Tomato skin versus human skin

The question

Tomato skin changes colour from green to red. The substance that causes this in the skin, could this also be a substance that can help albinos with their lack of skin pigmentation, to obtain a normal skin colour?

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The answer

The substance in a tomato that causes this change from green to red is the gas ethylene. Ethylene ensures that the vacuoles in the cell produce red colouring agents causing chromoplasts to arise. The chromoplast used to be a chloroplast. (Inside the chloroplasts of plants photosynthesis takes place.) As the tomato is ripening the chloroplast receives signals from its environment (by signalling molecules), these signals urge the chloroplast to change into a chromoplast. Furthermore, the build-up of red colouring agents in the vacuole is also responsible for the nice red colour of the tomato, which is also dependent on ethylene. Even tomatoes lying in the dark can turn red, which means that light/UV is not essential to this process. Light and warmth do have an influence on the production of ethylene.

Next to the fact that due to this mechanism we know when the tomato is ripe and tasty there is also an advantage for the plant. That has to do with the spreading of the seeds of the plant. When the tomato turns red it stands out more in its green environment. Birds/animals and people will therefore see the tomato more quickly, eat it and excrete the seeds elsewhere. These seeds can then germinate and grow into new tomato plants.

Human cells in the skin have a very different construction. Humans have pigment cells in their skin and these pigment cells are very different from chloroplasts, which makes it impossible to compare them. The human skin bronzes through pigment produced by melanocytes. Melanocytes are located in the epidermis and they produce melatonin under the influence of UV light. The mechanisms and the underlying chemical reactions that cause this are completely different from the ones taking place in tomato cells.

Kind regards,

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Translated by Anniversary Project Group