

Series Editor: William W. Huang, MD, MPH

## Sunscreen Agents

Sarah L. Taylor, MD, MPH

Dr. Taylor is Assistant Professor of Dermatology, Wake Forest University School of Medicine, Winston-Salem, North Carolina. The author reports no conflict of interest.

Category (Wavelength)	Agent	Organic <sup>a</sup> or Inorganic <sup>b</sup>	Notes
UVA-blocking agents <sup>c</sup> (320–400 nm)	Avobenzone	Organic	Highly unstable, other chemicals (eg, octocrylene) are added to prevent degradation
	Benzophenones	Organic	Includes oxybenzone (benzophenone 3), sulisobenzone (benzophenone 4), dioxybenzone (benzophenone 8), mexenone (benzophenone 10)
	Ecamsule	Organic	
	Meradimate	Organic	
UVB-blocking agents (290–320 nm)	Cinnamates	Organic	Includes cinoxate, amyl cinnamate, ethyl cinnamate, 2-ethylhexyl-4-methoxycinnamate; can cross-react with a variety of fragrances and flavorings including balsam of Peru, cinnamon oil, cinnamaldehyde, cinnamic acid
	Ensilizole (phenylbenzimidazole sulfonic acid)	Organic	
	Octocrylene	Organic	
	PABA and ester derivatives	Organic	Includes octyl dimethyl PABA (padimate O), amyl dimethyl PABA (padimate A), glycerol PABA; PABA and its derivatives can cross-react with sulfonamides, ester-type anesthetics (most commonly benzocaine), azo dyes, paraphenylenediamine
	Salicylates	Organic	Includes octisalate, homosalate, trolamine salicylate
UVA- and UVB-blocking agents (290–400 nm)	Drometrizole trisiloxane	Organic	
	Oxybenzone <sup>d</sup>	Organic	Most common sunscreen agent used in the United States; most common sunscreen agent to cause photoallergic and nonphotoallergic contact dermatitis; used in patch testing for benzophenone allergy
	Titanium dioxide	Inorganic	Inert mineral complex that does not tend to cause allergic skin reactions or irritate the skin
	Zinc oxide	Inorganic	Inert mineral complex that does not tend to cause allergic skin reactions or irritate the skin

Abbreviation: PABA, *p*-aminobenzoic acid.

<sup>a</sup>Organic (chemical) sunscreens filter and absorb UVA and/or UVB.

<sup>b</sup>Inorganic (physical) sunscreens reflect UVA and UVB.

<sup>c</sup>UVA filters are highly unstable and degrade with exposure to sunlight; therefore, they need to be stabilized.

<sup>d</sup>Benzophenones primarily absorb UVA, but oxybenzone absorbs both UVA and UVB.

## Practice Questions

- 1. Which of the following sunscreen agents is most likely to cause a photoallergic reaction on the skin?**
  - a. homosalate
  - b. oxybenzone
  - c. PABA
  - d. padimate O
  - e. zinc oxide
- 2. Which of the following sunscreen agents is least likely to cause an allergic reaction when applied?**
  - a. ecamsule
  - b. octisalate
  - c. padimate A
  - d. titanium dioxide
  - e. trolamine salicylate
- 3. Of the following, which is/are considered to be an inorganic sunscreen agent?**
  - a. PABA
  - b. titanium dioxide
  - c. zinc oxide
  - d. A, B, and C
  - e. B and C
- 4. Sunscreens containing PABA or one of its derivatives may cross-react with which of the following?**
  - a. bananas
  - b. doxycycline
  - c. griseofulvin
  - d. naproxen
  - e. sulfonamides
- 5. Which of the following is/are used in sunscreens for UVA protection?**
  - a. avobenzone
  - b. ecamsule
  - c. octisalate
  - d. A, B, and C
  - e. A and B

*Fact sheets and practice questions will be posted monthly. Answers are posted separately on [www.cutis.com](http://www.cutis.com).*