

The Future of Medicine: Biomedicine or Neuroscience?

Ewing GW

Department of Chemistry, Mimex Montague Healthcare Limited, Nottingham, UK

Corresponding author:

Graham Wilfred Ewing

✉ graham.ewing@mmhcl.co.uk

Department of Chemistry, Mimex Montague Healthcare Limited, Nottingham, UK.

Tel: 441159890304**Citation:** Ewing GW. The Future of Medicine: Biomedicine or Neuroscience?. Insights in Biomed. 2016, 1:2.

Abstract

The author takes a critical look at modern medicine and of the set of assumption upon which the prevailing biomedical paradigm is based. The many tests which are used to characterize a medical condition are based upon the assumption that a single pathological process can be used as an accurate measure of a pathological process yet it is increasingly recognized that most medical conditions are polygenomic, multi-systemic and multi-pathological. Accordingly, the various drugs which are used to treat a medical condition and which are based upon the often erroneous assumption that the suppression or masking of a single pathological process in order to treat the symptoms of dysfunction fails to take into account that the complex mechanism by which the brain regulates the autonomic nervous system and hence that treating the symptoms of a pathology with a drug often does little to influence the fundamental cause of the condition with the consequence that further pathologies emerge in due course. Here we quote Brenner "Some people have suggested that we can change the genome to fit this new environment". But that is blatantly ridiculous at this time. Another solution is to patch up the phenotype which is what modern medicine is all about. But the real alternative is to come to grips with the environment and adjust it wherever we can to cope with health problems that arise from maladaptation.

Keywords: Strannik; Autonomic nervous system; Mathematical model**Abbreviations:** CAM: Complementary and Alternative Medicine; ANS: Autonomic Nervous System; GP: General Practitioner; SVS: Strannik Virtual Scanning; SLT: Strannik Light Therapy**Received:** October 31, 2016; **Accepted:** November 01, 2016; **Published:** November 04, 2016

Introduction

The demand for healthcare around the world now exceeds the ability of the contemporary healthcare - based upon the prevailing biomedical paradigm - to diagnose and treat the many and various medical conditions which adversely influence our health. Only 5% to 10% of medical conditions have genetic origins therefore it is the lives which we lead which are the most significant factors influencing our health. The medical outcomes from contemporary biomedical tests and treatments are considered to be circa 50% effective [1] and often lead to low levels of Quality of Life. The numbers seeking assistance for their particular ailments continues to increase year on year. Healthcare remains beyond the reach of the majority of the world's population, in particular those in remote regions and/

or in the less developed world markets. Accordingly, there is a need for significantly better and less expensive ways to provide healthcare for the world's 7.5BN population.

Most of us lead a healthy drug-free existence. Many of us consult our GP when we seek assistance i.e. when we experience ailments which we are unable to eradicate through our own efforts e.g. antibiotics to eliminate bacterial infections which the body is unable to resist and/or repel, although no-one appears to consider why we are susceptible to such infections. Many lifestyle-related medical conditions are often reversible although if allowed to continue for long periods the conditions often become chronic and increasingly less reversible e.g. due to the physiological changes (often arising from being significantly overweight) which influence the function of different organs, structures and systems; and leads to degeneration and damage.

Stable pathological functional systems [2] become established which reflect the brain's best-fit approach to maintaining or optimizing physiological stability [3].

The established healthcare systems are challenged by governments to come up with cheaper and better ways of delivering healthcare. More of the same is no longer considered to be an option. The current medical systems are increasingly unable to meet the demand for healthcare. Some consider that digital techniques offer a solution [4]. Some seers and/or pundits comment that the emerging digital paradigm offers the promise of online healthcare within 5 years yet most digital techniques are not fundamentally digital. They merely use digital means of communication to transfer the established body of analogue data more quickly around the healthcare system.

A Critical Evaluation of the Prevailing Biomedical Paradigm

A critical evaluation of the current paradigm illustrates fundamental limitations and failings with the many and various techniques which are used to diagnose and treat the health of the patient [5].

In the UK, the doctor is expected to make a precise assessment of the health of the patient in a consultation of just 7 minutes. Their conclusions are based upon the prevailing etiology of each condition which is often recognized to be incomplete. If uncertain with their conclusions they can send samples for testing by histopathological tests which have accuracy of typically 25% to 90%. Ultimately, they send their patients for further tests by specialist consultants. The system involves ever greater levels of consultations, complexity and cost. The techniques are increasingly expensive; often beyond the limits of affordability e.g. in the less developed world markets where there is relatively low levels of disposable income; and incorporate a range of fundamental limitations which influence the accuracy of patient diagnoses. Nevertheless, despite the immense body of knowledge regarding how drugs function, there is not yet an accepted or coherent understanding:

- (i) Of the basic processes, which lead to pathological onset or the fundamental pathological components of most medical conditions i.e. most of us are born healthy therefore what are the factors which we encounter which influence our health?
- (ii) Of the neurological mechanism, which regulates how the body functions i.e. the autonomic nervous system?
- (iii) Of the function of the neural networks and their function.
- (iv) Of the fundamental mechanisms by which CAM techniques can have some effect upon the health of the patient.
- (v) Of the nature, structure, function and significance of the physiological and/or functional systems.
- (vi) Of the relationship between health and wellbeing.
- (vii) The significance of genotype, phenotype, the influence of the environment, stress, etc.
- (viii) Why the effectiveness of drugs declines over a period?

(ix) Why drugs are rarely more than 50% effective?

These issues have been recognized by eminent researchers e.g. Professor Sydney Brenner who referred to the need for modern medicine to patch up the phenotype because that's what modern medicine is all about, and Professor Eric Lander who commented the genome provides the parts list but not the operating manual.

The Emerging Neurological Paradigm

In recognition of the perceived limitations of biomedicine, visionary neurologist Henry Markham convinced the European Commission to create the Human Brain Project [6] which has the following three primary objectives: (i) to determine what the brain does and how it does it, (ii) to develop a new generation of cognition-based diagnostic technologies which are able to determine the pathological correlates of complex medical conditions such as Alzheimer's disease, and (iii) to understand and adapt with therapeutic effect the multilevel nature of brain function; however in an unexpected twist, the Russian researcher Dr. Igor Gennadyevich Grakov [7] has developed a technology which meets the key aims and objectives (i)-(iii) of the Human Brain Project outlined above. Moreover, it was developed in the period 1981-2006.

The first versions of Strannik entered use in the Russian market in 1997. It comprises mainly, but not exclusively, Strannik Virtual Scanning (SVS) and Strannik Light Therapy (SLT) and is based upon the fundamental observation that changes of brain function, in particular of sense perception, have pathological correlates; that the brain functions at different levels; and that knowledge of these relationships can be used as the basis of a biofeedback technology which is able to optimize the brain's ability to regulate the stability of the autonomic nervous system and the various physiological systems i.e. our cognitive coordinates mirror our pathological coordinates.

The technique incorporates knowledge that each pathological reaction emits biophoton(s) of light which influence our perception of colour. This serves as the basis of a theoretically sound scientific principle which measures the rate at which proteins are expressed and/or at which they react and has been transcribed into a computer-based digital technique of immense significance to 'healthcare'. It explains why the body is highly luminescent and employs principles more commonly associated with optogenetics, cognitive psychology, neuromodulation, or complementary and alternative medicine (CAM).

It incorporates an understanding of brain function - using similar methodology being developed by the Human Brain Project [6] SP3 - which links cognitive input to its pathological correlates.

SVS can determine the earliest onset of pathologies from their pre-symptomatic onset; each pathology reported in terms of its genotype and its phenotype; and the entire range of comorbidities in each and every organ (typically 15 per organ/30 organs). Moreover, the technique is entirely non-invasive and safe; can be conducted in 20 minutes i.e., to the point where results are available in report format; at a cost which is typically 5% to 25% of contemporary diagnostic tests; and is almost entirely free from factors which could adversely influence reported test results.

In the hands of competent trained Strannik practitioners the technique has been shown to function 2% to 23% more accurately than the range of diagnostic tests in use at the testing clinics and against which it was compared.

Limitations of the Biomedical Paradigm

By contrast contemporary diagnostic tests are not based upon a significant theoretical concept, but instead are often based upon relatively simplistic observations or phenomena which can be adapted with diagnostic or therapeutic effect e.g. the HbA1c test which is routinely used to diagnose diabetes is influenced by a wide range of factors which can influence test outcomes. Haemoglobin does not play a role in diabetes etiology so how could it be used as a marker? It is considered to be an indirect marker however, most significantly:

1. The levels of haemoglobin vary widely and adversely influence test outcomes [8].
2. The HbA1c test is 40% irreproducible after one month [9].
3. Diabetes is a problem of neural regulation of blood glucose [10].
4. Diabetes has both genetic and phenotypic manifestations [11].

Ideally, the diagnostic test should determine (i) the rate of genetic expression of the key protein – in diabetes this is pre-pro-insulin; and (ii) the rate at which this protein reacts with its reactive substrate; however, most tests determine the levels of a particular marker which is often a convenient compromise i.e. it does not measure the rate of genetic expression or protein reactivity.

Most diagnostic tests are rarely precisely accurate, incorporate a range of limiting factors which influence the accuracy and precision of reported outcomes, do not consider the genetic or phenotypic nature of each pathology i.e. each pathology has both genetic and phenotypic components [11]. Most medical conditions are polygenomic, multi-systemic and multi-pathological. Pathological onset is the consequence of systemic dysfunction.

Note: It is stress, in its various psychological or physiological manifestations, which creates the essential preconditions for autonomic dysfunction. It is manifest as the phenotype of every medical condition: the extent of the phenotype for each pathology being dependent upon the precise nature and extent of exposure to the stressor which explains why medical symptoms often worsen when the patient is stressed or is overweight. Moreover, exposure to the most severe stress (or) ultimately leads to epigenetic changes [12] influencing the level of protein expression [13] i.e. epigenetic changes are often the consequence of systemic dysfunction; and influences the genetic expression of proteins (genotype) and the rate at which such proteins react with their reactive substrates (phenotype).

Such tests are usually validated in the laboratory and take little account of the in-vivo context, in particular that the determined level of the identified biomarker is only one, presumed to be the dominant one/biomarker, of a spectrum of biochemical markers which are expressed by a medical condition; or that each medical

condition comprises a genetic and phenotypic component(s). These are not a new observation: (i) combination drug therapies have been used for many years, (ii) diabetes comprises a genetic and phenotypic component [11] i.e. Type-1 and type-2 diabetes. Many medical conditions comprise a range of pathological coordinates or comorbidities often as the primary condition(s) increase in severity e.g. as in Raynaud's phenomenon, Alzheimer's disease, migraine, depression, etc. The limitations of such tests often become apparent as misdiagnoses and ultimately at autopsy when it is possible to determine whether the patient's condition was correctly diagnosed and treated.

Drugs are based upon the same fundamental concept i.e. that a pathology has single pathological onset, and therefore that a drug can be used to mask the symptoms of the pathology and provide relief; however, this has significant limitations. The drugs may be ineffective, the effectiveness of the drug(s) may wear off after a period, the fundamental stress-related cause of the problem still exists and ultimately influences the stability of other body systems until other comorbidities develop, the drug acts upon the phenotype but the condition may have genetic origins, etc. The process, through its ignorance of how the brain regulates the body's function via the autonomic nervous system, in many cases perpetuates the disease process by dealing with the symptoms without dealing with the fundamental neurological cause of the problem.

Moreover, if the effectiveness of drugs declines over a period, which often occurs, there must be an explanation for this effect. The only valid explanation which can be offered is that the brain compensates for such pathological changes by adjusting the neural regulation of the systems and organs which are influenced by the drug(s).

Conclusion

The Strannik technology appears to be the most advanced of this new generation of medical technology [14] but it is not the first. There are many technologies and medical disciplines which have been playing with these principles for the last 80-100 years although without a significant or precise understanding of the scientific principles. It is for such reason(s) that patients lose confidence in their GP; in the drugs prescribed; that they are skeptical of novel techniques which are based upon spurious insubstantial hypotheses, theories or explanations, which have little long-lasting effect; and that they turn to unconventional alternatives (CAM).

Nevertheless, the entry of such technologies to the market is fraught with intrigue and controversy mainly because drug-based therapies have become entrenched in our psyche/minds as the only viable, comprehensive and rapid way to achieve relief from the symptoms yet most of us continue to live a healthy drug-free existence. Moreover, as we age, and especially so in the years 50+, we become less and less able to cope with change. We base our decisions upon what we have seen and understood in our lives and hence are less favourably disposed to disruptive and innovative technologies.

Strannik meets the requirements for a mathematical model of the physiological systems [14] which some have considered

to be necessary to explain how the body functions. It treads the boundary of complementary and alternative medicine, neurology, cognitive neuroscience, optogenetics, preventative and integrative medicine as well as contemporary biomedicine, biofeedback, neuromodulation, and all things digital; and incorporates an unprecedented level of understanding of how the brain regulates the autonomic nervous system [15-17] and of the relationship between molecular biology, cellular biology, organ function and the coherent function of the organ systems often referred to as physiological systems.

It illustrates that our perceptions of health and wellbeing are fundamentally linked to context. Stress influences our health to different extent(s) throughout each day. Health is an 'absolute' measure whilst wellbeing is 'relative' e.g. as we age our health declines because our bodies are no longer able to produce proteins in sufficient levels to sustain our normal function. Wellbeing on the other hand is whether we are sufficiently well

to complete our functional abilities and go about and complete our daily tasks, hence the daily greeting 'how well are you today?' The challenge for biomedicine is how to adapt to take account of this increased body of knowledge.

Conflict of Interest Statement

Graham Ewing is CEO of Mimex Montague Healthcare. Graham Ewing and Igor Grakov are dedicated to the future commercialization of Strannik technology.

Acknowledgements

Graham Ewing and Igor Grakov acknowledge the contribution of the many people who through their research have laid the foundations for the development of the Strannik technology. Particular thanks are given to Anokhin PK, Sudakov KV, Vysochin YuV, and Parvez SH, for their research and/or assistance and/or encouragement.

References

- 1 Spear BB, Health-Chiozzi M, Huff J (2001) Clinical applications of pharmacogenetics. *Trends Mol Med* 7(5): 201-214.
- 2 Egiazaryan GG, Sudakov KV (2007) Theory of functional systems in the scientific school of PK Anokhin. *Journal of the History of the Neurosciences* 16: 194-205.
- 3 Noakes TD, St Clair Gibson A, Lambert EV (2004) From catastrophe to complexity: A novel model of integrative central neural regulation of effort and fatigue during exercise in humans. *Br J Sports Med* 38: 511-514.
- 4 Ewing GW (2016) Your health: Analogue or digital? *Journal of Digital Medicine* 2(2): 6-9.
- 5 Ewing GW, Parvez SH (2010) The dynamic relationship between cognition, the physiological systems, and cellular and molecular biochemistry: A systems-based perspective on the processes of pathology. *Act Nerv Super Rediviva* 52(1): 29-36.
- 6 https://www.humanbrainproject.eu/en_GB
- 7 Grakov IG (1985) Strannik diagnostic and treatment system: A virtual scanner for the health service. Minutes of Meeting No. 11 of the Praesidium of the Siberian of the Academy of Medical Sciences of the USSR, Russia.
- 8 English E, Idris I, Smith G, Dhatariya K, Kilpatrick ES (2015) The effect of anaemia and abnormalities of erythrocyte indices on HbA1c analysis: a systematic review. *Diabetologia* 58(7): 1409-1421.
- 9 McDonald TJ, Warren R (2014) Diagnostic confusion? Repeat HbA1c for the diagnosis of diabetes. *Diabetes Care* 37: e 135-136.
- 10 Ewing GW (2016) Further perspectives on diabetes: Neuroregulation of blood glucose. *Neuroscience and Bio-medical Engineering (NBE)* 4(2): 75-83.
- 11 Ewing GW, Parvez SH (2010) The multi-systemic nature of diabetes mellitus: Genotype or phenotype? *N Am J Med Sci* 2(10): 444-456.
- 12 Bagot RC (2016) Epigenetic modifications of major depressive disorder. *Int J Mol Sci* 17(8): 1279.
- 13 Yehuda R, Daskalakis NP, Bierer LM, Bader HN, Klengel T, et al. (2016) Holocaust exposure induced intergenerational effects on FKBP5 methylation. *Biol Psychiatry* 80(5): 372-380.
- 14 Ewing GW (2015) A framework for a mathematical model of the autonomic nervous system and physiological systems using the neuro-regulation of blood glucose as an example. *J Comput Sci Syst Biol* 8(2): 59-73.
- 15 Ewing GW, Grakov IG (2015) A comparison of the aims and objectives of the Human Brain Project with Grakov's mathematical model of the autonomic nervous system (Strannik Technology). *Neurol Neurotech* 1(1): 002.
- 16 www.montaguehealthcare.co.uk/OperatingManual.pdf
- 17 Noble D (2015) Mathematics and biology: The ultimate interface? *Progress in Biophysics and Molecular Biology* 119(3): 205-207.