

1 SPRAY YOUR VITAMIN D3

DR. JOE'S® VITAMIN D3 SPRAY FOR ORAL ABSORPTION

For best results, we recommend the use of DR. JOE'S® VITAMIN D3 SPRAY by spraying the product onto the inside of the cheeks, two sprays, four times a day, for a total of 8 sprays. If need be, the 8 sprays can be administered all at once, or in 2 doses of 4 sprays – the important factor is to spray a total of 8 sprays per day. However, spreading the dose across the day provides a more consistent level of vitamin D3 in your bloodstream.

Why in a Spray?

DR. JOE'S® VITAMIN D3 SPRAY are specially formulated to be ingested through a process known as **Oral Absorption** that involves spraying a fine liquid mist of micro-sized droplets into the mouth, specifically onto the inside of the cheeks (the buccal mucosa). After a period of time, the liquid spray is swallowed, thus entering the alimentary system.

The typical vitamin D pill is taken once a day and is typically swallowed with a glass of water. After being swallowed, the pill enters the stomach where it is subjected to the action of hydrochloric acid, bile and a variety of digestive enzymes. Despite this rather harsh environment, many pills never completely dissolve or disintegrate. However, even if the pill does dissolve and release some or all of its nutrients, the acids and digestive enzymes can often degrade or destroy the nutrients and render them useless; thus the “nutrients” pass ineffectively through the body.

How Oral Absorption Works

The mouth, or oral cavity, has an extremely complex structure because of its many different physiological functions. The regions of the oral cavity vary in thickness and permeability. The 3 basic subdivisions of the mouth that can be used for the absorption of a substance (e.g. drug or nutrient) into the body are:

1. Sublingual absorption - takes place under the tongue and involves absorption through the membrane of the underside (ventral surface) of the tongue and the floor of the mouth.
2. Buccal absorption - involves absorption through the buccal mucosa, which is primarily composed of the lining of the cheeks.
3. Gingival absorption - which is restricted to the mucosa of the gingivae (the gums).

The lining of the cheeks (buccal mucosa) offers by far the most convenient and effective surface for oral delivery. In addition to being the most accessible region of the mouth, the surface area of the buccal mucosa is much greater than that of the other regions.

The “Fine Mist Oral Spray Delivery System” consisting of micro-sized droplets of nutrients in solution, was designed to take full advantage of the benefits of absorption thru the buccal mucosa. The fine mist spray is distributed over a large area of the buccal mucosa, in order to expose the nutrients to the largest possible number of absorption sites. Each droplet in the mist contains a high concentration of the nutrient(s), thus maximizing absorption.

Oral absorption not only avoids gastric degradation, but also results in rapid onset of action and high serum levels (amount of substance in the blood), often with a lower dose because of the lack of destructive metabolism. Once the molecules of nutrients pass through the buccal membrane, they are taken up into the many capillaries and veins that line the mouth. These blood vessels connect to the jugular vein and from there enter the systemic circulation, distributing the blood and nutrients throughout the body. The process is quite rapid, taking place in just a few seconds.

As an example of the value of oral absorption, let's look at nitroglycerin. If you swallowed a nitroglycerin pill, no active nitroglycerin would ever enter the bloodstream. In contrast, a nitroglycerin spray, used in cases of angina pectoris, gets to work on the heart almost immediately.

A Brief History of Oral Absorption

Absorption of drugs through the buccal mucosa was first noted in 1847 by Italian chemist Ascanio Sobrero, the discoverer of nitroglycerin (glyceryl trinitrate). The first medical recognition of the ability of a substance to cross the oral mucosa was noted by Braunton in his lectures to the Royal College of Physicians in 1877 and the sublingual administration of nitroglycerin was firmly established in medical practice in 1897.

Systemic studies of oral cavity absorption were first reported by Walton and Lacey in 1935. (Walton, R.P. and Lacey, C.F. Absorption of drugs through the oral mucosa, *J. Pharmacol. Exper. Therap.*, 54:61-77, 1935.) Since that time, there have been many studies done and today a much greater understanding exists of the processes of both oral and gastro-intestinal absorption.

On the Effectiveness of Oral Absorption

The Encyclopedia of Pharmaceutical Technology, Vol 2 (1990):

“The administration of drugs by the buccal route has several main advantages over peroral administration, including:

1. The drug is not subjected to the destructive acidic environment of the stomach.
2. Therapeutic serum concentrations of the drug can be achieved more rapidly.
3. The drug enters the general circulation without first passing through the liver.”

Physiological Pharmaceutics - Biological Barriers to Absorption (1989) Ch. 2

“Drug Delivery to the Oral Cavity”

“Venous return from the mouth enters the systemic circulation through the jugular vein and not the hepatic portal system. For this reason, first-pass metabolism is avoided and so there is much interest in optimising drug absorption from the oral epithelia. ...

“The oral cavity is rich in blood vessels and lymphatics, so a rapid onset of action and high blood levels of drug are obtained quickly. In many cases, buccal dose forms can have as high a bioavailability as intravenous formulations.”

FOR THOSE WHO DESIRE A MORE THOROUGH TECHNICAL UNDERSTANDING, THE FOLLOWING ARTICLES ARE AVAILABLE ON THE INTERNET: Buccal Mucosa As A Route For Systemic Drug Delivery: A Review (Amir H Shojaei, U of Alberta, Edmonton, Alberta, Canada in *J. Pharm. Pharmaceut. Sci.*, Pub. by Canadian Soc. for Pharm.Sci.) (Contains 109 reference citations)

AVAILABLE ON-LINE AT:

<http://www.ualberta.ca/~csps/JPPS1%281%29/A.Shojaei/buccalreview.htm>

The Merck Manual of Diagnosis and Therapy - Section 22, Ch 298, “Absorption” available on-line:

<http://www.merck.com/mrkshared/mmanual/section22/chapter298/298b.jsp>