

Dermal Absorption

In the last six articles, we discussed about the types of plastics and how they are used in daily life; about the harmful chemicals used to make them; and how they leach from containers into the contents. It was stated that if the contents are eaten or drank, there is the obvious risk of humans ingesting the chemicals and becoming affected negatively. But, what if the contents of those containers are for external use only? Can the harmful chemicals still harm us if the contents are placed on the skin instead of drinking or eating? (as in skin cream stored in plastic containers) If yes, how can they harm us if they are not being ingested or inhaled?

To answer all of these questions, we need to understand the concept of Dermal Absorption – or absorption through the skin.

The word derma means skin. Therefore, Dermal Absorption is the route by which substances or chemicals are transported from the outer skin to the inner surface of the skin and into the blood circulation system.¹ It must be noted that there is a difference between skin penetration and skin absorption. Skin penetration just means that the chemical is present in between the skin layers. Whereas, skin absorption indicates that the chemical has broken down the skin barriers and is affecting the body systems.²

Research shows that absorption occurs mainly during the first half hour of application of the chemical. The outermost layer of the skin absorbs the chemicals rapidly and stores them, before releasing them gradually into the lower layers.³ There are some chemicals, like organic or caustic, that help soften the outermost layer of the skin and assist the chemicals to seep in. The absorption of the chemical depends on the following factors:

- Concentration of the chemical
- Duration of the contact between the chemical and the skin

¹ Dermal Absorption. Environmental Health Criteria Series No. 235. (2006) World Health Organization.

² The Impermeable Facts of Skin Penetration and Absorption. (2011) Personal Care.

<http://personalcaretruth.com/2011/01/the-impermeable-facts-of-skin-penetration-and-absorption/> Accessed at 7 November 2013.

³ Chemicals get under the skin. (1995) Times Higher Education.

<http://www.timeshighereducation.co.uk/94382.article>. Accessed 7 November 2013.

- . Solubility of the content in which the chemical is present
- . The properties of the exposed part of the skin. Dry, cracking and flaking skin is more prone to absorption. The hair shafts, cuts, scrape and punctures on the skin also help facilitate absorption.

Once chemicals are absorbed through the layers of skin, they can easily enter the blood through the veins and become part of the blood circulation.⁴

The containers of most cosmetics and beauty products are made with plastics that have potentially harmful chemicals such as BPA as discussed in previous articles repeatedly. With time, these plastics could break down due to exposure to different temperatures; the chemicals in these containers can begin leeching BPA and other harmful chemicals into the liquid contents. We all know that harmful chemicals, once ingested, can wreak havoc on the human body, by mimicking different hormones and disrupting normal cell behavior. However, it is important to remember that ingestion or swallowing it is not the only the way these chemicals can cause harm. Dermal absorption can put in a significant amount of chemicals in our bodies too.

Once in the bloodstream, the chemicals can travel around the body without any hindrance and interrupt with ordinary bodily functions.

The process of dermal absorption is sometimes used to transport medicines through the skin layers. This method is commonly used for one-off nicotine and pain patches as a localized treatment, which is very different than daily exposure to harmful chemicals such as skin creams that may be contaminated with BPA or phthalates.

The daily exposure, regardless how unintentional, can lead to many diseases. In the upcoming articles, we will explain in more detail how dermal absorption occurs and how authorities regulate the production of containers and their contents.

⁴ How Workplace Chemicals Can Enter The Body. Canadian Centre for Occupational Health and Safety. http://www.ccohs.ca/oshanswers/chemicals/how_chem.html#_1_4. Accessed 7 November 2013.