Ray Peat's Newsletter

Natural Immunity and Viral Infections

W F. Koch worked in Moses Gomberg's lab, where free radicals were first observed. Koch soon constructed a theory of natural immunity against virus and cancer, based on his belief in the existence of biological free radicals, able to oxidize virus particles and carcinogenic molecules. Koch believed that allergies were an early sign of the failure of this free radical oxidation system.[1]

Albert Szent-Györgyi worked out some of Koch's ideas, and in the process discovered vitamin C (which has a free radical state), and explored many other energy exchange processes, including free radical activation by biological pigments.[2]

Both of these men argued that there is a special interaction between biological structure and the activated electronic state, and that both structural and electronic properties of molecules are involved in their toxic or therapeutic functions.

This model of cell structure and function leads to the expectation that any substance is likely to have a broad range of effects, acting on many different cell types, and promoting or suppressing cell functions, depending on the cell's type and its present state.

In this view, the living material is not an ordinary liquid, but is deeply structured, somewhat like a liquid crystal, and this structure is subject to many physical influences, in the process of adapting to a changing environment.[3]

Newer techniques are letting us visualize more of this finely structured cellular system, and it has been found that many types of virus replicate themselves while attached to the cell mesh-work.4 Alterations in the mesh-work and the adjoining water will obviously affect the ability of the virus to multiply.

The highest energy states of the cell tend to exclude water soluble substances, and to absorb oil soluble materials. The components of a virus have very specific affinities for water and oil, and they can be assembled only in a very special solvent environment. As mentioned above, a substance which modifies any type of cell will modify others. The high energy state of a cell is an electrically "hyperpolarized" state, and for a nerve cell this is an inhibited, quiet state.

Camphor

There is a long history of anesthetic substances being used to treat viral diseases. Abrams, in a 1910 textbook, described the use of chloroform to cure a viral disease in a horse. Camphor, besides being used as a local anesthetic and a heart stimulant, has been used to treat influenza and other systemic diseases,[5] and is one of the oldest topical treatments for herpes sores. More recently, a veterinarian reported curing an "incurable" virus disease in a dog with an anesthetic dose of ether.

Adamantane, which can be extracted from petroleum, is a close structural analog of camphor, and smells like camphor. With the addition of a nitrogen atom, it is water soluble, and is an effective anti-viral agent,

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and is also widely used in treating Parkinson's disease (its function is cholinolytic),[6] and more recently is being used in preventing withdrawal symptoms in cocaine addiction.[7] It is not metabolized, and does not present the genetic risk that has recently been recognized for other anti-viral agents which disrupt viral DNA.[8]

The fact that the body is well supplied with substances which – at a slightly higher concentration – are anesthetics, and which are depleted by the stresses which predispose to viral infections, suggests that they may normally have a camphor-like anti-viral activity. Some of these substances, the anesthetic steroids, have been found to prevent some viral infections,[9] and they also have a wide range of anti-toxic effects.[10] Pregnenolone, progesterone, DHEA, and pregnanediol are all good candidates as anti-viral drugs, but etiocholanolone – which also produces fever[11] – is the most interesting of the group.

It is well-known that stress, acting mainly through the glucocorticoid hormones, damages immunity by destroying thymus cells. The anesthetic steroids, especially progesterone, normally reduce the need for secretion of cortisol, but also act as a protective buffer against the damaging effects of cortisol.

Although a physiologically balanced amount of cortisol induces enzymes of detoxification, for example in the intestine, an unopposed excess causes destruction of these enzymes, eliminating much of the intestine's barrier function, and leading to allergies.[12] This action of cortisol against the thymus and against the bowel's detoxifying enzymes very likely accounts for the common association of allergies with virus infections. Since cortisol has a destabilizing, pro-convulsant effect on the nervous system, there are likely to be psychological symptoms – anything from compulsive behavior to depression or seizures – associated with the other chronic conditions.

In the last century, it was observed that digitoxin (a natural steroid derivative) lowered the fever caused by enteritis.[11] This is probably another example of a catatoxic function, a protective function common to many steroids, and probably worked by way of stabilizing the detoxifying enzymes and preventing the absorption of endotoxin.[13] Endotoxin is known to destabilize and inactivate the bowel's detoxifying enzymes, just as an overdose of cortisol does.[14]

Biological Erasers

Although it is important to be aware of the deadly effects of chronic, unopposed exposure to cortisol (and estrogen and prolactin), these hormones which cause atrophy and loss of function in various tissues also have a creative function. I have elsewhere called them the biological "erasers," the hormones of new beginnings.[15] In the case of cortisol, it might be useful to compare its effects on tissue cells to the process of winnowing wheat, in which the chaff is blown away while the grain is retained. I think there is a mechanism, as proposed by Meerson, in which a functional load preserves the cells and systems which are needed in the present environment, while idle cells are eliminated or reduced by cortisol's

catabolic action.[16] In this view, intermittent exposure to these hormones would improve resistance, but continuing uninterrupted exposure will destroy resistance.

Adequate energy, for example as available glucose, is protective against cortisol-induced catabolism. White blood cells can protect themselves by metabolizing cortisol in the presence of sufficient glucose.[17]

Some of the consequences of stress are not catabolic. When the detoxifying enzymes have been lost, then bowel toxins block other basic enzyme systems, leading for example to slowed protein turnover[18] and decreased activity of superoxide dismutase.[19] The consequent increase of lipid peroxidation will decrease steroid synthesis.[20] Stress also leads to the production of intracellular toxins, including ammonia and carbon monoxide, which tend to perpetuate the blocked state.

Just as with the anesthetic substances which modify the physical state of the cell, retarding viral replication, the oxidative protective system has several points at which intervention is possible to support detoxification, and to promote protein turnover.

Injecting Enzymes

Although natural promotion of the enzymes which degrade proteins and nucleic acids will help to shift the equilibrium away from virus production, recent research shows that it can be therapeutic to inject enzymes (nucleases, both DNAase and RNAase) which degrade viral nucleic acids.[21] Using labelled enzymes, it has been demonstrated that virus and enzyme can enter the cytoplasm in the same vesicle. In herpetic keratitis, the enzyme is used as drops and also injected under the conjunctiva, and in infectious mononucleosis and viral encephalitis it is injected intramuscularly.[21] In treating a viral paralysis of bees, the enzyme is administered as an aerosol. It was found that treatment increased the viability and productivity of outwardly healthy bees, apparently by curing a latent viral infection.[21]

While W.F. Koch was interested in the body's own oxidative free radical system of destroying toxins and pathogens, he studied several natural quinones found in medicinal plants. Recent work has found that phototoxins extracted from plants can kill mouse-cytomegalovirus without damaging the mouse cells.[21] These researchers selected chemicals which do not disrupt genetic material, recognizing the probability of serious side effects.

Although injected enzymes and plant toxins are safer than some current chemotherapies, the basic approach to controlling viral diseases should be to support natural immunity, by maintaining energy production at a high level, by unblocking and stabilizing the detoxifying enzymes, including mono-oxygenases, proteolytic enzymes, SOD, and nucleases, and by avoiding prolonged catabolic states. Many natural substances are available which promote these ends, without risk.

While this approach supports the known mechanism of the immune system, including protection of thymus cells and activation of the various white cell mechanisms of attack, it has the novel feature of altering cells physically to retard viral assembly, increasing their exposure to nucleases, proteases, and mono-oxygenases; that is, it mobilizes immune processes in cells which are not part of the immune system. By eliminating stress-induced susceptibility, it systematically shifts the balance toward normal functioning, and away from parasitic diversion of the organism's resources.

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All manuscripts for publication are to be typed and double spaced.

A reference sentence has a reference number at end.[3]

References for articles are written as follows:

3. Garner DM, Garfinkel PE, Socio-cultural factors in the development of anorexia nervosa. *Psychol Med* 1980; 10:647-56.

References for books are written as follows:

3. Benson, Herbert, M.D., *The Mind/Body Effect,* Simon and Schuster, NY, 1979.