An Open Letter On Pleomorphic Microbiology

Unbundling The Enderlein Legacy

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Abstract: From the pioneering work of Antoine Béchamp in the mid-19th Century to the contemporary researches of Lida Mattman and others, decoding the phenomenon of bacterial pleomorphism has always been a provocative challenge. Rather than perceiving pleomorphism as a single phenomenon to be accepted or rejected in its entirety, this paper focuses on the work of Dr. Gunther Enderlein (1872-1968) and attempts to "unbundle" relevant portions of his work into six distinct, but related elements. The merits of each element are explored in the context of current biological knowledge, creative scientific speculation, new analytical tools, and clinical therapeutic experience. The author argues that much – but not all – of Enderlein's work in this field remains valid, although new ways must be found to explain and integrate his discoveries and theories into the larger body of modern biological knowledge.

"Until man duplicates a blade of grass, Nature can laugh at his so-called scientific knowledge…it is obvious that we don't understand one millionth of one percent about anything. " – Thomas Alva Edison

"Nobody can pretend to know the complete life cycle and all the varieties of even a single bacterial species. It would be a presumption to think so." – Ernst Almquist (after 21 years of pleomorphism research)

"Everything should be made as simple as possible – but not simpler" – Albert Einstein

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Life on Earth is varied, bizarre, wonderful, and fantastically complex. Evolution, after all, aims for reproductive success – not retroactive clarity of design. The great triumph of biological science, especially over the past 50 years, is that we have been able to make so much sense out of so much chaos. The development of sophisticated theories and methods of molecular, cellular, genetic, and evolutionary biology has provided us with phenomenal understanding of the vast array of life on our planet, and many of the most fundamental processes of life itself.

But I find myself in sympathy with Edison when he observes that we don't really understand a "millionth of one percent about anything." Whenever we think we understand something, our insight is always colored by the conceptual "filters" through which we have gained that understanding. An old saying tells us that "nothing succeeds like success." When a particular theory, or experimental method, or style of understanding proves to be effective, we naturally tend to apply those ideas and methods over and over again. This activity has the positive effect of yielding more and more links in useful chain of knowledge.

But this activity, which is standard procedure in science, also has the negative effect of inadvertently suppressing other types of knowledge – knowledge that would only come to us if we looked for it in completely different ways. Ways which may, in fact, at first

seem to contradict a body of knowledge in which we already feel secure. But this is also standard procedure in science, although many scientists resist it. Of course, it's important to "mine" for additional knowledge using trusted, existing methods. But it's also vital that we "prospect" for new ways of exploring and thinking. Ultimately, it is from this more radical type of exploration that true scientific breakthroughs occur.

I am reminded of the French philosopher Auguste Comte (1798 – 1853). In 1835, Comte presented his "Theory of Eternal Limitations," stating that there were some things that would remain forever unknowable to mortal man. As an example, Comte cited our inability to ever decode the composition of distant stars. He said, "We shall never be able to study, by any method, their chemical composition or their mineralogical structure... Our positive knowledge of stars is necessarily limited to their geometric and mechanical phenomena."

Interestingly enough, in 1821, fully fourteen years before Comte's dictum, Fraunhofer had already constructed the first spectroscope, and had begun to analyze the composition of our sun. The exhaustive work of Kirchoff and Bunsen followed, cataloging the spectral signatures of numerous elements, and permitting the detailed analysis of the composition of stars at the furthest reaches of space.

Here's another good example – this one from cutting edge research. Every biologist knows that DNA contains chemical units called genes, and that these genes, when activated, direct the synthesis of specific proteins vital to life. The chemical units that make up the genes, called base pairs, are held in place by a spiral staircase of linked sugar and phosphate molecules that give the DNA molecule its signature "double helix" shape.

But it has recently been discovered that this spiral form, previously thought of only as a passive scaffolding holding up the letters of the genetic alphabet, is actually, in fact, an essential player in the function of the DNA molecule. The sugar-phosphate spiral has been shown to actively transport coded electrical pulses that travel down the helix and control critical genetic functions at distant sites!

This is absolutely revolutionary information – it promises to expand our understanding, not only of the function of the DNA molecule, but also of how structured energetic signals may affect living processes. This single insight may eventually give us ability to scientifically study many of the aspects of "energy medicine" that have been so difficult to comprehend within the current paradigm – and have therefore too often been dismissed by "serious scientists." It's essential to remember that this amazing insight *could not have been gained* by looking more deeply at the DNA molecule in the usual ways. The energetic function of DNA has always been present, but until someone had the creative inspiration to look in an entirely new way, it was completely absent from our awareness.

The question of microbial pleomorphism – the ability for some microbes to change their outer form, their inner biology, and their methods of reproduction in response to environmental cues – has always been controversial. Numerous researchers, beginning with Antoine Béchamp in the mid-19th Century and continuing to the present day with

biologists such as Dr. Lida Mattman, have established a great many phenomena of pleomorphism with meticulous care and in excruciating detail. The debate today should not be over whether pleomorphism exists. Our efforts should focus on the attempt to understand the biological mechanisms, evolutionary origins, and practical, clinical applications of these remarkable capabilities.

One interesting problem in communicating about pleomorphism is that various researchers have come to use the term to mean somewhat different things. For one group of investigators, pleomorphism refers specifically to the ability of certain microorganisms to become simplified, cell wall deficient variants, that may escape detection by the immune system by shedding their antigenic markers. Commonly referred to as "stealth pathogens," they are now implicated in a wide variety of chronic diseases.

Others, especially those influenced by the German biologist and zoologist Dr. Gunther Enderlein and his associates, tend to think of bacterial pleomorphism as giving rise to a related series of successively more complex forms that emerge within the living body, producing illness. My hypothesis, called *Pleomorphic Provolution*, as part of the larger *Ambimorphic Paradigm*, accounts for both of these perspectives, and shows how they may actually be two logically linked expressions of the same phenomenon. For a brief review of this theory, please see the paper entitled *The Theory of Pleomorphic Provolution – Revisiting The Heresy of Spontaneous Generation.*

Dr. Enderlein (1872 – 1968) occupies a unique position in the pantheon of pleomorphic researchers. Enderlein was aware of Béchamp's pioneering work in the 19th Century and proceeded to contribute his own, wide-ranging observations and theories. From a contemporary perspective, it's easy to package all of Enderlein's vast opus into one bundle which can then be accepted on faith, ignored on principle, or rejected as hopelessly incorrect and obsolete.

But I strongly suggest that if we *unbundle* the various components of Enderlein's work, we will find that some of the elements it contains are as valid today as they were in 1925, when Enderlein published *Bacterial Cyclogeny*, his first major work in the field. Of course, we will also find elements of Enderlein's work that, by the standards and methods of today's scientific knowledge, are simply untenable. I believe that it's essential to distinguish between these two categories, lest we run the risk of "throwing the baby out with the bathwater" and discard a remarkable set of scientific achievements because some parts are indeed outdated.

It is helpful to remember that from some perspective, everything the venerable Sir Isaac Newton wrote about gravity was also "wrong." But as a culture, we don't see it that way. We understand that Newton's insights systematized our understanding of gravity into a form that answered many pressing questions, and provided a platform on which to build our next levels of understanding. It's much better to treat your predecessors as beacons of light leading upwards, rather than as incompetent or naïve fossils with no relevance to the present inquiry.

Enderlein's work in pleomorphism can be broadly divided into the following six elements:

1. *Empirical mapping of pleomorphic relationships for various species of bacteria and fungi*
2. *A theoretical vision of how pleomorphic partnerships influenced our mammalian evolution*
3. *The discovery & description of a pleomorphic down-regulating mechanism, called isopathic regression*
4. *The development of therapeutic remedies based on the phenomenon of isopathic regression*
5. *Clinical research & experience documenting the efficacy and modes of action of the isopathic remedies*
6. *A set of hypotheses intended to explain the mechanics of pleomorphic transformation and isopathic regression*

In my estimation, the first five of these elements retain much of their value in the present day. It is the sixth element, namely Enderlein's attempts to explain the underlying biological mechanisms of pleomorphism, that hold up least well. In Enderlein's day, beginning with his first rigorous observations in 1916 and continuing through the 1950s, few tools existed for the kind of molecular, cellular, and genetic analyses Enderlein would have required to move his work into a deeper analytical context. Today, with these tools widely available, I can only hope that we will have the discipline to penetrate the first five elements of the Enderlein opus with creativity and vision.

Each of these elements deserves a complete treatment. Within the brief scope of this paper, let me just make a few comments, and expand upon them in later writings.

1. Empirical mapping of pleomorphic relationships for various species of bacteria and fungi

Hundreds of researchers, including Enderlein, have created detailed developmental maps, tracking how various bacterial species change under different environmental conditions. The quote from Almquist at the beginning of this paper places the magnitude of this quest in context. After 21 years of intense and careful study, Almquist concluded that it would be presumptuous to think that we could ever know all the adaptive variations available to a single bacterial species. If you pick up a current copy of Lida Mattman's book *Cell Wall Deficient Bacteria*, you will find chapter after chapter detailing bacterial variability, including notes on molecular, metabolic, and genetic changes. Unlike Enderlein, Mattman has had access to modern techniques, including electron microscopy, immunofluorescence, PCR and other molecular assessment techniques.

A unique character of Enderlein's work, however, is that he was able to focus on several specific, highly consistent patterns of pleomorphic transformation with critical impact on human health. Enderlein identified two forms he dubbed *endobionts*, colloids he believed to be derived from a long history of co-evolutionary interactions between mammals and the mold fungi *Mucor racemosus* and *Aspergillus niger*. According to Enderlein, the endobionts function as Janus-faced particles, capable of switching from a beneficial, symbiotic role within a healthy internal terrain, to a destructive, degenerative role as

various physiological factors within the body degrade. All of Enderlein's later therapeutic work was based on observing and learning to reverse this shift.

Perhaps the most controversial aspect of Enderlein's account of pleomorphism is the transition from bacterial to fungal form. Some critics have suggested that Enderlein did not observe the emergence of actual fungi, but rather, of filamentous bacterial variants that resemble fungus. The shift from the bacterial prokaryote, with its DNA arranged in free floating loops within the cytoplasm, to the fungal eukaryote, with its genetic material highly organized and bound within a nuclear membrane, is in fact a huge biological transition.

However, the work of Dr. Lynn Margulis and others has given substantial weight to the notion that all eukaryotic cells (those belonging to animals, plants, fungi, and protoctists) stem from the ancient fusion of multiple prokaryotes, forming a single, more complex type of cell. In this scenario, each different type of bacterium contributed a specialized function to the merged community, which in turn morphed back into a single, highly "educated" cell. It's interesting to speculate that the development of the membrane bounded eukaryotic nucleus was a primitive immune system response, establishing a steep boundary to protect the more successful genetic admixtures from additional fusion events. The idea that eukaryotes such as fungi arose from the merging of multiple bacteria, for me at least, makes the possibility of a pleomorphic, developmental link between bacteria and fungi more palatable.

2. A theoretical vision of how pleomorphic partnerships influenced mammalian evolution

For me, the most remarkable part of Enderlein's vision was his sensitivity to fact that obligant microbes can greatly affect the evolutionary development of their hosts. Remember, Enderlein began work in the field of pleomorphic microbiology just 59 years after Charles Darwin published his theory of evolution. With the biological world focused outward, thinking in terms of accidental mutations and their reinforcement through the process of natural selection, it required an amazing perspicacity to look inward and understand that the interior of the body also represented an evolutionary domain.

Even though Enderlein observed and documented the pleomorphic changes and regulatory influences of many bacteria including pathogens like the typhoid bacillus, he came to believe that the devolved colloids from *Mucor racemosus* and *Aspergillus niger* were special in a variety of ways. Unlike the pathogenic species associated with acute and often fatal illness, Enderlein believed that these two fungi had a long term history of development within the line of mammalian descent, and that our shared evolutionary history exerted a powerful influence on both host and obligant.

First of all, Enderlein discovered that the pleomorphic variants of most bacteria were benign. In general, one, or at most two of the variants of even the most pathogenic species were virulent within the mammalian body. However, Enderlein was able to

implicate all of the variations of *Mucor* and *Aspergillus* beyond a certain, low level of developmental complexity.

Enderlein asserted that in their most highly devolved forms, the colloids derived from *Mucor* contributed to the processes of blood clotting. Enderlein believed that the introduction and colloidal dissociation of *Mucor* created the evolutionary preconditions needed for our ancestors to develop extensive, highly complex vascular systems. The capacity to seal off circulation at the site of an injury opened up the possibility for extensive, peripheral circulation of nutrients, immune agents, and informational materials, such as neurotransmitters, to the evolving body. Without this type of self-healing capability, we would not have been able to generate enough evolutionary stability to grow in this way.

At an empirical level, Enderlein's efforts to influence the regression of *Mucor* within the body often have a profound effect on cardiovascular health – increasing circulation, decreasing cardiac strain, clearing ischemic damage, etc. Correlates of these effects are easily seen with various types of microscopy, and are particular evident using DIAD Ecological Microscopy (Differential Isopathic Assessment in Darkfield) – an advanced form of live blood microscopy in which native blood is mixed with a variety of fungal colloids, and the resulting changes are compared and analyzed.

Enderlein also believed that the dissociated colloids from *Aspergillus* influenced the formation of dense bone tissue and its relationship to other forms of connective tissue, and is similarly associated with the evolutionary rise of endoskeletal development. Enderlein believed that *Aspergillus niger* was the pleomorphic culminant (that is, the mostly highly developed form) of the family that include *Mycobacterium tuberculosis*, and its proper regulation was therefore especially helpful in tubercular and paratubercular disturbances. In a fascinating series of experiments, Enderlein was able to induce acute, full-blown cases of tuberculosis in healthy animals by injecting them with bacteria-free ultra-filtrates of sputum taken from individuals with tuberculosis.

It is difficult to determine, without recapitulating the core of Enderlein's 40 years of careful laboratory study with modern methods, which specific aspects of his thinking on co-evolutionary dynamics might be correct. But at the level of his over-arching vision, more and more contemporary work supports the thrust of his perceptions.

3. The discovery & description of a pleomorphic down-regulating mechanism, which Enderlein called isopathic regression *and…*

4. The development of therapeutic remedies purportedly based on the phenomenon of isopathic regression

It's helpful to consider these two points in tandem:

In 1916, while studying the typhoid bacillus, Enderlein first noted the remarkable phenomenon that was to become a cornerstone of all his work in microbiology. Enderlein

observed that occasionally, a tiny body attached itself to the wall of the bacterium, and after a moment's contact, the tubular bacillus simply disappeared. Enderlein was able to observe this phenomenon repeatedly in many different cultures, and soon generalized the phenomenon to including other microbes as well. He came to the conclusion that the chain of pleomorphic variants for every species contained its own regulator form, able to reverse the upward progression by causing the complete dissociation of the higher form. Since, according to Enderlein, the regulators worked within their own developmental series, he dubbed the phenomenon *isopathic regression*.

Painstakingly tracking the life history of the tiny regulator form, which he dubbed the *spermit* due to its sperm-like flat disk head and oscillating tail, Enderlein found that the it followed a distinct developmental series that was substantially the same for all species. This series begins with the appearance of a spherical membrane, typically about 2 to 4 microns in diameter – or about a quarter to half the diameter of a human red blood corpuscle. Some of these spheres subsequently develop tiny projections, which can eventually multiply to coat the entire membrane. At a later point, the membrane can open, spilling a swarm of spermits into the surrounding medium.

Enderlein called these three developmental stages the colloid thecit, the dioekothecit, and the spermit, respectively. Enderlein analyzed the characteristics of the biological terrain favorable to the emergence of these regulators, and his findings tend to match the teachings of all forms of natural healing. He found that excess acidity in the tissues, resulting in a compensatory alkalemia in the blood, inhibits the formation of the fragile dioekothecits and their regulatory spermits. This is one part of the rationale for using the appropriate form of various organic acids in therapy, such as L(+) lactic acid. Enderlein was also convinced that an excess of animal protein in the diet contributed to the suppression of regulator formation as well.

By isolating various fungal culminants from human tissues and body fluids, Enderlein was able to study the process of pleomorphic progression and isopathic regression in his laboratory. Later in his career, he was able to isolate specific fractions from these fungi that he believed would, *in vivo*, enhance the formation of the appropriate, much needed regulators. While great controversy has always existed about Enderlein and his fungal isopathic remedies, the thousands of practitioners who have experience with them know that they are highly effective, and often influence physical conditions that are difficult or impossible to heal with other methods.

The actual, underlying biology of isopathic treatment is open to debate. Many of us who use the remedies in a clinical setting have observed that they seem to have multiple layers of action. In my experience, some of these actions closely correspond to the phenomena elaborated by Enderlein. In fact, with DIAD Microscopy, these correspondences can be clearly seen and used to precisely guide a régime of biological therapy. On the other hand, the remedies frequently seem to have other effects that cannot be easily explained in terms of regulator formation and isopathic regression.

I cannot agree with those who believe that Enderlein's success with these isopathic remedies was essentially a fortuitous accident. There is too much "closure" between Enderlein's empirical observations, the microbiological models he based on them, his deliberate effort influence specific microbiological events predicted by his theories, and the amazing success of the remedies he prepared by following this paradigm. On the other hand, I fully expect that these remedies also have other modes of action, and that a great deal can be learned from studying them from different perspectives, and through the filter of different ideas. My hope is that we will be able to pool all our knowledge and discoveries into a deeper, more encompassing and holistic vision, rather than setting up an on-going competition.

A quick analogy from the history of science. For many years, physicists struggled with the question of whether light was a particle, or a wave. Newton seemed to show conclusively that it was a particle. Then Huygens conducted experiments that powerfully demonstrated the wave nature of light. Then Einstein, while unraveling the photoelectric effect, once again powerfully demonstrated the quantization of light as a particle. It took the development of quantum mechanics to find a system in which the discrete, particle like "lumping" of light could co-exist with the distributed, field-like wave nature of light. Neither belief was wrong – but we needed to find a broader conceptual system in which both aspects could co-exist. I refer to this phenomenon as "Either and…" in place of our typical "Either or…" thinking. The ability to live in the world of "Either and…" is a hallmark of creativity in all fields.

5. Clinical research and experience documenting the efficacy and modes of action of the isopathic remedies

In his development of isopathic remedies, Enderlein sought to stimulate the body's natural ability to maintain a system of checks and balances, keeping the degenerative, illness producing progression of pleomorphic forms within bounds. As stated above, practitioners who have extensive clinical experience using the remedies seem to share a universal agreement that they are indeed very powerful and extraordinarily useful. But is there any evidence that these fungal isopathic remedies actually employ the biological mechanisms suggested by Enderlein, at least, as part of their action?

Speaking from my own experience, I can point to massive amounts of corroborating evidence from the many *thousands* of experiments I have performed using a live blood analysis technique called DIAD Microscopy.

DIAD, which stands for Differential Isopathic Assessment in Darkfield, uses a standard darkfield microscope, much the same as Enderlein would have used. As an historical note, darkfield illumination was pioneered in 1909 by Bausch and Lomb as a tool for colloid chemists. While we tend to think of "vintage" scientific instruments as quaint relics of a bygone era, some of the early darkfield microscopes were optically magnificent, and used arc lamps equivalent to a modern 1000W illuminator.

The way in which DIAD departs from traditional darkfield analysis is somewhat analogous to the differences between a standard X-ray and a CAT scan. The CAT scan takes many different images, each one from a different angle, and then combines them to produce a final, 3-D image. With DIAD, we prepare multiple samples of live blood, but each one, except for a control sample, is mixed with a standardized, isotonic solution of one of the Enderlein colloidal formulas.

Now, when this formula is introduced to the body, we expect it to have the effect of isopathically regressing the more complex, pathogenic forms within its sphere of action. But on the microscope slide, something entirely different happens. Personally, I believe that the colloids added to the slide act as binding sites for compatible substances already present in the subject's blood. Under a variety of circumstances, potentially pathogenic instances of these substances contribute to the *in vitro* creation of markers corresponding to an *in vivo* tendency for pathogenic progression.

Like a CAT scan, each of the DIAD slides contains important information, but it is the *integration* of multiple slides that reveals what's really happening within the subject's internal ecological system. Each analysis is multi-dimensional, and takes into account the magnitude, rapidity, biological complexity, and progressive tendency for the given species. In a full analysis, this process is repeated for at least eight pleomorphic families, as compared to control slide with the subject's native blood. From this wealth of information, an extremely precise program of biological therapy can be engineered, and perhaps more importantly, tracked to confirm that the outward reduction of symptoms is related to a deep set of inward biological shifts.

It is this follow-up capability where I have seen the most convincing empirical corroboration of the Enderlein doctrine of isopathic regression. The *in vitro* development of pathogenic markers will steadily decline for those species that are treated isopathically. At the same time, we usually see more of the developmental stages that Enderlein identified in the regulatory series, primarily colloid thecits. Most often, the untreated species will not decline as dramatically, if at all, and if they present membrane bound spheres, they tend to be populated with attached points – rather than the clear, simple spheres associated with regulator development.

For those species under treatment, it is typical to first see an increased quantity of less well organized material in the blood – presumably debris and degraded forms from the breaking down and clearing of more highly organized, pathogenic stages elsewhere in the body. Over time, this outflow almost always decreases, resulting in an overall reduction of both the quantity and complexity of the response. As we move through a logical series of isopathic treatments, we see this phenomenon play out over and over again, with enormous consistency.

Besides the evidence from extensive DIAD observations, it's interesting to compare the Enderlein model with clinical successes from other researchers, working in other ways. In particular, during the 1920s and early 1930s, Royal Rife also isolated miniscule, filter passing entities from blood and other tissues. Rife's major focus was on cancer, and he

was able to show that these non-cellular particles derived from cancerous tissue, could reliably induce a comparable cancer when injected into an otherwise healthy animal. This itself was a highly controversial finding. But more importantly, by studying the motility of the colloids he isolated from malignant tissue, Rife was able to develop an electronic method to suppress their activity – with the hope of destroying the associated cancer.

Rife created an optical microscope that was able to provide magnification of up to 30,000 diameters. Again, this was another radical achievement, flying in the face of conventional optical wisdom. In the 19th Century, the physicist Lord Rayleigh had demonstrated that conventional optical magnification was limited by the diffraction of light to about 2000 diameters. Today, we know that this is a simplistic analysis, and a number of revolutionary optical microscopes have been built that provide electron microscope type resolution using real-time optical methods. Ironically, Rife's genius in constructing an "impossible" microscope later contributed to his chronic lack of credibility.

Film footage shot through one of Rife's microscopes still exists (I have a copy from a documentary produced by Dutch television some years ago). It clearly shows how the motility of the cancer filtrate particles is destroyed by exposure to Rife's device.

Working in association with a group of well-respected physicians and oncologists in the San Diego area, Rife's theories and therapies were put to a rigorous test in 1934. In a laboratory set up on the grounds of the Scripps Ranch, now the Scripps Oceanographic Institute, the physicians selected a group of 16 terminal, inoperable cancer patients as willing "guinea pigs" for Rife's radical methods.

Rife created a cancer isolate from each of these individuals, rich with the pathogenic colloids related to their tumors. He then used his microscope and his plasma wave device in tandem to calibrate the exact frequency of deactivation – known as the Mortal Oscillatory Rate, or MOR – for their particular cancers.

Each subject was exposed to the appropriate frequency for 2 minutes, every other day. After 30 days, 14 of the 16 subjects were judged to be completely free to cancer by the same panel of physicians who had previously declared them to be terminal and inoperable – by the medical standards of the day (and unfortunately, pretty much by our standards today as well). The other two, one of whom had a fist sized malignancy growing on his face, were given an additional 3 weeks or so of treatment. At the end of that time, they too were declared cured.

What happened in the aftermath of that stunning achievement is one of medicine's darkest tragedies. It's all been recorded elsewhere, so I won't dwell on it here, but Rife, by all accounts an other-worldly innocent and multi-faceted genius, was persecuted, prosecuted, and driven into a total collapse from which he never truly recovered.

For this purposes of our discussion, it's important to note that much of Rife's work overlaps Enderlein's in many important ways. Rife created extensive maps of pleomorphic transformation – including the observation that by carefully controlling the

environment of only 10 pure bacterial cultures, he could induced an unlimited number of variations that at least mimics, if not duplicated, all known bacterial morphologies. He reported nutrient media sensitivities as small as 2 parts per million to trigger the expression of wildly different variants.

Rife also isolated filter passing particles, still erroneously referred to as viruses by many contemporary followers of this work, that could directly transmit diseases to a healthy organism, including cancer. Enderlein had done the same thing with tuberculosis, showing that pathogenic bacteria were not a *precondition* of infection, but rather, arose as a pleomorphic *expression* of a deeper process.

The major difference between Enderlein and Rife was Enderlein's discovery of isopathic regression as a natural, down-regulating mechanism for the pathogenic phases of pleomorphic variation. In the absence of this knowledge, Rife developed electronic methods to destroy the activity and vitality of the underlying particles, and clearly demonstrated the elimination of the disease conditions that depended upon them.

One last note. In current research, a particle of protein known as the prion has been implicated in a class of illnesses known collectively as spongiform encephalopathies. These include scrapie in sheep, Creutzfeld-Jacob, fatal familial insomnia, and Kuru, the cannibal's disease, in humans, and of course, the ever popular Mad Cow Disease. Several years ago, Dr. Stanley Pruisner won the Nobel Prize in medicine for his pioneering work in this field.

One thing that has been discovered about the prion and how it transmits disease, is that under certain conditions, a non-pathogenic form of the prion unfolds its shape, changing from a set of spiral helixes into a pleated sheet. In this form, the sheets bind together and create highly disturbed regions, primarily in the brain, that give rise to spongy regions of degeneration.

There are many conceptual similarities suggesting a possible linkage between Pruisner's prions and the filter passing colloids described by Béchamp, Enderlein, Rife, and so many others. I have written about this similarity elsewhere, and will amplify on the subject in the future. The most immediately relevant point is the recent discovery that the pathogenic, unfolded form of the prion may actually be able to return to its non-pathogenic, spiral state. This is a distinct departure from the previous belief that once changed, the prion will forever remain unfolded and pathogenic.

And what have researchers found that will cause the prion to change back? Here's the newsflash. It's accomplished by exposing the pathogenic prion to an identical prion still in it's original, benign form. In other words, it's an isopathic regression, so similar in its general features to the process described by Enderlein in 1916, that I have a hard time believing it's just a coincidence. There is something deep, wonderful, and truly fundamental going on here.

This recent finding demonstrates that wholesale dismissal of Enderlein's work – however inadequate some parts of it may be – will take us no closer to the truth than will blind, unquestioning acceptance of what the great man and his colleagues described 85 years ago. Science is a living process.

6. A set of hypotheses intended to explain the mechanics of pleomorphic transformation & isopathic regression

Finally, we come to the subject of Enderlein's attempt to explain the biology of the many incredible phenomena he observed. Remember, Enderlein began his career as a zoologist, interested in the form, biology, and life processes of everything type of living thing. In many ways, it was this broad, inclusive view of the living Earth that positioned him to thinking outside the box, in a way far more integral and holistic than most of his fellow biologists.

But Enderlein, for all his brilliance, was in many ways limited by the level of biological knowledge available in his day. The existence of DNA was known, but its role in the heritablity of biological information was only a fringe hypothesis. Certainly, knowledge of the organization of DNA into genes, the mechanisms of gene expression and ribosomal protein synthesis, and most of the other basics of modern cellular biology were still far in the future. So when Enderlein refers to processes such as the universal urge for unification and the nationalization of multiple colloids into new forms, these terms may be descriptive of what is taking place, but they do not say very much that can be generalized into solid, biological principles as we currently understand them.

Contrary to some claims, however, Enderlein *did* perform detailed analyzes of the chemical composition and physical structure of the colloids and other pleomorphic forms he studied. He carefully noted the presence or absence of nucleic acids, the distribution of lipids and proteins at different layers of structure, etc. But again, the tools of the time were not sufficient for Enderlein to use this information to form a complete, comprehensive biology of pleomorphism.

Once again, I believe that we need to go back to the primary phenomena of pleomorphic reorganization and isopathic regression, and attempt to interpret them in a more universal way. As I've been urging for some time, this *does not* mean that we should simply deny the phenomena because they don't fit with mainstream ideas. I have often made the joke that this is like insisting that a radio can't possibly work, because when you open it up, you don't find any tiny musicians inside. Or more to the point, like arguing that homeopathy can't possibly work, because the solutions used are too diluted to contain any more of the original chemical substances. Visions of August Comte and the Theory of Eternal Limitations…

Rather than focusing on Enderlein's notion that bacteria and fungi can arise from the fusion of "living colloids" and "reserve nutritional substances," or that isopathic regression is really a form of bacterial sexual reproduction, I'd like to focus a bit on some of the phenomena themselves.

In mid-1800s, the remarkable French biologist and chemist Antoine Béchamp began a series of experiments that raised important questions about the nature and origins of life itself. Basically, Béchamp discovered that all the living organisms he studied, including plants and animals, left behind a colloidal residue after their death. Béchamp found that purified, sterile isolates of these colloid would give rise to living bacteria when added to certain other, non-cellular materials. Identical experiments, using the same materials except for the colloidal solutions *never* produced bacteria.

From these experiments, which spanned decades of active research, Béchamp came to the conclusion that these colloidal particles, which he called microzymas, were actually the physical basis of life – the fundamental carriers of what philosophers for years had called *élan vital*. Enderlein was aware of Béchamp's earlier work, and tried to show that at least some of these microzymas were derived from the fungi *Mucor racemosus* and *Aspergillus niger*, as previously discussed. Enderlein used the term *endobiont* to describe such particles, and his observation of pleomorphic progression, culminating in either bacterial or fungal cells, was therefore completely consistent with Béchamp's earlier discoveries. Again, it's unfortunate that given the tools available to them, both Enderlein's and Béchamp's theories concerning these events were more descriptive than analytical.

What are the possibilities? First, all of these experiments, and many others like them, may have been contaminated with living materials including fungal or bacterial spores, or other non-standard forms, including cell wall deficient variants that can later revert to traditional morphologies. If so, it's apparent that the living forms must have somehow depended upon the microzyma/endobiont preparations – since the same experiments, using the same materials, failed to produce living forms when these solutions were omitted. Even this would be a tantalizing outcome, rich with possibilities for important research.

Another possibility is that some microscopic organisms are able to persist for long periods of time (even hundreds of millions of years, in the case of Béchamp's experiments with seabed chalk) as a "toolkit" of disassembled parts which later recombine to regenerate a living cell. I discuss this possibility in *The Theory of Pleomorphic Provolution – Revisiting the Heresy of Spontaneous Generation*. This hypothesis, part of a larger model called the *Ambimorphic Paradigm*, would explain many pleomorphic phenomena. Although this model corresponds closely to the outcome of many experiments, it has yet to be rigorously tested.

A recent paper on Enderlein claims to totally disprove the concept of bacterial cyclogeny, so central to his work. If I understand the author correctly, he makes two major points.

The first is that Enderlein didn't understand the critical role of DNA in defining the identity of an organism. How, the author asks, can a complex genome appear as a microbe supposedly changes, sometimes within seconds, from something that didn't already contain it?

The second point is a little more subtle. Enderlein described an active colloidal element he called the *symprotit* that represented the essential building block of upward pleomorphic development within his theory. Using molecular techniques including immuno-fluorescence and electrophoresis, this author showed that colloidal masses visually observed in a fixed sample of blood were in fact nothing but hemoglobin, shed from erythrocytes due to physiological stress.

In response to the first observation, I turn to the ideas presented at the beginning of this paper. You can't study new phenomena by looking at them exclusively in old ways. In another paper, I briefly present a theory which would, if correct, account for the apparently sudden appearance of a complex bacterial or fungal genome. In *The Theory of Pleomorphic Provolution – Revisiting the Heresy of Spontaneous Generation* – I propose that fully evolved organisms may devolve within a host, becoming an intelligent molecular and genetic system capable of reconstituting functional cells from the devolved, disassembled parts. I don't know if the theory is correct, but I present substantial arguments showing how and why such an evolutionary outcome might actually be adaptive and physically possible.

As for the second objection, that Enderlein's *symprotits* are merely hemoglobin, I question whether the points observed were actually those Enderlein would have seen as building blocks. The blood is full of many point-like forms. The only way I know to visually distinguish among them, without the use of molecular tagging techniques, is to watch for those points that develop more complex, membrane bound forms versus those points that don't

Of the many thousands of points visible in a darkfield view of live blood, only a small number will become involved with membrane formation, and only a small number of those will continue to develop more complex tubular and branched forms suggestive of a cell forming process, or *cytotropism*. Even Enderlein distinguished between the *symprotit* and the *mych* – a change which could not be visually distinguished, but which could be discerned by a change in the function of the colloid.

Once last point bears mentioning, as it illustrates some of the possible pitfalls of working at the edge of a complex field of inquiry.

In Chapter 12 of her book, *Cell Wall Deficient Bacteria – Stealth Pathogens*, Dr. Lida Mattman considers the question of intra-erythrocytic parasites. She mentions that when blood samples are fixed using heat, subtle, cell wall deficient pleomorphic variants are usually destroyed, losing their distinctive shapes and becoming "indistinguishable from hemoglobin." Even though the samples in the previous study were not heat fixed, and therefore not subject to this confusion, it still serves as a reminder that in the world of subtle observation, every detail counts.

Let me just close by saying that I am enthusiastic and supportive of *any* new research that sheds light onto these strange and wonderful processes. I would only request that as we uncover and share new information, we make the effort to explore everything we learn in

the broadest possible context, so that we can creatively and responsibly integrate our knowledge into new models that move us closer, step by step, to embracing the beauty and complexity of the natural, living world. Thanks.

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Some Recommended Readings

- Becker, Robert O. – *The Body Electric – Electromagnetism and the Foundation of Life* (1985)
- Enby, Erik; Gosch, Peter; Sheehan, Michael – *Hidden Killers – The Revolutionary Medical Discoveries of Professor Guenther Enderlein* (1990)
- Enderlein, Gunther – *Bacteria Cyclogeny* (1925, English Translation 1998)
- Grace, Stuart – *An Open Letter on Pleomorphism – Unbundling the Enderlein Legacy* (2001)
- Hume, Ethel Douglas – *Béchamp or Pasteur? A Lost Chapter in the History of Biology* (1923)
- Lynes, Barry – *The Cancer Cure That Worked – Fifty Years of Suppression* (1987)
- Margulis, Lynn – *Symbiotic Planet* (1998), *Five Kingdoms: An Illustrated Guide to the Phyla of Life on Earth* (1998), *Microcosmos – Four Billion Years of Evolution From Our Microbial Ancestors* (1997)
- Mattman, Lida - *Cell Wall Deficient Forms: Stealth Pathogens, 3rd Edition* (2001)
- Pruisner, Stanley B, - *The Prion Diseases*, Scientific American 272(1), 48-51 (1995), *Human Prion Diseases and Neurodegeneration*, Current Topics in Microbiological Immunology, 207, 1-17 (1996). Note: A large amount of current and historical information on prion biology and pathology can be found on the Internet at www.mad-cow.org including an archive of more than 7,000 articles and studies
- Reckeweg, Hans H. – *Homotoxicology – Illness and Healing Through Anti-Homotoxic Therapy* (1980)
- Rife, Royal Raymond – Various research papers, laboratory findings, newspaper articles, and current research studies are published on the Internet at www.rife.org A newly discovered set of audio tapes documenting Rife's conversations with his associates is available from the Kinnaman Foundation at (970) 249-0859
- Sonea, Sorin; Panisset, Maurice – *A New Bacteriology* (1980, English translation 1983)

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