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Out of the Box

I am not joking

Tom Lehrer, the satirical singer, announced his retirement when Henry Kissinger was awarded a Nobel Peace Prize, saying that reality was now beyond his imagination. In this mood, here is a report originally from the *Los Angeles Times*[1]:

> The US defence department is sponsoring research into a nutritional patch. . .The patches could be used by troops in combat zones or while wearing chemical suits which make normal eating difficult. The nutrients would be absorbed through the skin into the bloodstream, bypassing the digestive system. The patches, which have not been tested on humans, could include caffeine aimed at keeping troops awake without having to use drugs. The transdermal patches. . .are being developed by the National Nutraceutical Center, a consortium of university researchers. They could be available by 2010 if the private sector joins the military in developing them. "Clearly it doesn't replace a turkey dinner," Gerald Darsch, director of the Defense Combat Feeding Program, overseeing the project, told the *Washington Post*. "It ensures the war fighter can get back to eat the turkey dinner."

Not tested on humans? Good grief! Has the National Nutraceutical Center played war games in which US *ob/ob* mice invade North Korean knock-out mice?

The great protein scandal?

Our text for today is on page 56 of the new WHO Technical Report 916 on *Diet, Nutrition and the Prevention of Chronic Diseases*, or the Revised Version, 916 for short[2]. It says, as did its predecessor 797[3] (known to the sugar trade as the Unauthorised Version) in 1990, that the global population goal for protein intake is a range of 10–15% of energy.

This is odd. First, 916 says zip about protein and chronic diseases, apart from a confused story with osteoporosis. Second, 797 set the same goal in 1990, with the explanation that 10–15% is the global range of consumption, an example of the 'what is, is good' theory of human nutrition. Third, 916 supports its goal merely with a footnote saying it 'should be seen in the light of the Joint WHO/FAO/UNU Expert Consultation on Protein and Amino Acid Requirements in Human Nutrition' held at WHO Geneva in April 2002. But when 916 hit the stands a year later, and at the time I now write, results of the consultation were unknown and unpublished, so we are in the dark. Ah. Oh. Or as conspiracy theorists say, aha! And oho!

The last UN report on the subject was published in 1985[4]. But, odder and odder, this report is out of print – a collector's item. The copy in the Ministry of Health here in Brasília is in tatters. I got my own copy by going to the library at WHO Geneva and photographing the whole 212 pages, so the original on the shelves has a bent binding – sorry.

Some readers know better than me what has been going on. Since 1985, attempts to revise UN estimates for protein requirements have been in limbo. Successive groups of experts convened by FAO/WHO remain deadlocked. The reasons go to the root of public health nutrition science, its meaning and purpose, and its implications for world food systems[5]. I dare also say that the forces that influence UN expert reports are not only scientific[6].

Data mean nothing alone. They inform and are derived from principles[7]. With protein requirements, what is the principle? That everybody should have more than enough protein, on an analogy with 'shop til you drop'? Or that protein should be consumed prudently, and that enough is as good as a feast? As the last words of the 1985 protein report say: 'requirements for what?'

The deep context of protein goes back to Justus von Liebig, and requirements proposed since the 19th century in Europe and North America, and later by UN agencies. We all know now that the very high recommendations of 15% and more of energy intake, originally devised in Germany by Carl von Voit, Max Rubner and their followers, are Ptolemaic stuff. The concepts of the 'protein gap' and of protein–energy malnutrition as a global scourge, which dominated UN thinking in the 1950s and into the 1960s, have been tossed in the trash[8,9]. However, the discarded beliefs in high protein requirements and in the supremacy of 'first-class' animal protein have shaped the world's food systems[5].

Take the world now. High protein requirements imply that most rural Asians are malnourished, because the protein content of rice is relatively low, and that wheat, higher in protein, is a better staple crop. If in addition animal protein is given priority, then the world's food systems need further manipulation to approximate to those of Europe and North America: more meat, milk and dairy products, conveniently packaged as cheeseburgers and milkshakes, or else dumped on vulnerable countries as 'trade' or 'aid'[10]. This of course is what has been happening since the Second World War, with accelerating pace[11]. This is why, here in Brazil, unsustainable cattle ranches and soya farms are destroying the rainforest and *cerrado* (savannah)[10,12].

Low protein requirements imply that traditional Asian food systems, when adequate in energy and also varied, are healthy. Low requirements suggest that only those populations whose staple foods are low-protein roots

and tubers, in particular manioc (cassava), are at substantial risk of protein deficiency. Low requirements mean that the energy-dense, fatty, sugary and salty diets[3,4] of rich countries, whose protein content is around 15%[13] or actually even higher[14], are at best wasteful and at worst comprehensively pathogenic.

So, what does the 1985 WHO/FAO/UNU report say? Well, after the well-documented 'great protein fiasco' first revealed in the early 1970s[8,9], UN reports up to and including 1985[15,16] stated that protein requirements are relatively low; and mention is even made of human milk, uniquely low in protein[5].

The 1985 report expresses protein requirements in terms of grams per kilogram of body weight, not as percentage of energy intake. Its adult population requirements, allowing for the usual safety factor abracadabra, and adjustments for different sources and balances of essential amino acids, generally work out at around 8–11% of energy[4,17]. Young and active people use protein more efficiently, and vice versa[4]. Thus a universal protein requirement, superfluous for small slim young peasants and adequate for big fat old couch potatoes, might be around 10–12%. Add the extra protein needs for growth, infection and lactation, and the 'one size fits all' 916 range of 10–15% makes rough sense. But for practically all adults, anything much above 12% will be excreted, and therefore superfluous. This is what the 1985 report indicates.

I now turn to a current authority, Alan Jackson of the University of Southampton. As Chairman of the Scientific Advisory Committee on Nutrition, he is in effect the UK government's chief nutrition advisor. He can expect to be taken seriously.

He finds that the gut flora of humans, as well as of ruminants, make 'essential' amino acids most of all on high-fibre diets that provide lots of fermentable substrate[18]. His colleague in the field, Joe Millward of the University of Surrey, finds that the body adapts to high and low protein intakes more gradually than is evident in short-term studies[19,20]. If these findings are right, they mean that protein requirements are lower than estimated in the 1985 report.

The principle behind the body's own manufacture of amino acids is ecological. The significance of symbiosis between bacteria and eukaryotes such as fungi, plants and people is still often overlooked[21]. There is no evidence that human protein requirements from food could possibly be zero, but Alan Jackson's findings mean that the requirement for protein from food is to a significant extent a function of the integrity of the gut flora.

The principle behind adaptability is evolutionary. The experiments of Carl von Voit on German brewery workers measured short-term nitrogen turnover of an unusual type of man, *Homo eisbeinii mit bauernbratwursten und doppelmunchenburgerschnitzel*, physically resembling the Hulk, who tended to roll out their last barrel in their 30s and 40s[22]. But as Joe Millward says (italics mine): 'healthy individuals can, with time, safely adapt their metabolic demand to match their protein intakes over a wide range. . .*down to levels considerably below the intakes habitually consumed by individuals satisfying energy and micronutrient requirements*'[19].

Thus, what may at first seem just brainy technical calculation, is political nitroglycerine. A low figure for protein requirements, if now endorsed by the UN system and member states, would have revolutionary implications for industrialised and traditional food systems, rural and urban livelihoods, concepts of food security, the number of people in the world defined as malnourished, and indeed for the profits of McDonalds, Nestlé and Yum! Brands.

So, what does WHO now say about protein? A claim has been inserted in an introductory section of 916, I guess by an FAO official, which was not there when the report first went for consultation[23]; it first appeared in the 'advanced final draft' in March 2003[24]. It says 'the high-value protein that the livestock sector offers improves the nutrition of the vast majority of the world'[2].

This plug for the meat and dairy production, processing, distribution and catering industries is not supported with evidence. Indeed, what does the statement mean? That Mr Bones the Butcher and Mr Moo the Milkman can be found in a myriad of municipal markets, doling out not loaves and fishes but chump chops and pintas, to the protein-starved billions?

When will the WHO/FAO/UNU report on human protein requirements emerge? It is referenced in 916 as being in press. Was this so, when 916 went to press? Was a report agreed in April 2002? Or did the experts leave Geneva having failed to agree? Is there a draft still being worked on by the FAO secretariat? Or, is the completed report about to be circulated, after I write this item and before you read it? I cannot tell you. I have asked some of those who might be in the know, and they have observed *omerta*.

Could the political and economic implications of low protein requirements be a reason why the experts convened by FAO/WHO have been deadlocked for over 15 years? Could this be why the 1985 FAO/WHO//UNU report is out of print? Is the Pope a Catholic?

How to be a millionaire

I have been thinking about the 14 nutrition recommendations of the World Cancer Research Fund[25]. Trying to follow 14 rules is as tedious as a weighed intake or nutrition labels. So I offer seven rules, as the basis for a smash hit best-seller.

1. Eat 10 or more helpings of vegetables, fruits and legumes every day.
2. Drink two litres or more of water every day.
3. More than half of all foods and drinks to be under 100 kcal/100 g, and at least two-thirds of the rest to be under 250 kcal/100 g.

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4. Eat only whole, fresh food, or food cooked with water.
5. Eat nothing palatable only when hot, or that you would not feed to a dog.
6. Eat and drink nothing with added fat, sugar or salt; do not drink alcohol.
7. After rules 1–3 are followed, rules 4 and 6 can be broken once a day.

The rules can be elaborated into a book. What are 'vegetables and fruits'? What is 'a helping'? I specify 'fat' in rule 6: olive and other yummy oils, as the sizzle for a stir-fry of garlic, onions, peppers, tomatoes and nuts, with whole-grain rice, is fine. Does the fat of intensively reared animals count as 'added'? What about toast[26]? I include rule 3 to give employment to dietitians; it refers to plant foods, and to the flesh of wild or free-ranging animals, birds and fish[26].

Half of the rules are unrestrictive – enjoy. And the rule-breaking 7, don't ya love it? I finish my supper with chocolate chip ice-cream, grapes and cashew nuts, and a glass of *Miolo Seleção Tinto*, and I swear on the bible[25] that I am under 25% of energy as fat. The secret is rules 1–3 and their effect on satiety, including the item missing from most nutrition guidelines: water.

Catch!

This column written so far, I walk to Pão de Açúcar, my local supermercado in Brasília, to buy fresh vegetables. Elias is throwing a stick into the top branches of the tree whose leaves give shade to his taxi. He is knocking down avocados for supper. He promises one for me.

Walking back, I enjoy *milho cozido*, corn cooked wrapped in its own leaves, which costs the equivalent of $US 50 cents. Elias gets up from a game of dominoes under the mango tree[27]. He gives me four avocados, looking like gigantic whole horse chestnuts, scarred by his stick. Halved with a splosh of balsamic vinegar, that's the first course of my suppers for a week, at 190 kcal/100 g[28], and for free.

If one sunny day in Brasília I meet a man wearing a gas mask and transdermal patches on a combat jacket flashed 'National Nutraceutical Center/Yum! Brands' who offers me gum and asks me the way to Starbucks, I will throw an avocado to him. Catch! Fresh off the tree, as delicious as turkey, richer in monounsaturates. But he will need guts.

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