A Time of Revolution

By
Mark O'Reilly, FIA

This is an exciting time for the life sciences – we may well be on the cusp of a revolution in our understanding and treatment of chronic diseases. But like all scientific revolutions, it shares the protracted fighting we associate more with political revolutions. After helping discover the nature of quantum mechanics, Einstein spent much of his life opposing his contemporaries' formulation, despite its brilliant empirical success. The Theory of Evolution has been attacked ever since Darwin reluctantly published it. As for the Copernican revolution, Galileo was still recanting to a hostile Church almost a hundred years after the Polish astronomer's death.

To many of us, the equivalent of *De revolutionibus orbium* or *On the Origin of Species* is T. Colin Campbell's *The China Study*, but it would have been very naïve to imagine that convincing the world to see it this way was going to be easy and quick. To summarize two large groups who do not accept the author's conclusions (which I will refer to in the article as the whole food plant-based (WFPB) hypothesis):

- The medical profession's official voices have moved in the general direction of emphasizing whole plants in healthy nutrition, but balk at dropping below at least a modest amount of animal produce.
- The animal-produce industries and low-carbohydrate-diet advocates claim that the study, and/or its support of the hypothesis, is fatally flawed.

The purpose of this article is twofold. First, it is to view this scientific revolution as objectively as possible, and make some suggestions for its further progress. Second, it is to explain why someone such as myself feels no hesitation in following what has become known as WFPB nutrition, deciding that its opponents have almost certainly lost their case. To many low-carb bloggers, that will immediately brand me as "biased." But hopefully all earnest scientists will recognize that, after reading a great deal about this subject, it would be strange not to make a decision about the best course for you, and your family's, health. I try to isolate each step of reasoning and sincerely wish to know if I am somewhere fooling myself. I invite anyone to find fault in my reasoning, but the following are insufficient criticism:

- You're *cherry-picking* the data!
- That was on *mice* and we're talking humans!
- Correlation does not mean *causation*!

I am not saying that these criticisms are *per se* false. But when they are used without precision in science, nothing is ever achieved. I will refer to them as the ALSKIADT (A Little Scientific Knowledge Is A Dangerous Thing) arguments. Here are the valid arguments:

- You cited X-Y, but cases P-Q are in my view more compelling in the other direction, because…
- Humans are most unlikely to respond in the same way as mice because…
- A different hypothesis equally supported by that correlation is…

Much of the anti-WFPB debate found online is of the ALSKIADT type. I give an example here at some length, because it helps explain why diligent reading of WFPB detractors has steadily strengthened my confidence that they have no substantial case.

I really liked Dr. Michael Greger's *How Not to Die*, but not for a moment did I believe that every fact presented in this 562-page book was unassailable. As with all scientific revolutions, it is achieved by weight of evidence, and we should expect revolutionaries to cite everything they believe contributes materially to that weight – even when clearly imperfect. It is certainly not their duty to compile every valid counter-argument. In the book, Greger cites a study in Japan where meat consumption was strongly correlated to incidence of Alzheimer's. A book review in *Healthline* by Denise Minger accuses Greger twice of being biased (though it's hard to know what she means by this term) and also of cherry-picking his evidence, which she calls "one of the… most gainfully employed fallacies."

She raises the concept of changing diagnostic standards "in Asia" as a confounding variable (though she doesn't employ this term) by citing another study in Greater China in which similar correlation "disappeared after stratifying for newer and older diagnostic criteria." But Minger left out the second study's additional conclusion, "It may be too early to detect [correlation] because current cohorts of older people did not experience these dietary changes in their early to mid-life." (In fact, being quite integrated into Chinese society myself, I can say with confidence that "may" is a serious understatement, perhaps meant to rescue the relevance of the study.) Reading the abstract, it does not seem possible that this omission was accidental, because Minger had quoted verbatim just above the disclaimer.

I believe this one criticism of Greger's argument has the remarkable distinction of four blunders. First, it is not valid to diminish the value of one study with assumed adjustment for a confounding variable described in another study – implying that the first study did not properly take account of any such relevant phenomena. (In ALSKIADT terms, this is the cherry-picking and causation cards combined.) Second, you cannot conflate a developed medical economy with a developing one (where diagnostic changes are going to be more rapid) and pretend that calling them both "Asia" confers homogeneity. (A version of the mice card as in, being Asian is different.) Third, if you are going to quote verbatim from an extract, you cannot leave out words which almost invalidate the study's relevance. Finally and most damningly, her conclusion that "the link between animal foods and dementia, at least in Asia, appeared to be a technical artifact rather than a reality," is a completely false inference, even based upon her own evidence cited.

This is a classic "red herring" criticism, designed to give the impression that the criticized author is being less than candid – whereas in fact it is the reviewer who is lacking candor. I give Greger an immediate pass for not citing this other study – there is no space in his book for fully dissecting hundreds of thousands of diet-related medical papers, all of varying quality. But by this obvious attempt to smear Greger's narrative with a bogus counter-example, I believe that Minger disqualifies her role as a trusted critic of the revolution. (By the way, there is more of the same in the review, but one case this egregious is enough.)

We are obliged to apply such strict rules because there is simply too much conflicting argument and we cannot waste time on commentators who have shown themselves to mislead us. (The "fool me twice" principle.) It is not necessary to prove Minger had bad intent: it is enough that her eagerness to try and find fault with Greger blinded her claimed pursuit of truth. The same rule would apply to Greger, Campbell and all proponents of the WFPB hypothesis, if caught doing the same. They may be forgiven for the occasional error or lack of judgment, but there should be no forgiveness for attacking others' work by using quotes from studies which omit crucial mitigating language, and then inventing non-sequitur conclusions.

This example is also important because Denise Minger is most famous for her very lengthy attacks on The China Study and even (later, highly emotional) *ad hominem* attacks on

Campbell himself. Not surprisingly, these attacks include similar problems to the one above. There is no need to document them here, as the more rational ones are well covered by Campbell's response on his website. That response has done nothing to dampen the widespread belief in the low-carb community and elsewhere that The China Study has been completely debunked by Minger. She has been cited by famous medical professionals who appear oblivious to Campbell's thorough refutation. I've reached the conclusion that MDs are as likely to be guilty of ALSKIADT arguments as any non-scientist, which makes sense because scientific method is not rigorously tested for medical qualification. (Further illustrated below for Dr. Tim Noakes.)

This curious state of affairs leaves an impact upon the scientific mind, and not one in favor of low carb. If such bad arguments are embraced, can their motivation really be scientific truth? I have tried what I think is my best to find similar arguments by the WFPB thought-leaders but, so far, so clean. If others have examples, I want to review them. Like probably everyone involved with Actuaries for Sustainable Health Care, I seek only evidence that leads me to the most healthful conclusion. My financial interest is, and I am confident will remain, zero.

Minger's efforts have nevertheless been highly beneficial to the debate, even for me. She has no scientific qualifications or clinical experience (she says they are unnecessary these days, even harmful to thinking for yourself), but she is clearly intelligent and has obviously digested thoroughly the best of the low-carb-supporting studies. When she publishes a 5,000 word review of *How Not to Die* which is phrased to seriously undermine the book and yet fails to find one argument which shakes my confidence in Greger, I am sincerely grateful to her. The ALSKIADT used by more famous low-carb advocates is usually less impressive. Take these two quotes from an interview with Tim Noakes, published in the Institute and Faculty of Actuaries (IFoA) April edition of *The Actuary* magazine, neither of which were challenged by the interviewer:

> *"For actuaries who include cholesterol as a key measure of morbidity, there is no evidence that it makes any difference."*
>
> *"It is easy to do an experiment to prove a hypothesis."*

Since everyone reading this article knows neither statement to be true (i.e. whether or not cholesterol is *truly* a key risk-marker, there is of course colossal and persuasive *evidence* in favour of it being a risk-marker; since the time of David Hume, 1711-1776, we have known than a scientific hypothesis cannot be proven, either with ease or difficulty), their ongoing use suggests that the low-carb audience is not listening to hear real facts. The appeal is perhaps to the weight-reduction and weight-lifting communities rather than the scientific community. The statements do serve a purpose for those who have *already* decided to pursue a low-carb diet because of its immediate and perhaps irresistible benefits, but are also hoping to hear something reassuring about the future to increase their comfort with the decision already made. In blog commentary, the single remark, "the China Study has been thoroughly debunked," serves a similar purpose.

I was very disappointed that the IFoA's scientific standards allowed the Noakes interview to be published in the form that it was, and also somewhat surprised that the doctor was invited to speak to the International Actuarial Association (IAA) 2019 Colloquium. For all I know, Tim Noakes is a brilliant sports-nutrition expert. But there appears nothing in his own biography to suggest he has any authority to make statements about the link between cholesterol and chronic morbidity. His doctorate is in Exercise Science. There is nothing I can find on the Noakes Foundation website which references peer-reviewed papers he has published in any area of epidemiology, let alone chronic disease and the use of cholesterol as a risk-marker. In fact, the Foundation modestly asks, "How do we determine the optimum

diet?" and then solicits funds to research an answer. It also states how its outreach branch shows the effects of a low-carb-high-fat diet on "high cholesterol, blood pressure, obesity, diabetes and insulin resistance."

Wait a minute… *high cholesterol*? Wasn't there *"no evidence it makes any difference"* to morbidity? By the way, the IFoA article also indirectly quoted him as saying that *low* cholesterol was a *bad* thing. Lost yet? The article also stated that, as a result of a recent "trial" involving Noakes, "no one can be charged with recommending a low-carb diet on the grounds that it is unconventional and unsafe. This legal precedent paves the way for a new model in clinical practice that could improve quality of life and longevity." In fact the "trial" was a misconduct hearing before the Health Professionals Council of South Africa concerning a single Tweet by Noakes, *"Baby doesn't eat the dairy and cauliflower. Just very healthy high-fat breast milk. Key is to ween (sic) baby onto LCHF."* In respect of this single Tweet, Noakes was found not-guilty of unprofessional conduct by the HPCSA. The judgment explained, "To understand the response properly and in the context of the LCHF diet there would have had to have been meaningful dialogue between [the recipient] and [Noakes]. It is common cause there simply was none." In other words, the disciplinary committee viewed the case as having nothing to do with recommending LCHF diets in a medical setting – an unremarkable judgment about what seems to me a well-meaning Tweet about the importance of breastfeeding. There is, of course, no "legal precedent" paving the way to anywhere. Apparently, *The Actuary* doesn't bother to check background facts in its featured articles!

To summarize so far, when critics of the WFPB hypothesis try to be scientifically precise, careful analysis consistently appears to disarm them. Their favoured arguments (i.e. I find them repeatedly) appear to be of the form:
(a) famous person suggested this hypothesis,
(b) here's the rationale for the hypothesis,
(c) the Establishment has buried the hypothesis,
(d) if the hypothesis is true, here's how it changes everything,
(e) these brilliant studies have found this evidence supporting the hypothesis,
(f) so now this should be your diet…
This stuff is quite interesting, but very largely speculative. Meanwhile, the WFPB hypothesis points to serious problems with the diet. Hence the desire to criticize WFPB nutrition or, if that fails, simply label observational epidemiology an unreliable science. I have yet to find such a critic who shows understanding of how multiple confounding variables in cohort studies can be controlled for using today's software and computing power. (Ironically, these critics take and prescribe medicines and supplements, the efficacy and safety of which depends critically upon the same statistical techniques.)

But the short-term body-sculpting of ketosis will attract enthusiasts anyway. The animal-produce and supplements industries have every reason to fund the studies mentioned above in (e) if the medical profession tries to move further away from animal produce. As one USDA expert, Dr. Marion Nestle, put it, "I was told we could never say, eat less meat." In the IFoA interview, Noakes cites funding accepted by Harvard Medical School and the AMA, "to incriminate [animal] fat." Unfortunately, for my own WFPB article in the same edition of The Actuary, generic reference to the impact of money on the debate was edited out as "too controversial."

As with Denise Minger, I don't question Tim Noakes' sincerity, and they both enrich the nutrition debate. They have undeniable charm, appeal and intellect. Their campaigning against sugar and refined carbs is admirable. But from their own writings, it's clear that they personally experienced medical problems with some version of a "high-carb" or vegan diet, then relief from low carbs. Noakes terms it a "Damascus experience" (i.e. an epiphany) and

it does indeed seem to bear a resemblance to religious conversion. As we know, one's own case study is not much support for a hypothesis, but it can fuel a mission to find corroborating evidence and to see established science as in serious error, if not subject to conspiracy. I am less forgiving of *The Actuary's* editorial management which, in its unquestioning reverence for Noakes' off-the-cuff musings has, as I see it, gone against the British actuarial institution's sterling scientific tradition. Sports-medicine doctors are free to express their views on the origins of chronic disease, but it is a different matter featuring them as experts on the topic without relevant academic reputation. The IFoA's Royal Charter obliges it to "put the public interest first." I leave it to readers to judge how far they fell short of this obligation.

To WFPB followers, the reputation of established nutritional science is also somewhat tarnished by financial interests, but it does appear that more principled (and usually younger and poorer) researchers are slowly putting animal produce in the "handle with care" category. While Noakes mentions in his interview 150 studies supporting the benefits of low-carb, this should be put in the context of the 20,000 papers on nutritional science published in US journals *each year.* These researchers' efforts have given us much confidence in our scientific analysis of the evidence and thus in our own and family's health, and they deserve our thanks. Unfortunately, we can have much less confidence in revolutionary progress, i.e. the dramatic rollback of chronic disease. "Handle with care" will not conquer the Mad Men's milk moustaches. And it is hard to see the public fully rejecting low-carb's magic, short-term results and its conspiracy theories.

In my view, our particular revolutionary war seems to have already bogged down into the trenches of the Western Front, with strips of No Man's Land being gained and lost equally on each side. What can break this apparent stalemate? I think we can all accept that the debate needs to be reframed, but how? Unsurprisingly, you are going to get my suggestion here. Since we're never going to shift the low-carb community, we need to develop a tool which provides more backbone to the medical community at large. That tool needs to replace the unfortunate confusion caused by the "food pyramid" and perpetuated by "My Plate." While well-meaning, these tools do nothing to help people choose between WFPB and low-carb. Instead, they appear to add a third, competing model, which may inadvertently do more to promote obesity than reduce it.

Our very first task is to eliminate entirely the word "carbohydrate" from any popular discussion on the WFPB side, to circumvent the endless conflation of grains with junk food. Lumping together white rice, fluffy bread and tinned spaghetti, let alone cake, with oatmeal, purple rice and German-style muesli is a debate-destroyer and must be *verboten*. Our basic food groups, which low-carbers (yes, I accept they won't change their terms) cannot object to, would then be:

- "Vegetables & Fruit," including whole seeds, nuts and legumes;
- "Refined Calories," including all refined grains and highly processed plant food (e.g. most sugars) that are not included in Fatty Nutrition below;
- "Unrefined Crops," i.e. whole grains and tubers. (Note: crops, not carbs);
- "Fatty Nutrition," i.e. animal produce & vegetable oils;

We can even abbreviate these to a more scientific notation of VF, RC, UC and FN, and not lose many people. Our immediate gain from this model is that every responsible nutritionist will support the elimination of RC where at all possible. Now we're down to just three groups. Our next gain is that most nutritionists will emphasize the importance of VF. Some want to exclude legumes, but that group is relatively marginal and, of course, quirky and lacking decent science – this approach will help to expose their quirkiness, at least.

So the revolutionary war can be described in very simple terms. WFPB nutrition prescribes that we add UC to VF, but not FN. Low-carb nutrition typically prescribes that we add FN to VF, but not UC. And the medical profession's formal messages typically add UC to VF with limited amounts of FN. (Note that we are also eliminating the unhelpful distinction between meat and dairy, and encouraging vegans to make a health choice – no RC or FN plants – quite apart from the ecological arguments. We are sacrificing the word "whole" in front of VF but I am certain it is worth it and avoids "do I eat apple cores and orange rind?")

Of course, the low-carb community may see a trap in this model and continue the conflation of all carbs, regardless. We can simply refuse discussion on these terms, pointing out that carbs belong in VF as well as RC and UC. With patience, we will smoke out weirder positions held by low-carb advocates. On Twitter, Noakes commented on the food pyramid with the entire grain group circled, "One day this diagram will appear in museums recording histories of human genocides." Quite upsetting to a Rwandan victim seeing the butcherer of her family equated to mistaken nutritionists? Now at least he would need to provide evidence that whole grains are lethal.

It is central to the WFPB case that "whole carbs" (particularly unrefined crops) are a *fundamentally different food group* from refined carbs, when viewed from the perspective of digestion. As Greger describes in sometimes wincing detail, UC really comes into its own *after* our lunch has left our stomachs. How much refined sugar is harmful, and what about salt? To be honest, we don't yet have a thorough scientific answer so views among even leading WFPB advocates differ. For now it's more a case of "keep managing your taste preferences." My own version is, "enough sugar and salt to enjoy your meal, but try and surprise yourself how little is enough, and avoid the white stuff if possible."

The medical profession could then present the three major, de-facto, generic "Nutrition Plans" as follows (borrowing Greger's green/red signals for go-for-it!/stop-it! More sophisticated charts could include amber as well but, for the moment, I will assume related diets include some items which are marked red, e.g. vegetarian might go somewhere next to the UCrop Option with FN as amber for eggs and dairy):

Nutrition Plans	Food Groups				Long-Term Health Score
	VF	RC	UC	FN	
UCrop Option:	✓	✗	✓	✗	?
Combo Option:	✓	✗	✓	✓	?
FatN Option:	✓	✗	✗	✓	?

The "Combo" covers perhaps dozens of variations from the Mediterranean to the Nordic to the Asian – a valuable economy, since they appear to differ in just taste rather than health impact. By contrast, the UCrop Option becomes clearly exclusive by cutting out oils. And the many low-carb diets must now describe what they are – heavily animal-fat-and-protein diets – rather than what they are not.

It would be fair to say that each of these options, if followed responsibly, can achieve short-term health through weight regulation. The Combo Option requires portion control, and

perhaps the same is required of the FatN Option. I believe that most if not all people find that the UCrop Option does not require any portion control or counting calories. One significant score in its favor.

But WFPB nutrition is really all about long-term health, i.e. avoiding chronic disease. There are three possible ways of comparing long-term effects:

- Population studies;
- Cohort studies;
- Clinical trials.

Immediately, we are faced with a problem for populations and even cohorts. We do not have large groups, let alone populations, in the developed world which have eliminated either RC+FN, or RC+UC, from their nutrition for many years. From the WFPB point of view, this saves us from dealing with countless red-herring arguments. A favorite low-carb argument is that the medical profession's low-fat drive has been accompanied by increasing obesity, therefore we should be eating more fat. On this occasion, low-carb advocates claim correlation as evidence of causation. But the readers here will know that, at best, modest reductions in FN were replaced by whopping increases in RC. And there is good evidence that absolute levels of FN increased, reducing as a percentage of total calories simply because of RC explosion. Hence the WFPB hypothesis is better supported by this correlation than the low-carb hypothesis, though in either case it is weak support due to massive variable confounding.

Western society has not even tested the Combo Option yet on a large scale, let alone the UCrop Option. *How Not to Die* cites the ever-increasing pile of evidential "nuggets" from cohorts and clinical trials suggesting that the UCrop Option wins big, but the classic ALSKIADT arguments (cherries/mice/causation) will still be used as blunt and partisan refutation, rather than tools searching for deeper answers.

What are we to do? Well, it's already been done, and it's called *The China Study*. It's the only population environment where, in effect, the UCrop and Combo Options have been tested side-by-side for whole lifetimes up until the 1990s. The study period was exceptionally fortuitous because it was relatively unaffected by major confounders such as healthcare improvements or changes in physical activity, smoking or pollutants. Since that time, lifestyle, technological and societal factors have so profoundly affected China's morbidity that isolating dietary impact can no longer be done using the simplicity of cohorts and death-counts. China from 1973 to the early 1990s will remain unique in human history: an agrarian, non-mobile, population-dense society with an intense degree of social control and efficient bureaucracy. It was the one and only time that the effects of animal produce on lifetime health could be analyzed under near-laboratory-type conditions. What in the West would have been a vague population study was in effect, due to immobility and underdevelopment, a virtual cohort study.

To professional statisticians or anyone who knows Campbell's professional reputation, the answer is clear. To Minger, who demonstrates her lack of understanding of multiple regression throughout her attacks, and anyone who cites her favorably, there will never be an answer because advanced epidemiology is beyond their competence and they refuse to recognize that fact.

What has never been tested under any conditions is the long-term impact of the FatN Option. Extrapolating the China Study's conclusions cannot fill us with confidence but, who knows, could there be a "hair of the dog" effect? I read a low-carb article recently which reassured readers of the long-term safety of its diet and referenced four papers. Three were clinical trials conducted over twelve months, three months and six weeks respectively. One was a

meta-analysis over periods up to 24 years but, unsurprisingly, it was the old low-fat/high-fat questionnaire type where low fat is anything up to 30% of total calories. There was no fat/disease correlation, as indeed the WFPB hypothesis predicts.

If the low-carb hypothesis survives another thirty years, we will have better cohort data. First, we will need to be confident that a cohort truly followed a high animal-fat diet for that length of time, then we will need their medical histories. Ideally, vetted adherents to the diet over decades can provide CT scans of clean arteries. Since Noakes says he switched to low-carb only in his sixties, his health condition doesn't tell us much. Most other low-carb advocates are too young for high rates of chronic disease even relative to junk-food consumers. Perhaps our single data point is Dr. Robert Atkins, still the most famous name in the low-carb business, who had a heart attack at 59, died at 72 and is reported to have suffered from high blood pressure and congestive heart failure. His wife, who inherited the brand, declined an autopsy, so we have no measures of arteriosclerosis or other progressing disease.

In the meantime, we can only piece together clinical trials and meta-analyses which shed pencils of light on the sweeping WFPB hypothesis and its low-carb corollaries. By their practical nature and given no big-money motivation, very few such trials can be designed in double-blind, randomized format, but then that was hardly the way that the Copernican Revolution took hold. To repeat, the process must be accumulating weight of evidence, all of it of very varying quality. Progress to date? You may want to listen to an interview with Dr. Kim Williams, past President of the American College of Cardiology, who cites a meta-analysis implying that ketogenic diets are associated with a 31% increase in mortality. I also found another study which agrees broadly, but also particularly favors high *vegetable-fat*. Since the study is based on "semi-quantitative" self-reporting, perhaps quantity of olive oil was linked to salad consumption? You can see how difficult it is to fully control for such quirks, but animal produce shows no such ambivalence.

I suggest that, with the aid of the clearer version of the hypothesis shown in my model above, the impact of this accumulating evidence becomes clearer. Despite the stridently critical tone of Minger's review of *How Not to Die,* she largely agrees with Greger on cooked-meat carcinogens, which should be enough for most rational people to at least hope their willpower can manage the UCrop Option.

Should the medical profession worry about being seen as punting by presenting three options? On the contrary: we should invite it to describe the pros and cons of each option, based upon the full body of literature it regards as pertinent. As mentioned, these are the de-facto choices that Westerners are faced with today and official silence on that reality simply diminishes confidence in medical authority. I am content that the medical profession states its preference for the Combo Option, provided it explains why. The mainstream debate will then be clearly framed in terms of the nutritional value of Fatty Nutrition (and not carbs, glutens, einkorn, GMO, Ansel Keys' legacy, the sugar industry and all the other red herrings.)

Should we worry about WFPB nutrition being called the Unrefined-Crop Nutrition Plan? It avoids confusion with vegans who shop at Whole Foods, which is one of Campbell's primary concerns. Greger has an excellent video explaining why vegans have not historically shown significant longevity relative to omnivores. Poor plant choices can be hazardous to your health, and none so much as refinement.

I recall that (before the war) we concluded there were WMDs in Iraq based upon some twenty-plus items of evidence. To a non-statistician, this must have seemed like plenty –after all, provided each was independent and had at least a 2.5% probability of proving its case, didn't that amount to probable WMDs? The flaw here is that evidence is very rarely independent

and a 2.5% probability of actual proof is really quite high. The way to sanity-check our logic is to objectively perform the counter-calculation: add up all the evidence that WMDs were in fact destroyed. If this also gives us more than 50%, then something must be wrong somewhere.

We need to approach nutrition and chronic disease in a similar way, bearing in mind that chronic disease may well mean losing much of what we hold precious – not something we want to play a 50/50 game with. I invite the medical profession to stack all the available evidence under each option and then weight that evidence, recognizing that you cannot favor the Combo without asserting that the UCrop Option *must* lack nutritional value that is unique to Fatty Nutrition. This value must outweigh the carcinogens, pathogens and toxins we already know are most heavily concentrated in FN. Finally, the evidence-weighting will determine the probability each Option is the healthiest one for longevity. By definition, those probabilities must add to 100%, which means that at least two of the Options must score less than 34%. If the Combo Option doesn't come out on top, the medical profession has some serious explaining to do.

Mark O'Reilly, FIA, is a Senior Advisor at Deloitte China. He obtained his Fellowship in London in 1978 and worked in the USA for 23 years before moving to Hong Kong in 2010. He switched to WFPB nutrition in September 2018 and enjoys his meals more than ever. He can be contacted at: marqoreilly@gmail.com.

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