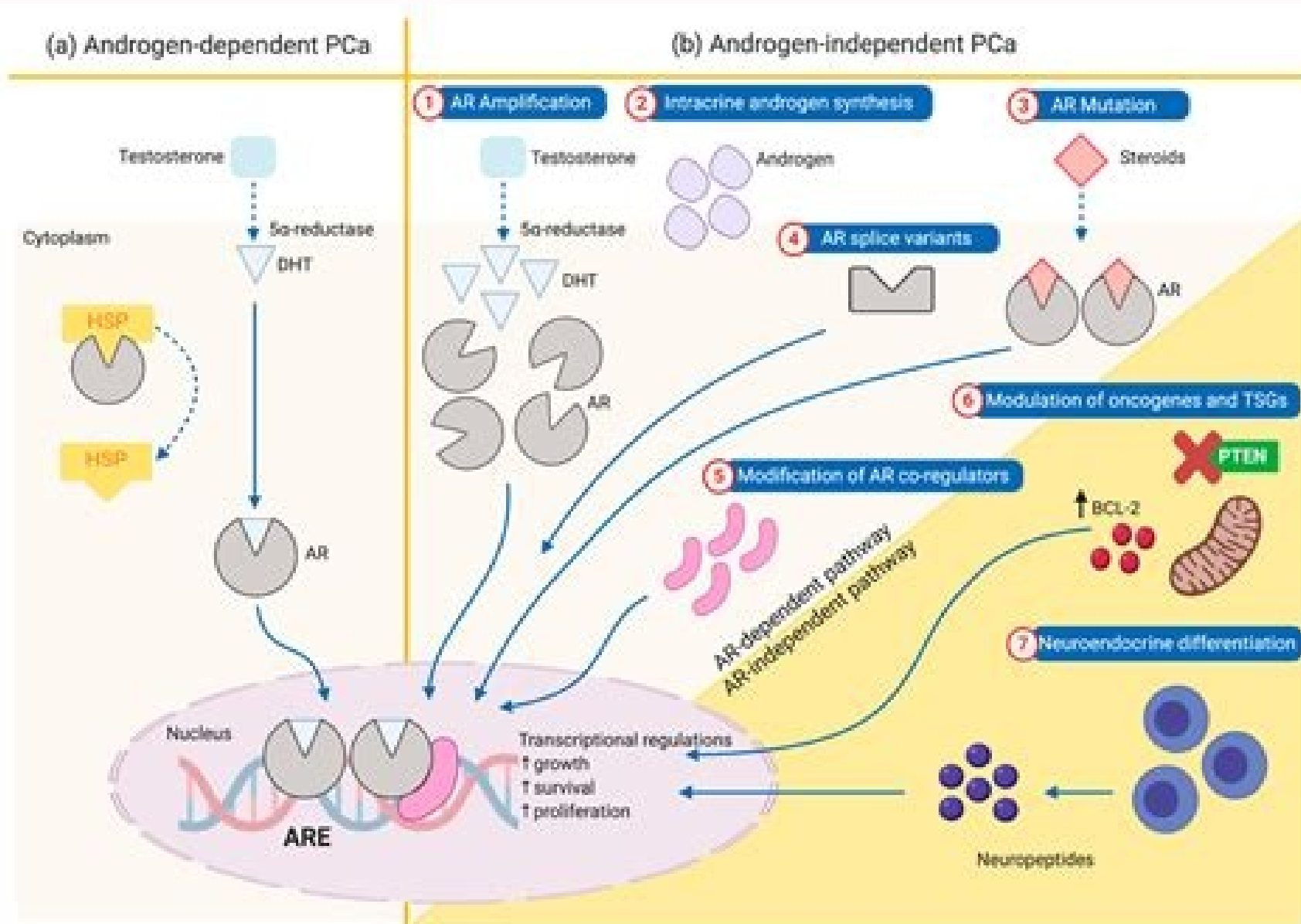


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Experimental condition	Tm (°C)	ΔHm (J/g)
PLLA	167	67.5
PLLA nanoparticles (no curcumin)	161	45.3
Curcumin-loaded PLLA nanoparticles (1%wt cur)	154	19.1
Curcumin-loaded PLLA nanoparticles (3%wt cur)	161	26.9
Curcumin-loaded Eudragit S100/PLLA nanoparticles(3%wt cur)	160	22.5*

Article

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Abstract: Background: Curcumin (Cur) possesses a variety of beneficial pharmacological properties including antioxidant, antimicrobial, anti-cancer and anti-inflammatory activities. Nevertheless, the low aqueous solubility and subsequent poor bioavailability greatly limits its effectiveness. Besides, the role of myrrh oil as an essential oil in treating inflammatory disorders has been recently demonstrated. The objective of the current investigation is to enhance Cur efficacy via developing Cur nanoemulgel, which helps to improve its solubility and permeability, for transdermal delivery. Methods: The formulated preparations (Cur gel, emulgel and nanoemulgel) were evaluated for their physical appearance, spreadability, viscosity, particle size, *in vitro* release and *ex vivo* drug permeation studies. The *in vivo* anti-inflammatory activity was estimated using the carrageenan-induced rat hind paw edema method. Results: The formulated Cur-loaded preparations exhibited good physical characteristics that were in the acceptable range of transdermal preparations. The release of Cur from gel, emulgel and nanoemulgel after 12 h was 72.17 ± 3.76 , 53.91 ± 3.93 and $62.0 \pm 3.9\%$, respectively. Skin permeation of Cur was significantly ($p < 0.05$) improved when formulated into nanoemulgel since it showed the best steady state transdermal flux (SSTF) value ($108.6 \pm 3.8 \mu\text{g}/\text{cm}^2/\text{h}$) with the highest enhancement ratio (ER) (7.1 ± 0.2). *In vivo* anti-inflammatory studies proved that Cur-loaded nanoemulgel displayed the lowest percent of swelling (26.6% after 12 h). Conclusions: The obtained data confirmed the potential of the nanoemulgel dosage form and established the synergism of myrrh oil and Cur as an advanced anti-inflammatory drug.

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Keywords: curcumin; nanoemulgel; transdermal; permeation; anti-inflammatory

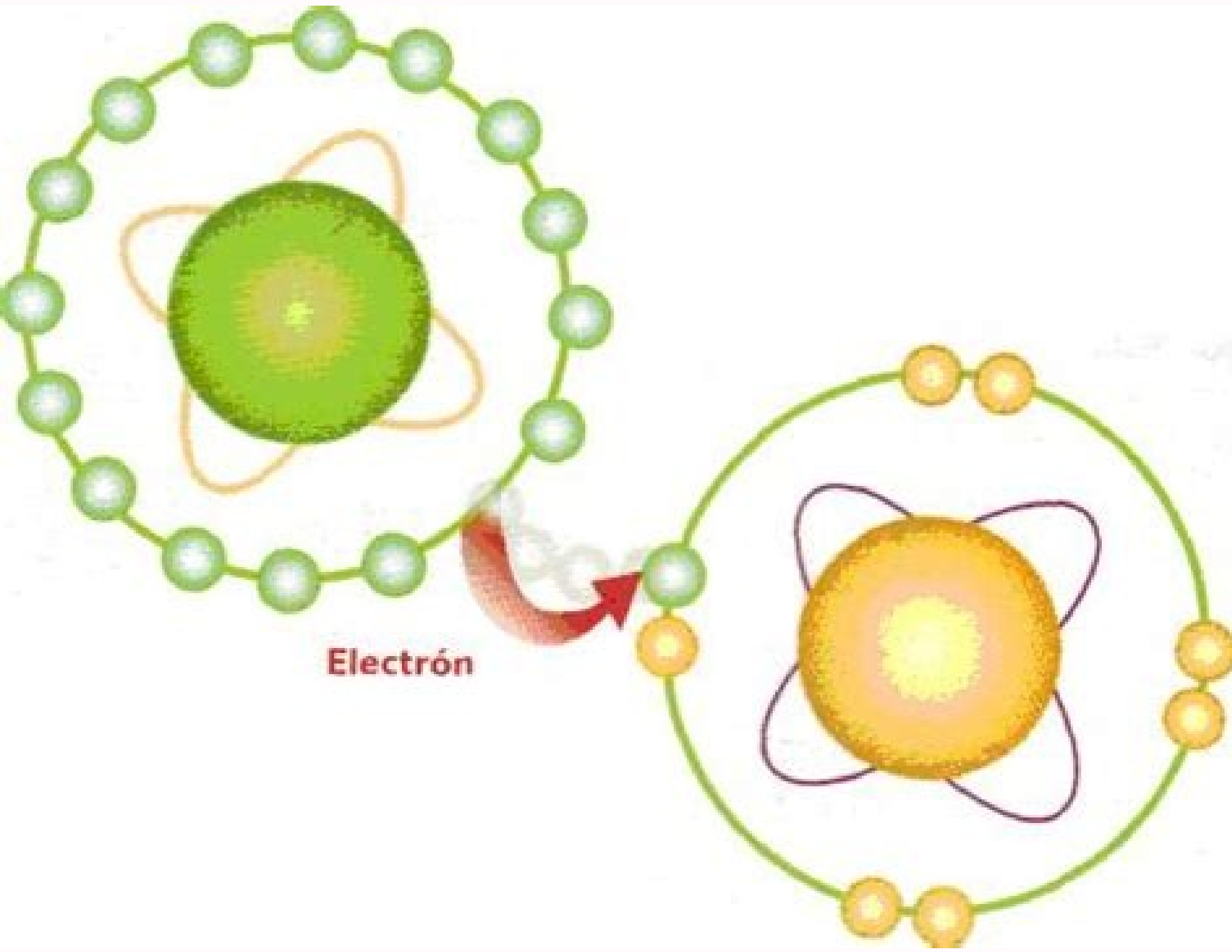
1. Introduction

Curcumin (Cur) is one of the main constituents of *Curcuma longa* (turmeric) rhizome, which is a natural compound [1]. It is regarded as the main component responsible for its yellow color [2]. It has demonstrated numerous pharmacological activities, including antioxidant [3], anti-inflammatory [2], antimicrobial [4] and anti-cancer activity [5]. Cur is a lipophilic compound and is practically insoluble in water; further, it possesses poor bioavailability, which seems to be mainly due to its poor absorption, and rapid metabolism and elimination [6,7].

Myrrh oil has been recognized as a natural remedy and is renowned for its substantial effect in treating skin disorders [8]. It comprises numerous components that possess

<i>Curcumin</i> (μM)	<i>Viability</i> (%)
0	100
0	22 (100%)
1	52 (100%)
5	93 (100%)

ment of cells with different concentrations of CHP. Cells were induced with 5 μ l (1:100) CHP. MTT assay.



Antioxidant activity curcumin, Antioxidant activity of curcuminoids, Antioxidant activity of curcumin and related compounds, Antioxidant and anticancer activity of curcumin, Free radical reactions and antioxidant activity of curcumin, Production solubility and antioxidant activity of curcumin nanosuspension, Anti-tumour and antioxidant activity of natural curcuminoids, Antioxidant activity of curcumin derivatives.

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