

Focusing on Functionality

How to get better results in nutritional therapy

Lorraine Nicolle MSc, NTCC

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When Patsy came to my practice one grey, Autumn day, her chief complaints were persistent fatigue and irritability. But she also alluded to a host of other symptoms, which, when taken together, were making her feel a lot older than her chronological age (of 40 years). On further investigation, she was experiencing bloating after eating, mild, nagging, recurrent headaches, an itchy skin rash, poor sleep and anxiety. She was also about a stone overweight. One source of Patsy's anxiety was the fear of breast cancer – her mother had just come through this and she was aware of the potential inherited tendency. She had trouble with cravings while on diets and she drank too much coffee, in a bid to overcome her seemingly relentless fatigue, which also prevented her from exercising. She used medicated cream for her skin and was considering antidepressants but not yet using them.

Whatever type of CAM therapy you practice, you are likely to recognize this type of chronic, long-term scenario only too well. But with so many symptoms presenting simultaneously, what are the best points at which to intervene; and how should such interventions be prioritised?

It was precisely these questions that sparked the idea for the recently published book *Biochemical Imbalances in Disease* (1). Both converts to the Functional model of patient care (developed in the 1980s by the Institute of Functional Medicine - IFM) (2), the editor-authors firmly believed that the only logical approach to such complex cases was one that began with an in-depth delve into the patient's life story and family history. This would then be complemented by relevant laboratory investigations. The aim would be to identify any biochemical imbalances, along with other antecedents, triggers and mediators* that were likely to be contributing to Patsy's current state of ill-health. Such a Functional *modus operandi* differs from the allopathic approach in that it asks, 'What sort of individual has the disease?', rather than, 'What disease does the patient have?'.

Paucity of training in the UK

It came as a surprise to learn, during research of BANT-registered** nutritional therapists (NTs) (3), that a sizeable proportion of NTs had not had the opportunity to learn about Functional Medicine (FM), despite the fact that clinicians using the model found that it

significantly enhanced their practices (see box). From this came forth the idea to create a 'handbook' on the use of the Functional model, written by UK practitioners and educators, for UK (and other) healthcare practitioners and students, and complementing the in-depth texts produced by the IFM.

Box: *Benefits of using FM, as reported by Functional Nutritional Therapists (3)*

- *Improved patient outcomes*
- *Improved patient understanding of his/her health issues*
- *Enhanced practitioner understanding of the individual patient's case*
- *Enhanced practitioner knowledge of human physiology and biochemistry.*

Four education institutional contributors to the book had already been doing much to ensure that their nutritional therapy degree courses were grounded in the Functional approach^{***}. And since publication of the book, the paucity of UK training for existing healthcare practitioners is now thankfully being addressed: BANT has run a session on FM; the IFM is looking to host its foundation course in the UK later this year; The Centre for Nutrition Education (CNELM) is working towards teaching a MSc in Functional Nutrition scheduled to start this October; and Lamberts Healthcare is facilitating countrywide seminars on the Functional model.

The focus on key biochemical imbalances

The Functional approach to patient care is characterized by six basic principles (see box) and much has been written about these elsewhere (4). Rather than try to encompass all the intricacies of the model, *Biochemical Imbalances in Disease* aims to give a taste of its inherent ability to enlighten both patient and practitioner, by focusing on the key imbalances that are found in the most prevalent chronic diseases of today:

- Gastro-intestinal disturbances and dysbiosis
- Poor hepatic biotransformation
- Dysglycaemia and dyslipidaemia
- Endocrine imbalances, including sex hormones, adrenals and thyroid
- Immune system dysregulation
- Compromised essential fatty acid metabolism
- Poor energy production and increased oxidative stress

- Dysregulated neurotransmitter function.

The author-editors wanted to illustrate how inextricably such imbalances are entwined with an individual's risk for developing conditions like cardiovascular disease, cancer, diabetes, mental health problems and autoimmunity. Such medical conditions are almost always 'preceded by a lengthy period of declining function in one or more of [these] body systems' (4). In addition to this, many patients, like Patsy above, experience myriad chronic, debilitating symptoms, involving various different organ systems, but which don't always have any discernible organic cause. In Functional Medicine terms, this does not make the patient's health conditions any less 'real', nor any less concerning if one is looking to minimize her risk for developing chronic diseases in her middle and later years.

Box: *The Principles of Functional Medicine*

- *An understanding of the biochemical individuality of each patient*
- *A patient-centred versus a disease-centred approach*
- *The search for a dynamic balance among internal and external factors*
- *Familiarity with the web-like interconnections of internal physiological factors*
- *Seeing 'health' as not merely the absence of disease, but as a positive vitality*
- *The promotion of organ reserve for a healthy old age.*

Adapted from Jones D (2005). *Textbook of Functional Medicine* (p6). Gig Harbour, US: IFM.

An understanding of the ways in which such imbalances may be linked to clinical signs and symptoms, and of how to identify and intervene in such *causes* of the symptoms, is key to the success of Functional health practitioners' programmes. Between them, the core clinical imbalances cover all the main body systems. Each of them has the potential to be altered so as to improve the function of the body's cells and organs. The clinical symptoms and medical conditions thus take a secondary position.

An illustration of how this works in practice can be found in the *Biochemical Imbalances in Disease* chapter that is devoted solely to a case study ('Marie'). To take one of many examples from this chapter, Marie's case analysis indicated the presence of gastro-intestinal (GI) dysbiosis, which was likely to be triggering and/or exacerbating not only her digestive problems but also many of her non-GI symptoms, including those relating to her diagnosis of rheumatoid arthritis.

More generally, we see a growing body of evidence for GI imbalances having systemic effects. For example, there are strong links between *Helicobacter pylori* infection and cardiovascular disease (5) (6); and also a likely involvement of *Klebsiella pneumoniae*

infection in the aetiology of the auto-immune condition ankylosing spondylitis, in genetically susceptible individuals (7).

Improving quality standards in nutrition practice

The *Biochemical Imbalances in Disease* text has been constructed primarily by practitioners of, and educators in, nutritional therapy. Being an unprotected title, the umbrella of nutritional therapy has historically included a rather eclectic mix of such therapists, using a variety of different approaches. This has understandably given rise to doubts regarding the scientific, and therefore therapeutic, integrity of practitioners using this title. However, the 2009 revision of the National Occupational Standards for NT now explicitly articulates the use of the FM framework (8). This has been welcomed by many practitioners, who see the move as a catalyst for attaining consistently high standards of education and practice across the profession.

For, although FM is still a minority approach, it is based on the conventionally well-respected disciplines of molecular biology and nutrition science and it draws on the principles of some of the most exciting and forward-looking scientific paradigms of today. Three of these are introduced below. The *Biochemical Imbalances in Disease* text is influenced by the epistemological standpoints held by these paradigms and it carries hundreds of references to scientific papers, the vast majority from well-established peer-reviewed journals.

Allostasis

Coined by Peter Sterling and Joseph Eyer (1988) (9), the term ‘allostatic load’ refers to the cumulative negative effects of stress over an individual’s lifetime. Such stressors include, for example, poor diet, exposure to environmental toxins and destructive relationships. It is, ‘the price the body pays for being forced to adapt to various psychosocial challenges and adverse environments’ (10). Thus the root causes of chronic disease are complex and accumulate over a person’s lifetime. FM focuses on identifying and influencing the particular biochemical imbalances that have resulted from such stress inputs.

Systems biology

This is an emerging science that breaks from the historical norm of studying organisms part by part, and instead views the organism, ‘as an *integrated* and *interacting network* of genes, proteins and biochemical reactions which give rise to life’ (11). Studying the many complex interactions between biological components, and between an organism’s

genome and the external environmental influences, will, according to its proponents, 'transform our understanding of human health and disease'.

That the function of the human body relies on myriad web-like interconnections within and between physiological pathways is an important principle of the Functional approach. Such a principle can explain how, 'multiple factors can underly a single condition [of ill-health], and multiple conditions can be influenced by a single dysfunctional process or imbalanced system' (12).

Nutrigenomics and pharmacogenomics

Nutrigenomics looks at the way in which nutrients can affect health specifically by altering genetic expression, while pharmacogenomics postulates that interventions and dosages should be different depending on the individual's genetic make-up.

There is a growing body of evidence that nutrients affect genes. For example, in endothelial cell membranes, omega-3 fatty acids have been found to modulate the expression of genes that code for adhesion molecules and pro-inflammatory enzymes, both of which are implicated in the aetiology of atherosclerosis (13). Similarly, the well-documented cardiovascular benefits of virgin olive oil polyphenols may in part be due to the down-regulation of pro-atherogenic genes (14).

With regard to pharmacogenomics, the Functional approach acknowledges the patient's biochemical individuality and that it is the interaction of the patient's unique set of genetic and environmental factors that cause the physiological imbalances that eventually lead to chronic disease. Accordingly, the patient is prescribed an individualised programme to meet his particular needs.

This point about the value of personalised programmes can be illustrated in the ongoing debate about what constitutes adequate micronutrient intake. When measuring dietary adequacy in the UK, the Department of Health (DoH) first establishes an 'estimated average requirement' (EAR) level for each nutrient. Next, it sets a 'lower reference nutrient level' (LRNI), which is up to 20% lower than the EAR. It then looks to identify the percentage of the population not meeting the LRNI (15). (RNIs – 'reference nutrient intakes' - are not used in such analyses because, according to the DoH, 'Almost all people in the population need less than the reference nutrient intake' (16).)

In sharp contrast to this, award-winning researchers like Professor Robert Heaney MD and Professor Bruce Ames believe that systems of average determinations are

inadequate because they do not take account of individual needs, especially with regard to genetic variations.

Ames found that as many as a third of mutations, and several single nucleotide polymorphisms (SNPs), in a gene reduce the effectiveness of cofactor (micronutrient) binding sites. This implies that, for normal functioning, certain individuals may need these nutrients at far higher levels than:

- individuals without the genetic variations and
- the levels recommended by the standard dietary reference values (17).

An example is that of individuals with a genetic variant of the enzyme 5,10 methylene tetrahydrofolate reductase (MTHFR) having a possibly increased risk for cardiovascular disease, Alzheimer's and osteoporosis. Due to a lower than average activity of MTHFR in such individuals, an intake of folic acid that is considered sufficient for someone without this polymorphism, may not be high enough to prevent the low plasma folate and hyperhomocysteinaemia that make individuals in the polymorphic group vulnerable to such diseases (18).

We also see that in mainstream medicine, the concept of mass pharmaceuticals, the 'one-size-fits-all' drug, means that only some people gain real benefit, and usually only some of the time (19). This is a sentiment echoed by a senior genetics executive at GlaxoSmithKline, who said in 2003 that most drugs only work in 30-50% of patients (20).

Nutritional Insufficiency and Disease

Researchers like Ames and Heaney go even further in their criticism of the exclusive reliance on dietary reference values, by saying that the recommended intake levels are probably too low for *everyone*. This is because they are designed to prevent the classic deficiency diseases (like scurvy and beri beri) and do not take into the account the insidious biochemical consequences of chronic insufficiencies of a more moderate order (18).

In 2006 Ames proposed his 'triage' theory as a unifying explanation for how even such modest insufficiencies are significant causal factors in many types of chronic disease. He hypothesises that these modest shortfalls, common in the population, trigger a triage response such that metabolic functions critical to short-term survival (e.g., ATP synthesis) are favoured, at the expense of functions needed for longer-term health, such as the prevention of DNA damage and mitochondrial decay (21). Thus optimal

(and personalised) intakes of micronutrients are crucial in reducing society's burgeoning problems of age-related diseases.

This practice of using nutrition as a primary intervention, (alongside medication where necessary), is not, of course, considered conventional. Yet, when working from the fast-emerging standpoint that all disease arises from the interaction of genetic uniqueness with environmental inputs, one could reasonably ask, 'How could diet and lifestyle *not* be considered crucial?'.

The journey

So, back to Patsy. How will her road to better health be revealed? We have established that the detailed elucidation of the life story comes first. Some practitioners find it helpful to plot this in a timeline, (an example of which is given in the case in the book), indicating the environmental inputs (diet, medications, leisure habits, psychological stressors and others), medical test results and clinical signs and symptoms, in blocks of five years or so. From Patsy's point of view, this is also the start of the healing process, for she finds it cathartic to relate the story of her life. The process also helps her to see her situation more objectively and, perhaps for the first time, to spot connecting threads between her lifestyle and her health issues.

Once the timeline has been drafted, the practitioner arranges for Patsy to undertake any laboratory investigations that she believes will be enlightening. Much is written about the value of such investigations elsewhere (22).

This is just the start of the iterative analytical process that will lead the practitioner to devise a long-term strategic plan and periodically set shorter-term action plans for Patsy. S/he will work in partnership with Patsy, educating her about the links between her diet, lifestyle, biochemical imbalances and clinical symptoms, and motivating her to take responsibility for making the recommended changes. A discussion of the specific nutritional interventions for Patsy is beyond the scope of this article but the issue of where and how one could intervene in such cases is discussed at length in *Biochemical Imbalances in Disease*.

In the meantime, one final point to stress before closing is the importance of building regular reflection into one's practice. Reflective practice is not just the process of remembering the events that have happened during the day. It is an *active* process, which involves reviewing the experience, making sense and drawing conclusions from the experience and planning outcomes that have arisen from the reflection (23).

Reflective practice is now widely taught on healthcare degree courses but its value is still too often underestimated. Successful use of the Functional model requires deep and critical reflection to be applied regularly to each patient's case, in order to continuously develop new insights, and thus better treatment options, throughout the therapeutic journey.

Conclusion

Proponents of the Functional approach believe that it epitomises the systems-oriented, personalised medicine that is needed to meet the greatest healthcare challenge of the 21st Century, that of the sharply rising 'epidemic' of chronic disease (24). FM is not an easy option, for it tests the practitioner's endurance in critical thinking, and it requires a commitment to continuous knowledge development, including through regular reflective practice. But most Functional healthcare specialists find that using the framework brings hitherto unattainable rewards in terms of improving clinical judgment and patient outcomes. *Biochemical Imbalances in Disease* is designed as an aid to help clinicians both new to, and experienced in, the Functional model to experience more such rewards.

Lorraine Nicolle MSc, PGCLT, BA (Hons), Dip. BCNH, Dip. CIM, NTCC, CNHC, MBANT is a Nutritional Therapist and a nutrition educator and writer. *Biochemical Imbalance in Disease* (co-edited with Ann Woodriff Beirne) is published by Singing Dragon. A companion book, also based on the Functional approach, is to be published early 2012.

Notes

- * In Functional Medicine, antecedents and triggers are elicited by asking, 'where does the symptom come from?' Mediators are found by asking, 'What keeps it going?'
- ** BANT is the British Association for Applied Nutrition and Nutritional Therapy
- ***These were The Centre for Nutrition Education and Lifestyle Management (courses validated by Middlesex University), Thames Valley University, University of Westminster and Worcester University.

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