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# Retinol and Retinol Compounds

Retinol is the chemical name of the essential micronutrient vitamin A which can be harmful to your health when it's added to cosmetic products in certain forms. Two derivatives – retinoic acid and retinyl palmitate – should be avoided in cosmetics and personal care products while retinol itself should not be used at high doses.



# WHAT IS RETINOL?

Natural vitamin A and its derivatives have important roles in human reproduction and development and in maintaining good vision and healthy skin.<sup>[1]</sup>

People must consume enough vitamin A from their diet to be healthy.

All-trans retinol (retinol, vitamin A) is obtained in the diet from plant or animal sources.<sup>[2]</sup> Retinoic acid is the most active biological form of vitamin A and retinyl palmitate is the major storage form of vitamin A in the skin.<sup>[3]</sup> In cosmetics, natural and synthetic retinol and retinol derivatives are used as skin conditioners and anti-acne agents in a variety of moisturizers, lotions and anti-aging creams.<sup>[4]</sup>

## Found In

- Anti-aging creams and lotions
- Moisturizers
- Foundation

## What to look for on the label

- Retinol
- Vitamin A
- Retinyl acetate
- Retinyl palmitate
- All-trans retinoic acid
- Tretinoin

## Health Concerns

**Cancer:** Retinoic acid and retinyl palmitate, in combination with sunlight, may increase skin cancer risk. In August 2012 the National Toxicology Program of the US National Institutes of Health published a report, which examined the photocarcinogenic effects of retinoic acid and retinyl palmitate. The study applied creams containing retinyl palmitate or retinoic acid to mice who were then exposed to synthetic sunlight. It found that the inclusion of these compounds in the cream increased the number of tumors and decreased the time of tumor appearance compared to animals given just the carrier cream both with and without synthetic sunlight.<sup>[5]</sup>

It should be noted that a number of vitamin A/retinol derivatives have been suggested as cancer-preventative agents. Unlike other dietary phytochemicals proposed to be cancer-preventive due to detoxifying and antioxidant properties, retinol derivatives have been suggested as anticancer agents mainly for their effects on cellular differentiation and growth suppression. However, despite some promising laboratory and early clinical evidence for retinol and its derivatives in cancer treatment and prevention, several more recent large-scale trials have so far failed to show therapeutic benefit.<sup>[6]</sup>

**Developmental and reproductive toxicity:** The California EPA's Proposition 65 list identifies all-trans retinoic acid as a developmental toxicant. It also identifies retinol/retinyl esters as developmental toxicants, but only when daily dosages exceed 10,000 international units. The listing notes that retinol/retinyl esters are required and essential for maintenance of normal reproductive function and that the recommended daily level during pregnancy is 8,000 international units.<sup>[7]</sup>

## Vulnerable Populations

Babies & Children (<https://www.safecosmetics.org/population/babies-children/>), Men (<https://www.safecosmetics.org/population/men/>), Pregnant Women (<https://www.safecosmetics.org/population/pregnant-women/>), Teenagers (<https://www.safecosmetics.org/population/teenagers/>), Women of Color (<https://www.safecosmetics.org/population/women-of-color/>), Workers (<https://www.safecosmetics.org/population/workers/>).

## Regulations

All-trans retinoic acid (Tretinoin) is banned for use in cosmetics in the EU.<sup>[8]</sup>

## How to Avoid?

Read labels and avoid products containing retinyl palmitate and all-trans retinoic acid (tretinoin). Also avoid products with high doses of retinol (when in daily dosages in excess of 10,000 IU, or 3,000 retinol equivalents).

### Explore other Chemicals

**Octinoxate** (<https://www.safecosmetics.org/chemicals/octinoxate/>)

**[Parabens \(https://www.safecosmetics.org/chemicals/parabens/\)](https://www.safecosmetics.org/chemicals/parabens/)**

**[Phthalates \(https://www.safecosmetics.org/chemicals/phthalates/\)](https://www.safecosmetics.org/chemicals/phthalates/)**

**[Phenoxyethanol \(https://www.safecosmetics.org/chemicals/phenoxyethanol/\)](https://www.safecosmetics.org/chemicals/phenoxyethanol/)**

**[Nail Polish Removers \(https://www.safecosmetics.org/chemicals/nail-polish-removers/\)](https://www.safecosmetics.org/chemicals/nail-polish-removers/)**

**[Acrylates \(https://www.safecosmetics.org/chemicals/acrylates/\)](https://www.safecosmetics.org/chemicals/acrylates/)**

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## References

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