Nanotechnology Applied to Cancer Research

The technology described in article that starts on page 3 becomes even more significant when the principles of quantum mechanics (physical science) are translated into biological processes.

Assuming the reader of this document has an interest in capitalizing on the prevention and/or cost effective treatment of cancers, they are encouraged to allocate the time to read the information provided for their independent interpretation and application.

We have used hyperlinks to provide supporting information that can be verified by bioinformatics professionals. In terms of oncology research, scientific leadership merely needs to understand a few basic processes; e.g. DNA theory is flawed – a fact validated by a team of researchers at Weill Cornell Medicine when they reported in 2012 that a 5th nucleobase exits. Why is this significant? The A-C-T-G alphabet requires 3.2 billion base pair calculations using a complex algorithm. While DNA comparisons can be made, efforts to use the data to identify causes of chronic diseases may be impossible using existing technology.

These scientists commented that the discovery would necessitate rewriting textbooks.¹ However, knowing that a flawed model exists does not provide solutions that can addresses the causes of chronic diseases such as cancer and put forth an explicit model that can be refined and enhanced as necessary. The information provided in this document and supported by the findings contained in the MCFIP website provide the basis from which the biomedical research community can rectify the shortcomings that have resulted from the flawed DNA alphabet.

In terms of physics, self-assembly creates configurations in 3s (trefoils) and 5s (pentafoils). The nucleobases are a pentafoil configuration. Relative to particle physics, the bosons were confirmed as a pentafoil when Higgs was verified to exist. Another pentafoil is quantum chromodynamics; the 5 colors of red, blue, green and two yellows. In terms of trefoils; the neutrinos, antineutrinos and fermions are all trefoil configurations. However, only recently were the quarks identified as being a pentafoil as opposed to a trefoil.²

Set aside the technical translations involving subatomic particles

¹ http://www.sciencedaily.com/releases/2012/05/120517131655.htm
² http://www.pbs.org/wgbh/nova/blogs/physics/2015/07/what-the-heck-is-a-pentaquark/
The website www.mcfip.NET has been developed as a tutorial to provide verifiable biomedical explanations of cellular level applications of trefoils and pentafoils that require homeostasis (balance – equilibrium) in order to prevent imbalances; the cause of all chronic diseases. The website is open source; i.e. provided for use by anyone to perform independent verification.

Nanotechnology opens the door for cancer research when the following are used as a foundation:

- Cytokines have minerals and elements as their elemental constituents. [http://www.mcfip.net/upload/Small%20Molecule%20(Cell-Surface)%20Activities.pdf](http://www.mcfip.net/upload/Small%20Molecule%20(Cell-Surface)%20Activities.pdf)
- Minerals and elements interact through agonistic, antagonistic and transitional relationships. Terminology such as acetylation, methylation and phosphorylation can be translated into positive, negative and transitional activities.
- The principles of homeostasis discovered by Nicola Tesla (positive – negative – ground) can be applied to cellular signaling activities (i.e. epigenetics or proteomics). The MCFIP website includes hundreds of examples of trefoils (signaling in 3s) that enable on – off and modulating (grounding) relationships.
- Cell surface signaling molecules are created by the catabolic processes introduced in the link provided above. They are combinations of mineral/elements and amino acids in trefoils. Obviously, to be at the cell-surface level, at a maximum, they will be nanoscale.
- Cellular activity requires the ability for cells to communicate with each other; the cell-surface activity. At the time, cells require the ability to obtain “nutrients” to remain viable. How do cells secure such “nutrients?” Multiple paths exist that utilize a variety of receptors. The primary path is endocytosis; the cellular mechanism that transports cell-surface signaling molecules into the cytoplasm. [http://www.mcfip.net/upload/Endocytosis%20Modeling%202015.pdf](http://www.mcfip.net/upload/Endocytosis%20Modeling%202015.pdf)

The objective of this document is to provide a verifiable high level explanation for nanoscale activities and cancers. Accordingly, to minimize complexity, intracellular activities have been set aside for discussion and verification by interested parties as a separate topic.

- Interested parties may be willing to allocate the time to understand how PD1 – PDL1 and PDL2 are formed by catabolic activity on IL-3 and, under optimal conditions, are transported into the cytoplasm. Current use of PD1 drugs inhibit activities that can prolong life expectancies but fail to ensure necroptosis. These assertions can be verified by bioinformatics professionals who utilize the epigenetic (proteomic) model developed by MCFIP using the principles of quantum mechanics (physical science). [http://www.theguardian.com/lifeandstyle/2016/jun/11/nanotechnology-research-potential-cure-cancer-genetic-level](http://www.theguardian.com/lifeandstyle/2016/jun/11/nanotechnology-research-potential-cure-cancer-genetic-level)

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3 We use the term epigenetics but it is the same as proteomics.
4 Using small molecule formation and endocytosis models that are posted on the MCFIP website
How nanotechnology research could cure cancer and other diseases

Genetic diseases may soon be a thing of the past thanks to nanotechnology, which employs tiny particles to manipulate cells and change our DNA.

Nanotechnology, the science of working with particles that are one billionth of a meter, is enabling scientists to change gene expression on the cellular level, potentially curing a host of diseases. MCFIP – We assert that nanoparticles of elements such as gold will change epigenetic activity; the basis for turning signaling on or off through ionic polarity; i.e. agonistic or antagonistic relationships dependent upon the elemental constituents involved. Refer to the “small molecule” hyperlink.5

Olga Oksman
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Here’s how cancer treatment often runs today: a patient develops an aggressive tumor. A surgeon operates to remove the tumor, but a few cancer cells remain, hiding in the body. Chemotherapy is administered, weakening both patient and cancer cells. But the cancer does not die; it comes back and eventually kills the patient.

Now imagine another scenario. After surgery, strands of DNA anchored in tiny gold particles are injected into the affected area. The DNA strands bind to the tumor cells, killing them directly, without the help of chemo. The healthy cells around the tumor cells, which don’t express the tumor gene, are untouched.

5 http://www.mcfip.net/upload/Small%20Molecule%20(Cell-Surface)%20Activities.pdf
Just like that, all the tumor cell stragglers are rendered harmless, corrected on the **genetic level**. The patient is cured, and without having to endure months of chemotherapy and its brutal side effects: hair loss, nausea and extreme weakness. MCFIP – Chronic diseases are the result of imbalances involving epigenetic level signaling. Unless the causes of the imbalances are rectified, the cancer can reoccur. Specific examples of interactions and how imbalances can result based on physical chemistry are embedded in the MCFIP website for independent verification.

The future of medicine won’t focus on treating the symptoms of a disease, according to researchers: it will focus on curing it at the **genetic level**. MCFIP – Epigenetic (proteomic) level!

**Nanotechnology**, the science of working with particles that are one billionth of a meter, is enabling scientists to change gene expression on the cellular level, potentially curing a host of diseases.

“Nanotechnology medical developments over the coming years will have a wide variety of uses and could potentially save a great number of lives,” says Eleonore Pauwels, senior associate and scholar at the Wilson Center, an interdisciplinary policy research center.

The science of using nanoparticles got its start with a lecture by theoretical physicist Richard Feynman in 1959, but because of the technical challenges, it is only in the past 10 years or so that the technology has really taken off for practical medical applications. MCFIP – Application was thwarted by the lack of technology. That obstacle has been overcome and the new hurdle of device technology is in the embryonic stage; i.e. pico, femto and attoscale.

Several examples are embedded in the MCFIP website for verification and discussion with interested parties.

Figuring out how to consistently create the right nanoparticle, get it into the right tissue, ensure it is not degraded and does what it was programmed to do, took some time.

The science of nanotechnology depends on the fact that when things get super small, they function differently. Protein, for example, is a naturally occurring
A single protein molecule is a very different entity than a human being, which is made up of many protein molecules.

Gold, which is used often in medicine, is red when broken down into tiny particles. That microscopic bright red color has been used for centuries to give red stained glass its color.

“Because of their small size, engineered nanomaterials have unique properties that do not exist at the larger scale: increased surface area, charge, reactivity and other physicochemical properties, all of which may affect how nanomaterials interact with biological entities, like cells,” says Sara Brenner, assistant professor of nanobioscience at SUNY Polytechnic Institute.

Scientists are learning to take advantage of those properties to create new treatments. One of the most powerful examples uses DNA, says Chad Mirkin, a professor at Northwestern University and director of the International Institute for Nanotechnology.

"A whole new class of treatments for genetic diseases is being developed."

DNA is rod shaped and normally would not be able to enter cells, which have developed protection against entry from foreign DNA segments. But by using nanotechnology, many little snippets of DNA can be attached to a tiny, round synthetic core. The receptors on cells that would block rod shaped DNA do not recognize the tiny spheres of DNA and allow it to enter.

Using that property, a whole new class of treatments for genetic diseases is being developed.

By being able to insert DNA into existing cells, scientists can “attack disease at its genetic root and turn off receptors that regulate how a cell functions, stopping a disease pathway in its tracks,” explains Mirkin.

Right now, most of the research into developing therapies using spheres of DNA is focused on disease of the liver, says Mirkin, as anything a person takes in is going to be processed in the liver. Another area of research into nanotech treatments is
the skin, as the treatment can be applied topically, making it easy to target one area.

“Potential applications are virtually endless,” explains Brenner. “But some areas of investigation right now for gene therapy are cancer, diabetes, AIDS, cystic fibrosis and heart disease.” MCFIP – We have opted to focus explanations on cancers and many examples are posted on the website for verification. With that said, if parties have an interest in diabetes or heart diseases many verifiable examples of epigenetic modeling for these disease states are embedded in the website for discussion. With that being said, the model for cystic fibrosis exists but it is highly complex and it has been set aside for discussion with parties that focus on this particular disease.

As research into using nanoparticles advances, scientists hope to be able to not just turn off specific signals in cells, but also eventually insert genes to correct for defects and cure more complex diseases. Called gene therapy, it would involve inserting larger fragments of DNA into cells that have faulty DNA. For example, cystic fibrosis is caused by a defective gene called CFTR. If scientists can figure out a way to get a non-defective copy of the gene into the cells and correct it, they could cure the disease. MCFIP – Turing off specific signals is now being addressed using CRISPR technology. However, optimal cellular activity is being addressed with optogenetics. Our modeling of that concept is included on the MCFIP website as: http://www.mcfip.net/upload/Optomechanics%20(Explanation)%20x.pdf

Understanding of any or all cellular modeling activities included in the website will require the allocation of time to bridge terminology between disciplines; including the application of physical science principles. Modeling of optogenetics and the fact that the process has been proven will require an understanding of WHY light waves can be converted into cellular energy that regulates epigenetic activities. Following review of the information we provide in the aforementioned link, it should become obvious that our modeling provides the ability for biomedical research to take a quantum leap forward!

“Approximately 4,000 diseases have been found to have a genetic component and are therefore potential targets for gene therapy,” according to Brenner.
While nanotechnology has the potential to revolutionize medicine and how we view treatment of diseases, there are still kinks to work out. Some of the challenges with nanotechnology include how to get nanoparticles into the right cells and tissues, and how to get them into the cells safely without the nanoparticles degrading.

Nanotechnology is still in its infancy, however. It’s only recently that we were able to produce microscopes that allowed us to see and manipulate nanoparticles. **Research requires bringing together a number of disciplines like chemistry, biomedical engineering, biology and physics.** But pharmaceutical companies have already begun work on creating treatments using nanotech, and many are in various stages of development now. “It’s not a pipe dream,” says Mirkin. Being able to cure genetic diseases of all kinds is on the horizon.