

ORIGINAL

**AN INTRODUCTION TO PROTOMORPHOLOGY**

BY

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— Professional Distribution —

## AN INTRODUCTION TO PROTOMORPHOLOGY

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There is probably no recent discovery in the field of biological science which has shown such great promise of prompt and practical therapeutic results as that branch of nutrition now known as protomorphology.

*Introducing a new  
biological and  
nutritional field  
of science.*

In this brief review of the subject we will introduce some of the basic principles of protomorphology and outline the theories that have evolved. In addition we will give some of the latest reports regarding the use of protomorphogens as practical therapeutic entities.

*Outline.*

Those who are interested in learning more about this subject may obtain on 30 day approval the book, "Protomorphology — The Principles of Cell Auto-Regulation" (\$8.50), from Lee Foundation for Nutritional Research, Milwaukee 3, Wisconsin.

*Reference.*

Protomorphology, as we know it today, was made possible by the efforts of many early investigators. We must pay tribute here to some

*Early  
investigators.*

of the most outstanding of these men: Dr. Fenton B. Turck, author of "The Action of the Living Cell"; Dr. George W. Crile, author of many books, especially "Life As a Bio-Electrical Phenomena"; and Dr. T. Brailsford Robertson, author of "The Chemical Basis of Growth and Senescence". Without the pioneering efforts of these men, we would have been at a loss to explain the many complex problems that are now becoming clear to us.

**RESULTS  
OF RESEARCH:**

*Many chronic diseases given a simple explanation and nutritional remedies made possible.*

It was this important background material which enabled us to arrive at a simple explanation of many chronic diseases and to locate a simple remedy — usually some missing nutritional element. We were also able to supply a single explanation for a variety of seemingly unrelated disorders and physiological phenomena— allergic reactions, healing responses, adaptation of skin grafts and certain aspects of aging, to mention only a few of these — which all became understandably related according to the perspective of this theory.

**APPLICATION:**

*Practical results confirm theoretical findings.*

In our early work we appreciated the fact that we were merely assembling the structure of something for which these men had spent their lives designing the parts but who had not lived long enough to find out the real importance of their contribution to research — the discovery of the physiological mechanism of the automatic regulation of growth and repair. Now that the facts are known and practical methods have been worked out for their application, it is obvious that a completely

new system of treating chronic disease has resulted. For several years now we have been accumulating clinical data, and our present knowledge is being fortified by the new clinical uses which are constantly being revealed to us. Some of the most important facts in the world were discovered first and explained afterward, the explanation being easy once the facts were known. We realize here that we began with a lot of unexplained facts and then set up a theory. The important thing was that we found that the theory seemed to work whenever it was applied.

As one authority describes it, life is simply "a bundle of enzymes". Protomorphology may be defined as the study of enzymes and their activators. Enzymes are the key to growth and repair, the key to the maintenance of the cell—in fact they are the key to life itself. The word "protomorphogen" is used to express the function that these enzymes are performing. "Morphogen" means determiner of form, and protomorphogens are protein determinants, catalyzers of protein synthesis. Every cell has a number of these protomorphogens because it has just as many as it has kinds of proteins. We also describe a protomorphogen as one of the fractional blueprints of the cell. Protomorphogens are in the nature of nucleo-proteins and are really blueprints of things that are going to be built long before they are built.

**DEFINITION:**

*The study of function of enzymes and their activators.*

Protomorphogens are produced by every living cell in the body. The germ cells, the

**ORIGIN:**

*Produced by all living cells; transmitted by germ cells.*

sperm and egg of the mammal, are both bundles of these protomorphogen blueprints, i. e., chemically speaking, their basic characteristic may be 80 or 90 per cent protomorphogen. Our offspring carry the characteristics of the parents, and these characteristics are delivered through the medium of these blueprint substances. In order to have a complete pattern in the germ cell, these blueprints have to originate in each of the cells of the body and be carried by the blood stream to the gonads for assembly.

*Acquired characteristics.*

Inherited diabetes serves to illustrate what happens when these protomorphogens are lost. If both parents happen to be diabetic and do not have islets of Langerhans in their pancreas, the offspring will be diabetic because there was no source for the specific protomorphogen to supply these blueprints to either germ cell. (When we speak of the inheritance of acquired characteristics, some of our biological friends say that is impossible, but, if we as human beings develop diabetes and our offspring are diabetic as a result, I think this is a case where we are transmitting acquired characteristics.)

*COMPOSITION:*

*Complex functioning mechanisms inter-related with cell proteins and enzymes.*

The infinity of the differences in proteins has always been one of those things that have staggered biochemists. Every cell is a mixture of proteins, and we may have hundreds of them in a single cell. Every enzyme is a separate protein, and even the simplest kind of cell may have dozens of enzymes. These proteins and enzymes are of various types and they are

all specifically different. Now when we realize that protomorphogens are the essential components of this enzymatic-protein construction because they are the determinant factors by which its substance is maintained, we begin to have some idea of the significance of these growth substances.

Protomorphogens should be considered as non-vitamin food factors because the substances involved are almost all parts of structures of the beef animal and are simply extracts of various tissues and organs that would ordinarily be considered as foods. Since they do not contain hormones, in one sense they are simply meat juices, nutritionally speaking. The factors which are involved have always been present (like vitamins and enzymes and organically combined minerals) but remained heretofore unknown and unsuspected components of the human food pattern.

The single cells of every organ in the body have their own specific types of these cell determinants which carry the blueprints of the whole organ. To understand the general mechanism of protomorphogen control, it is first necessary to go back to the single cell and its anatomy. We know that the cell builds and repairs itself by first secreting into the surrounding media the enzymes and determinants (protomorphogens) that promote the formation of a layer of protein molecules on the outer cell wall. Then the wall is rebuilt outside this protein layer, and the process is repeated.

**BIOLOGICAL  
CATEGORY:**  
*Non-vitamin  
food factors.*

**FUNCTION:**  
*Organization of  
protein construction  
in pericellular  
fluids.*

Note: The new protein must be built outside the cell from materials in the surrounding media and, to build the special proteins, the cell must be provided by some means with the blueprints to guide the required construction. This guidance of construction is accomplished by an aggregate of enzymes and trace mineral factors that are more highly organized than any watch. This is the function of protomorphogens.

**CONTROL  
OF GROWTH:**

*Continuous growth  
and repair of  
tissues shown.*

It has been demonstrated that you can put a fragment of liver tissue into a flask and, by changing the culture medium every day to get rid of the toxic material (a specialized form of blood serum), these liver cells continue to grow and you have to cut a piece off every day or two to keep from filling the flask. You will probably recall Dr. Carrell's famous chicken heart fragment which grew for 35 years until they tired of taking care of it. These experiments prove that repair will continue as long as the proper environment for tissue is maintained.

**TISSUE  
DETERMINATION:**

*The nature of  
tissue controlled  
by protomorphogens.*

It has also been demonstrated that one kind of cell may be reconstructed to become another kind of cell. For instance, you can culture some liver cells in a flask and put some connective tissue from kidney in with it and soon you will have kidney cells instead of liver cells. This is because connective tissue has a special affinity for protomorphogens and, by changing the concentration of the blueprint material in the culture medium, the basic tissue will follow the pattern being set up by the

blueprint material. In the same way, if you graft a piece of skin from outside the body into the mucous membrane of the mouth, in a few weeks it will become mucous membrane. The epithelial cells of the skin take in the blueprints of the mucous membrane and gradually convert the skin cells to mucous membrane cells. An experiment of this kind was made by grafting a piece of embryo calf skin into the belly of a guinea pig. In a few months the calf skin was growing guinea pig hair instead of calf hair. These experiments show that the protomorphogens find their way into the culture medium and direct the growth processes of any appropriate cells which may be present.

Now I would like to go into the work of Dr. Robertson. He wrote a textbook in 1923. He was the first man to discover the growth factor of the pituitary gland. He also showed that certain growth factors could be separated from every living cell, from yeast cells for example, and that these cell extracts would stimulate growth when supplied to a culture medium; also, he showed that if these cell extracts were supplied in increasing amounts they would inhibit growth instead of stimulating it. It was the degree of concentration of the substance in the medium that was significant and growth was thereby regulated. Apparently there were three primary phases: in a very dilute concentration the growth rate was relatively slow; in an optimum or medium concentration there was accelerated growth; and

**GROWTH CYCLE:**

*Growth rate  
predictable;  
S-curve  
characteristic.*



*Healing rate  
calculation.*

in a higher concentration the growth rate was slowed. For such substances, which have the characteristic of forming an S-shaped curve when graphed, Dr. Robertson set up mathematical formulas which enabled him to predict the exact weight of a test animal at any part of its life (unless stunted by starvation). Later on, during World War I in France, surgeons were able to take observations on the healing rate of wounds and, by estimation of this healing rate, they could calculate the age of an individual within a year or two. This showed that as we get older our healing rate slows down and is an index of the actual age of the individual.

*Wound healing  
factors.*

The healing of wounds has been one of the mysteries of medical science. What stimulates the need for repair and what stops the repair after it has completed its task? The cause of the cessation of growth appears to be the formation of antibodies, known as Natural Tissue Antibodies (NTA), which are formed in opposition to the growth of an organ or tissue beyond the needs of the body. The cause of the acceleration of growth appears to be specific growth factors, protomorphogens, which are called upon when the needs of the body are increased. These apparently opposing factors constitute a regulatory mechanism which is always active in its function of maintaining a balance, but at the same time is flexible in being able to meet varied demands. For instance, if we hang one arm in a sling, a so-called "disuse" atrophy affects its

muscles. On the other hand, if a surgeon removes one kidney the other one will become twice as big within a few months. It automatically adjusts its capacity to carry the load. To summarize, we may say that both stimulating and inhibiting factors are necessary for the control of growth. Protomorphogens are the stimulating factors and Natural Tissue Antibodies are the inhibiting factors by which growth and repair are regulated.

A mechanism similar to the above occurs with disease germs when antibodies are formed. Also, I suspect, a like mechanism is in effect during the aging processes. Thus, we may understand that we get old not because of the effects of time alone, but because our bodies are arranged to operate a given period of time and "run down" like an eight day clock. That is illustrated by the fact that a pigeon dies of senile degeneration in 10 years, while a parrot, physically similar and supplied with the same food, normally reaches five to ten times that age. Man normally reaches his recessive phase at the age of 25 to 30. This is demonstrated by the fact that a prize fighter is at his physical peak within these time limits. The physical changes for about 20 years are usually insignificant (a cumulative period, apparently, before the effects of changes taking place become noticeable). The emotional experiences and nutritional habits that one meets in daily life may to some extent influence the rate of these changes. For instance, life insurance statistics show that deep-sea fishermen live the

*Growth factors  
in longevity.*

longest, watchmakers ranking next. About the only thing in common between these two fields of activity is that in each case the worker has little occupational cause for worry. The physician, according to the statistics, has a relatively low position in the longevity scale. It offers supporting evidence to the old axiom that "worry kills more people than work". However, in any event, these differences in the age periods due to stress are relatively insignificant and we are compelled to conclude that in general the life period is determined by the vagaries of evolution, being a hereditary characteristic that is beyond ordinary influences. One thing that we should keep in mind, however, is that the average life span and the normal life span may differ by 20 years or more. Adequate nutrition can quite possibly increase the average life span 20 per cent or more, but even the best diet is limited to preventing premature senility (which is a condition of malnutrition) and cannot prolong life beyond its physiological limits. The reason for this appears to be that, as we get older, there is a slower and slower release of the growth factors, protomorphogens — or an increase of the Natural Tissue Antibodies, all of which seem to progress along the lines of the S-curve of Dr. Robertson.

*PRACTICAL USE:  
Nutritional  
environment of  
specific organs  
influenced by oral  
administration.*

Now here is the method we are working on which apparently bears out in practice. By supplying extracts of the specific organ involved, we can influence the local nutritional environment of those particular cells. Any

activity of an organ causes the increased secretion of protomorphogens into the surrounding fluids, and the effect is a purely physiological one whether activity causes the increase in protomorphogen or whether it is supplied by means of tissue extracts containing these protomorphogens. If it is kidney or liver or other epithelial tissue, we may have cell division and regeneration of tissue. I might say that only epithelial tissue does this in the adult, cell division not occurring in other tissues. That is why most of our glandular organs have been developed from epithelial tissue so that they can increase in size to care for overloads. The glandular protomorphogen extracts have been of specific interest because one of the most important problems in medical science has been the ways and means of correcting the malfunctioning of these various glands. Now these protomorphogen factors have shown some remarkable results where these endocrines have been overloaded or injured for one reason or another.

Another important aspect of this same theory is what may be called the "allergic reaction". In order to understand this, we must not limit ourselves by thinking that we are speaking of the usual concept of an allergy — something in the nature of an external manifestation — but rather look to allergies as demonstrations of protective mechanisms, which at times may be oversensitive. To explain this, we will begin by stating that the chemical nature of these growth factors appears to be the mineral com-

ALLERGIC STATE:

ponent of the protein. Dr. Turck demonstrated that you could take tissue and reduce it to an ash and, if you did not run the temperature over 700 degrees centigrade, that ash could be injected into a test animal and it would have almost identically the same effect as the protein from which it was taken. Allergies can be excited with this tissue ash just as well as with the protein. This showed that it is the mineral component of the protein which was producing the reaction.

**DENATURED  
PROTEIN:**  
*Protein which has  
lost its mineral  
component.*

A protein that has lost its mineral component is denatured. That means that it can not instigate or create this allergic reaction. Biochemists have used this term "denatured protein" for years, and with various shades of meaning, but this is one explanation for all the different phenomena that attend this denaturation of proteins.

*Sbock reaction.*

A basic effect of a protein, if it is injected into the blood stream of an animal, is to create a sensitivity which is very serious if you inject a second dose of this protein. The second dose will usually kill the animal unless it is a very small dose, whereas the first dose will not disturb him at all. That is known as an anaphylactic reaction.

When anyone develops allergies, he has become sensitized to a specific protein by some manner or other, and it becomes a very disturbing thing: for instance, hay fever, in which the victim was sensitized to the protein

of weed pollen, hay dust, or something else.

Now, it is the breakdown of the protomorphogen content of the cell that is doing the irritating because histamine is one of the end products. If we are sensitized, we'll say, to ragweed pollen and we inhale some pollen, that pollen combines with an antibody in the blood stream in the membranes of the respiratory tract. When an antibody and a protein combine, they are destroyed or digested by enzymes that are present in all tissue. One of the end products is histamine. It is the histamine that does the irritating which makes this whole reaction obvious to us.

*Histamine*

What we must realize now is that this reaction need not be excited from something introduced from the outside. For instance, suppose we have a patient who has had a coronary occlusion and a part of his heart muscle has become robbed of its supply of blood and it is replaced with scar tissue. In accomplishing that repair, the heart muscle proteins were absorbed after necrosis into the blood stream. They now act as any foreign protein would do, and the victim becomes allergic to his own heart muscle protein. That means that the blood stream begins to carry antibodies to the heart, which will impair and reduce the rate of repair of heart tissue, and any overwork on the part of that heart is going to be very serious, because any recovery will be slower than usual.

*Heart antibodies.*

One interesting patient had found that his heart decompensation was relieved as long as he ate a pound or so of beef or lamb heart per day. He was much gratified to get far better results with one or two small tablets of the protomorphogen heart extract and to be able to drop his special diet that had become quite monotonous and distasteful.

*Lung  
antibodies.*

Suppose that a patient has had tuberculosis which has destroyed part of the lung and that the blood stream has had to absorb this lung material and carry it away. He is bound to have antibodies to lung in his blood stream. If we feed that individual a few tablets of the protomorphogen extract of lung — of beef lung — we may find that it will be of great benefit. Most cases of chronic bronchitis are due to failure of the lung to repair itself at the normal rate. This failure to repair is simply due to the fact that the blood stream carries these antibodies which impair local nutritional environment.

*Brain  
antibodies.*

In another case, we find that a patient who has had a skull fracture at one time in his life, say 25 years ago, may still have antibodies to brain and may still have a slower than normal mentality; this may even be the result of injury incurred in childbirth. These individuals may be doing quite important work. We found doctors with a "slow mentality", though perfectly successful in their work, who find that the brain protomorphogen extract restored their mental processes to normal.

Any so-called "foreign protein" in the blood stream may excite allergic reactions and when we become allergic to a food it may be because we did not completely digest that protein in the stomach, and we may have had ulcers or lesions in the bowel — whether it was ulcerative colitis, duodenal ulcers or what have you. We had to have some break in the tissues in order to let that protein get into the blood stream. That is the theoretical background of food allergies.

*Food allergies.*

There are certain protective factors. The protomorphogens seem to be wrapped in a fatty envelope of cholesterol and fat soluble vitamins in addition to other things. Vitamins A, E and F are particularly important and will tend to reduce the amount of histamine produced from enzymatic destruction of protomorphogens because they help to prevent this reaction from occurring. There is also a natural anti-histaminic, a liver fraction discovered by Japanese investigators who reported it under the name of "Yakriton", which is now available commercially as "Anti-Pyrexin". This fraction has experimentally been found extremely beneficial as a detoxifying factor, particularly in the case of histamine; that is why it makes a valuable remedy for colds.

*Protective factors.*

If these protomorphogen extracts are not needed by the patient to whom they are given, they act merely as that much protein in nutrition, apparently perfectly harmless. There is only one possible exception. Take a patient

**ADMINISTRATION:**



who has had tuberculosis for many years (or any other disease which would produce excessive antibodies) and has produced a very high level of lung antibodies. If such a patient is given too much protomorphogen extract of lung at one time, he might have some histamine reactions— systemic histamine reactions. What would that mean? It would mean that he would feel as though he were coming down with a cold, because when you are coming down with a cold, you are simply getting a generalized histamine reaction. That is why anti-histamines are cold remedies. It does take a fairly heavy dose to bring about such a reaction even though the patient is highly "loaded" with antibodies to any particular tissue. So all that we need to do is to warn the doctor who may be using these extracts to start with a relatively conservative dosage. These reactions are not serious, but the average patient does not feel very encouraged about the wisdom of the treatment if it makes him feel ill to start with. However, such reactions prove beyond any question of doubt that this particular patient does need this kind of treatment, and his subsequent response to the therapy is very favorable.

*Administration:  
oral only.  
Injection would  
provide excess  
of antibodies.*

These protomorphogen extracts can never be administered by injection, as in that case they will aggravate the target organ instead of helping it. This is because injected protomorphogens are immediately picked up by phagocytes and carried off to lymphoid tissue where they instigate the production of more,

instead of less, Natural Tissue Antibody. Alimentary administration, on the other hand, simply promotes the reduction of the blood levels of Natural Tissue Antibody, undoubtedly by direct combination with the antibody, as fast as the protomorphogen is absorbed into the blood stream. The different effect may be entirely due to the concentration on arrival in the blood, the alimentary absorption being so dilute that phagocytic pickup can not be accomplished, but at the same time not so dilute that definite and specific effects are obtained where the Natural Tissue Antibodies are concerned.

I may digress here to say that phagocytic pickup has been reported as greatly increased every time a person begins to eat certain foods, most generally cooked foods, and that this leucocytosis does not occur when raw foods are eaten. This reaction has been called digestive leucocytosis. Apparently there are specific enzymes in fresh and living cells which influence this deployment of defense mechanisms. This selective capacity of the alimentary tissue cells may be one of the most incalculable and important of factors in the functioning of protomorphogen extracts in the nutritional process. Incidentally, the spleen is the organ which controls the integrity of antibodies, and removal of this organ is attended with loss of immunity to diseases against which one had been immunized. For instance, upon the removal of the spleen, a person who had been immune to typhoid fever

*Selective capacity  
of alimentary  
tissue.*

*Function  
of spleen.*

becomes susceptible to reinfection.

*CLINICAL REPORTS:*

By the use of these protomorphogen extracts we can often produce a dramatic change in the condition of some organ. In cases where progress is slow or lacking and where stimulation or repair is desirable, it is a remarkable thing how progress can be accelerated by the use of these extracts whereas ordinary nutritional measures may have produced only a mildly beneficial effect. We may say, the facts have been assembled over the years — the empirical facts — and all seem to fit in with our theories that involve these growth and repair factors.

*Adrenal  
protomorphogen.*

The patient who has weakened adrenals has low vitality, tires easily and may have low blood pressure as well as a host of other disorders and complaints all well known to those who have made even a slight study of these important organs. Now, those adrenals may have been damaged by a lot of things. Infections, for instance, create a terrific demand upon the adrenals. Many cases of chronic illness following severe attacks of pneumonia, tuberculosis or an infectious childhood disease of some kind may be traced back to damaged adrenals as a result of these increased demands upon their function. The adrenals have a detoxifying function, and it is the removal and elimination of these toxins which produce the adrenal stress — to say nothing of the everyday stress and strain that may be placed on the adrenals by overwork and worry. If

you get burned very severely, the adrenals will be damaged. It has been said that patients who die from generalized burns do not die from the burns themselves, but they die from adrenal destruction. Vitamin support of the adrenals— C and G complexes, as well as adrenal protomorphogen extracts— often produce remarkable re-establishment of adrenal function, which to my knowledge can not be obtained in any other way, hormonal therapy having proved transient in its effects and in many ways otherwise lacking. I do not mean to say that a completely destroyed adrenal may be restored or that complete restoration may be had, as in severe Addison's Disease, but it is surprising the number of cases that respond to this vitamin and adrenal protomorphogen therapy.

Another interesting phase of our investigation has been that the pituitary protomorphogen extract has been extremely effective in the syndrome of gastric ulcers. This disease is more common in the male than in the female— I believe that the ratio is about 4 to 1. It seems to be due to a failure of the pituitary to control hormonal balances and to maintain a proper healing rate in general. The so-called sex hormones seem to perform their physiological action by regulating the release and use of protomorphogens. That can be easily understood when you realize that, without the protomorphogen which is released from the tissues and made available to the gonad (the germ producing organ), there would be no reproduction— no hereditary blueprints avail-

*Pituitary  
protomorphogen.*

able. Nor could we have any healing without a release of these protomorphogens. That is why the effect of the sex hormones is to stimulate repair of the tissues as well as to provide free protomorphogens to travel in the blood stream for the ultimate assembly into the germ cells. Medical science came to the conclusion some years ago that one of the best remedies for gastric ulcer was the female sex hormone. And now we find that this pituitary protomorphogen extract is a very promptly acting remedy, apparently because it normalizes the function of the pituitary which basically controls the release, distribution and function of the sex hormones (through the so-called gonadotrophic effect of the pituitary).

*Thymus  
protomorphogen.*

We often see cases in which the stimulation of defense mechanisms is desirable. In our experience with thymus protomorphogen extract we have found it to have phenomenal value in the treatment of the patient who is susceptible to infections— the patient who has carbuncles, boils, styes, acne and so forth. How does the thymus work? Well, the thymus is a lymphatic organ. It is part of the system that produces white cells. The white cells are the fighters that pick up germs. So, apparently, when we use thymus protomorphogen extract, we are simply putting our finger right on the key to this whole thing of defense and providing a bigger and better army to go out to do this job.

*Bone  
protomorphogen.*

One of our first experiences with these extracts was with bone— raw veal bone— extract.

We found that patients with a history of pyorrhea had apparently developed antibodies which inhibited the recovery and repair of the supporting tissues of the teeth (which every dentist knows how difficult it is to get to regenerate). The results following the use of veal bone extracts have been very gratifying. It is frequently possible to tighten up loose teeth. The only cases in which you can not get results are those where such a destruction of tissue has occurred that normal regeneration is impossible. I would say that in 60 per cent of the cases satisfactory results may be expected. It is a very interesting reaction. You can actually see in X-ray pictures regeneration of bone within 10 days or 2 weeks, so that there need be no question about it.

One of the most important of these extracts has been that of the heart muscle. I would say that the average patient who has had heart complications has at least a 50% chance of being a victim of the development of heart antibodies, and probably all such patients would find benefit from the use of this extract. Our observations tend to indicate that heart protomorphogen extract is beneficial for all muscle tissue. Its effects are measurable by any instrument which is used for the measurement of the efficiency of the heart muscle. I specifically refer to phonocardiography, which is the method now used to measure muscular activity. (About 80 per cent of heart pathology is muscular.) The Electrocardiograph measures the nerve conductivity and would not serve to

*Heart  
protomorphogen.*

aid in the judgment of the efficacy of this extract. At any rate, the results with the heart protomorphogen extract have been more than satisfactory from a clinical viewpoint.

*Conclusion.*

The results obtained in clinical use of the other protomorphogen extracts have been on a comparable basis with those that have been elaborated upon here. We have prepared a booklet entitled "Applied Protomorphology" (no charge), which gives more comprehensive information and gives a complete list of the clinical uses of the various protomorphogen extracts.