Physical alterations that change the DNA to cause cancer

Marcos Hurvitz

Molecular Biology Area

Instituto de Coloproctología

info@coloproctologíabb.com.ar

www.coloproctologiabb.com.ar

Genetic alterations that produce cancer, as the last link in the chain of events would be physical forces (vibrations, light, electromagnetism) and not biological.

But biological organisms (microorganisms in the cell environment, or virus inside the cell) could produce also physical forces that act in fact almost directly changing DNA.

Therefore, the molecular changes in the internal or external cellular environment end up producing physical changes that alter the three dimensional structure of DNA conformation, mainly producing some kind of vibration (EM waves) and the resulting change in electrons.

Denaturalization of nucleic acids of DNA by high temperatures produces a separation of the double helix, occurs because the hydrogen bonds are broken. This event can occur during polymerase chain reaction, nucleic acid chains are again teaming (renaturalized) once the "normal" conditions are restored. If conditions are restored quickly or not, the chains can not line up properly.

A scientist who has ventured into this field of physical influences of DNA is Luc Montagnier.[1] [2] The Nobel Prize winner is investigating a hypothesis, first developed by Jacques Benveniste, which establishes a relationship between electromagnetic waves (EM) produced by biological substances, such as DNA, including viruses and bacteria (with some of its components), with the development of certain diseases such as autism, Alzheimer's and Parkinson.[3] Montagnier said in his works that DNA emits EM waves when excited and could then change their three dimensional conformation resulting in impact on gene expression. We focus on cancer.

Different wavelengths (since we know that EM waves can modify the DNA destroying or causing cell death) could activate or inactivate genes repressing promoters of cancer.

---

[1] Montagnier L, Aïssa J, Ferris S, Montagnier JL, Lavallée C. Electromagnetic signals are produced by aqueous nanostructures derived from bacterial DNA sequences. Interdiscip Sci. 2009 Jun;1(2):81-90. Epub 2009 Mar 4.

[2] Montagnier L, Aïssa J, Lavallée C, Mbamy M, Varon J, Chenal H. Electromagnetic detection of HIV DNA in the blood of AIDS patients treated by antiretroviral therapy. Interdiscip Sci. 2009 Dec;1(4):245-53. Epub 2009 Nov 14.

[3] Science 24 December 2010 Vol 330:1732.

And each wavelength in each different medium or different cells or different DNA, different molecular changes can result at any level. We believe that some molecules or physical changes in the extracellular environment may also affect the way the DNA. Or maybe the physical environment of the interface between the transmitter and receiver (in this case DNA) EM pulse is altered. And when it comes to altering the physical environment, we can say electrons, photons or elements capable of traveling through the extra-and intracellular biological environment, and interact with DNA directly.

Although work published by Franco, is in animals, the line of research would be the same: small molecular alterations that cause changes in the physical environment and cause effects at the cellular level.[4] [5]

Another mechanism could be that the alteration of a cell membrane receptor to interact with a substance in the extracellular medium may emit EM waves into the intracellular environment to generate physical disturbances that modify the DNA. Or the same electrical disturbance of the cell membrane to change its conformation the same membrane receptor or to interact with this element could lead to physical change, no changes of cellular metabolism inside the cell. And these intracellular movements of particles or the surrounding physical environment can be driven by the cytoskeleton, as this should have tether both in the cell membrane and in nuclear.

Another element that could function as a transfer medium is water, such as electron transport itself, giving and receiving the same, using hydrogen as the main atom.

The chain of events to the DNA that produce the phenotypic changes can be either atomic or molecular and sub-atomic, or, as I argue, physical nature, as an example the vibrations, which obviously end up being a jump or change of electron.
For example, a particle or a molecule that alters a cell receptor, altered this to create adisturbance inside the cell by altering the intracellular substance (matrix gel or sol).This alteration of the intracellular matrix lead to

---

[4] Andrea Rinaldi. Do Vibrating Molecules Give Us Our Sense of Smell? Science Now; 14 February 2011.
[5] Franco MI et al. Molecular vibration-sensing component in *Drosophila melanogaster* olfaction. PNAS February 14, 2011

the nucleus and DNA, through themechanism of exchange of electrons with vibrational motion or similar, since minor alterations of DNA methylation or aggregate rate of H atoms can activate or deactivate genes, they change the same three-dimensional conformation and functionality.

One implication of this theory is that scientists are beginning to investigate the physical consequences of small molecular changes. We would like to focus in the opposite: physical features could produce perdurable molecular changes.

Because tissues consist of biomolecules that have their own distinctive set of molecular vibrations, the Raman spectrum (RS) is actually a biochemical figure print, converting these biomolecules in spectral markers.[6]

There has been exponential interest in using RS to detect molecular changes in tissue associated with the development of diseases in recent years.[7] [8] The potential of this technique has been demonstrated mainly for the diagnosis of malignancy in various organ systems, such as the cervix, skin, breast, and bladder.[9] [10] [11] [12] Previous Raman studies in colon research have focused on cancer and precancer detection. Early work on colon cancer using near infrared RS found differences between normal tissue and adenocarcinoma corresponding to nucleic acid changes.[13]

RS is a sensitive technique that can detect molecular-specific alterations in diseased tissue. Previous Raman studies have demonstrated the potential of RS in differentiating colorectal

---

[6] Bi X, Walsh A, Mahadevan-Jansen A, Herline A. Development of Spectral Markers for the Discrimination of Ulcerative Colitis and Crohn’s Disease Using Raman Spectroscopy. Dis Colon Rectum 2011; 54: 48–53

[7] Mahadevan-Jansen A, Richards-Kortum R. Raman spectroscopy for the detection of cancers and precancers. *J Biomed Optics.*1996;1:31–70.

[8] Hanlon EB, Manoharan R, Koo TW, et al. Prospects for in vivo Raman spectroscopy. *Phys Med Biol.* 2000;45:R1–R59

[9] Lieber CA, Majumder SK, Ellis DL, Billheimer DD, Mahadevan-Jansen A. In vivo nonmelanoma skin cancer diagnosis using Raman microspectroscopy. *Lasers Surg Med.*2008;40:461– 467.

[10] de Jong BW, Schut TC, Maquelin K, et al. Discrimination between nontumor bladder tissue and tumor by Raman spectroscopy. *Anal Chem.* 2006;78:7761–7769.

[11] Mahadevan-Jansen A, Mitchell MF, Ramanujam N, Utzinger U, Richards-Kortum R. Development of a fiber optic probe to measure NIR Raman spectra of cervical tissue in vivo. *Photochem Photobiol.* 1998;68:427– 431.

[12] Chowdary MV, Kumar KK, Kurien J, Mathew S, Krishna CM. Discrimination of normal, benign, and malignant breast tissues by Raman spectroscopy. *Biopolymers.* 2006;83:556 –569.

[13] Feld MS, Manoharan R, Salenius J, et al. *Detection and Characterization of Human Tissue Lesions with Near Infrared Raman Spectroscopy*. Bellingham, WA: SPIE; 1995.

cancer from normal tissues.[14] [15] Molecular changes of nucleic acids and lipids were associated with the development of cancer.[16]

The greatest advantage of RS is its potential to provide fast and accurate in vivo diagnosis in situ, without the requirement of staining or exogenous agents. Because RS can provide molecular-specific information regarding the biochemical components of tissue, it has great potential to serve as a supplemental tool to diagnose cancer from its origins.

As Akira Shinohara says: “More recent experiments indicate that physical forces may be regulating chromosome functions, that is, physics may regulate biochemistry”.[17]

It takes a lot of teamwork, collaboration, among physicists, molecular biologists and geneticists to achieve not only apparent in all aspects of this theory but also progress on the implications of it.

---

[14] Widjaja E, Zheng W, Huang Z. Classification of colonic tissues using near-infrared Raman spectroscopy and support vector machines. *Int J Oncol.* 2008;32:653– 662.

[15] Chowdary MV, Kumar KK, Thakur K, et al. Discrimination of normal and malignant mucosal tissues of the colon by Raman spectroscopy. *Photomed Laser Surg.* 2007;25:269 –274.

[16] Molckovsky A, Song LM, Shim MG, Marcon NE, Wilson BC. Diagnostic potential of near-infrared Raman spectroscopy in the colon: differentiating adenomatous from hyperplastic polyps. *Gastrointest Endosc.* 2003;57:396–402.

[17] Osaka in focus. Science 18th February 2011 Special Section (331) 6019:XVI.