

The Effects of Plant Form Proteases on Viruses

Viruses and viral diseases have been with us since the dawn of recorded history. Archeological artifacts dating back thousands of years B.C., suggest that such familiar diseases as polio and smallpox now known to be caused by viruses were no strangers to the ancient world.

THE EFFECTS OF PROTEASES ON VIRUSES

vi·rus (vrs) *n. pl. vi·rus-es* - Any of various simple submicroscopic parasites that often cause disease and that consist of a core of RNA or DNA surrounded by a protein coat. Unable to replicate without a host cell, viruses are typically not considered living organisms.

Some of the better known viruses include smallpox, influenza, chicken pox, measles, mumps, herpes, the common cold and rabies. These have been a major cause of human misery and death throughout history.

In 1939, using an early electron microscope, researchers were able to “see” a virus for the first time. Like other microorganisms, viruses typically gain entry to the body through epithelial surfaces, usually the:

- *Skin*
- *Mucous membrane of respiratory tract*
- *Gastrointestinal tract*
- *Genital tract*

If a virus manages to make it through these physical barriers, it encounters a second line of defense. This defense is engaged against anything the body recognizes as foreign. They include phagocytes (literally, “cell eaters”), white blood cells whose job is to engulf, ingest and eliminate foreign particles including of course viruses before they can infect any of the body’s cells. Perhaps a billion strong, they constantly circulate throughout the body in the blood and lymph systems.

WHITE BLOOD CELLS

Many white blood cell types can act as phagocytes, but most important to our story are the macrophages. Macrophages (Greek for “big eaters”) may be mobile, circulating through the blood and lymph fluid, or attached to

a particular type of tissue. They devour viruses and bacteria, as well as killed or damaged body cells and other debris. Other cells called natural killer cells wander through the blood and lymph fluid looking for abnormal cells, particularly those that are infected by viruses or are cancerous. When they find an abnormal cell, they ingest it.

HOW VIRUSES DIFFER FROM BACTERIA

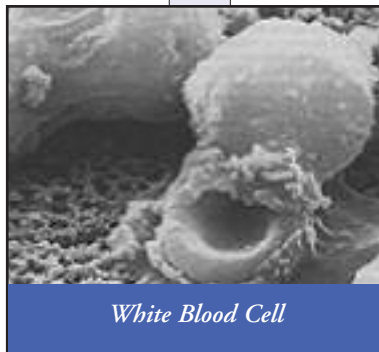
Most of us have the sense that viruses are unique in some way and that viral infections are not as readily treatable as those caused by bacteria. The key differences between viruses and bacteria are size and structure. Viruses are the smallest known form of life, ten to 100 times smaller than an average bacterium. Bacteria are large enough to carry their own synthetic machinery, and thus can live and reproduce independently of a host cell. Viruses, in contrast, are obligate intracellular parasites (that is, they can replicate only inside a host cell).

VIRAL STRUCTURE

The structure of a virus is an exercise in simplicity. The most basic viruses have just two components: a core of genetic material and a protein coat called a capsid. In addition to these components, some viruses have an outer envelope, consisting of a combination of lipids, proteins or carbohydrates. A complete, fully developed viral particle that contains both genetic material and a capsid coat is called a virion. This economical little structure is capable of doing a great deal of harm by invading and replicating within host cells.

SURFACE PROTEINS

Glycoproteins on the surface of viruses apparently act as “recognition factors” that enable the virus to recognize and attach to only those cells within its host range (the range of organisms and cell types it infects). In the case of naked



White Blood Cell

viruses, these glycoprotein recognition factors occur on the capsid itself; in enveloped viruses, they protrude through the envelope to the surface of the virus. There is some evidence that these provide protection against direct neutralization.

PROTEIN COAT

The protein coat, or capsid, is made up of a series of repeating subunits known as capsomeres. While human cell membranes have hundreds of different structural elements, the viral capsid consists of just a few proteins, repeated again and again. Thus, relatively little of the virus' genetic material is devoted to coding for these structural proteins allowing the virus to carry a minimum of genetic material.

PROTEASES & THE PROTEIN COAT

"All viruses are alike in that they have protein coats containing nucleic acid...Enzymes fight viruses by breaking up this protein" (Anthony J Cichoke, D.C.)

Protease is a classification of a group of enzymes which act on protein molecules and assist in catalyzing reactions. These reactions, in effect help to change the molecular structure, or break down the protein molecules. Based on clinical studies, it is known that proteases are able to dissolve almost all proteins as long as they are not components of living cells. Normal living cells are protected against lysis by the inhibitor mechanism. Viruses, parasites, fungal forms, and bacteria are either protein or protected by protein. The introduction of oral proteases presents the ability of those enzymes to act upon the protein coating of viruses or any protein that is harmful to the body or does not belong. Enzymes can also break down undigested food protein, cellular debris, and toxins in the blood, sparing the immune system this task. The immune system can then concentrate its full action on the bacterial or parasitic invasion.

It should be noted that protease when taken on an empty stomach are readily taken up into the mucosa cells of the intestine and passed into the blood circulation. Clinical observations have noted that upon high intake of oral protease, heavy metal concentrations have been significantly decreased in the blood. While in the blood, proteases are taken up by alpha II-macroglobulin which ensures its survival in the body. This same alpha II macroglobulin escorts the protease throughout the body and appears to have the same ability that white blood cells have for determining what does not belong. Once identified the Alpha II macroglobulin exposes the protease to the protein invader and digestion of that protein begins.

Oral proteases come in many forms. It is important to look for a high protease product that utilizes numerous forms of these enzymes. The greater the number of proteases contained in the formula, the more effective the product. Look for a product that combines plant based proteases with other proteolytic enzymes such as Serratiopeptidase, Seaprose, Catalase and Nattokinase NSK-SD. All of the above enzymes have the ability to break down different forms of protein and support the immune system in unique ways.

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More references available upon request.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, prevent or cure disease.

Virus Structure Definitions

Capsid: A protein coat surrounding a virus.

Capsomeres: One of the individual subunits that makes up a capsid.

Complement: A complex system of proteins found in normal blood that combines with antibodies to destroy pathogenic bacteria and other foreign cells. Also called alexin.

DNA: Deoxyribonucleic acid. It carries the genetic information in the cell and is capable of self-replication and synthesis of RNA.

Genome: The full complement of genetic material belonging to an organism.

Glycoprotein: Any of a group of conjugated proteins that contain a carbohydrate as the non-protein component.

RNA: Ribonucleic acid. A polymeric constituent of all living cells and many viruses. The structure and base sequence of RNA are determinants of protein synthesis and the transmission of genetic information.

Virion: A complete Virus particle that consists of RNA or DNA core.

Virus: Ultramicroscopic infectious agent that replicates itself only within cells of living hosts; many are pathogenic.