



## Internal Medicine Flashcard

## A young man with orange hands

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## 1. Case description

A 26-year-old Caucasian man with previous history of medullary sponge kidney (also known as Cacchi-Ricci disease) presented to the outpatient clinic for routine follow-up. While his kidney disease remained uncomplicated, the patient reported the recent orange discoloration of palms and soles. Clinical examination confirmed an orange aspect of palmar skin (Fig. 1), but no change in the color of his sclera. Blood tests including bilirubin, thyroid hormones, glucose, creatinine, and liver enzymes were all normal, and total cholesterol was mildly increased (206 mg/dl, normal < 190). Serum  $\beta$ -carotene levels were elevated (722  $\mu$ g/dl, normal 60–200), while vitamin A (retinol) levels remained within the normal range (66  $\mu$ g/dl, normal 30–80). Further questioning revealed dietary intake of 15 g of spirulina (in pill form) per day for the last six months, for its potential antioxidant effects.

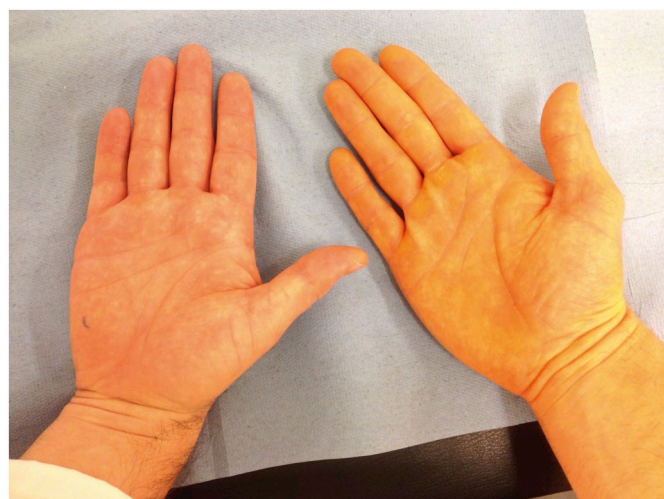


Fig. 1. The patient's hand is shown on the right, and the hand of an individual without hypercarotenemia on the left.

## 2. What is the diagnosis?

Hypercarotenemia refers to the orange coloration of the skin caused by chronic elevated serum levels of carotenoids, usually through excessive dietary intake of  $\beta$ -carotene.  $\beta$ -carotene is the naturally occurring orange colorant found in carrots, squash, sweet potatoes and green beans, and represents the most important precursor of vitamin A. When consumed in high amounts, it is stored in the intercellular fat of the *stratum corneum*, causing an orange appearance of the skin where the *epidermis* is thicker, typically on the soles and palms. Contrarily to jaundice, hypercarotenemia does not affect the color of the ocular sclera. Common in small children on vegetable-rich diets, hypercarotenemia can also be associated with *anorexia nervosa*, hypothyroidism, *diabetes mellitus*, and severe hyperlipidemia [1]. Hypercarotenemia is a benign condition that does not lead to hypervitaminosis A, as the enzymatic transformation from  $\beta$ -carotene to retinol is tightly regulated [2].

Spirulina is a microscopic blue-green *alga*, found in alkaline salty lakes all over the world. It is responsible for the orange-pink hue of the famous African lesser flamingos that feed on it. Indeed, besides its high content in proteins, essential amino acids, minerals and vitamins, Spirulina also contains large amounts of  $\beta$ -carotene (1.5 mg/g) [3], and is marketed as a green “superfood”. In our patient, skin color normalized eight weeks after significant reduction of daily spirulina intake.

## Sources of funding

None to declare.

## Declaration of Competing Interest

None to declare.

## References

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