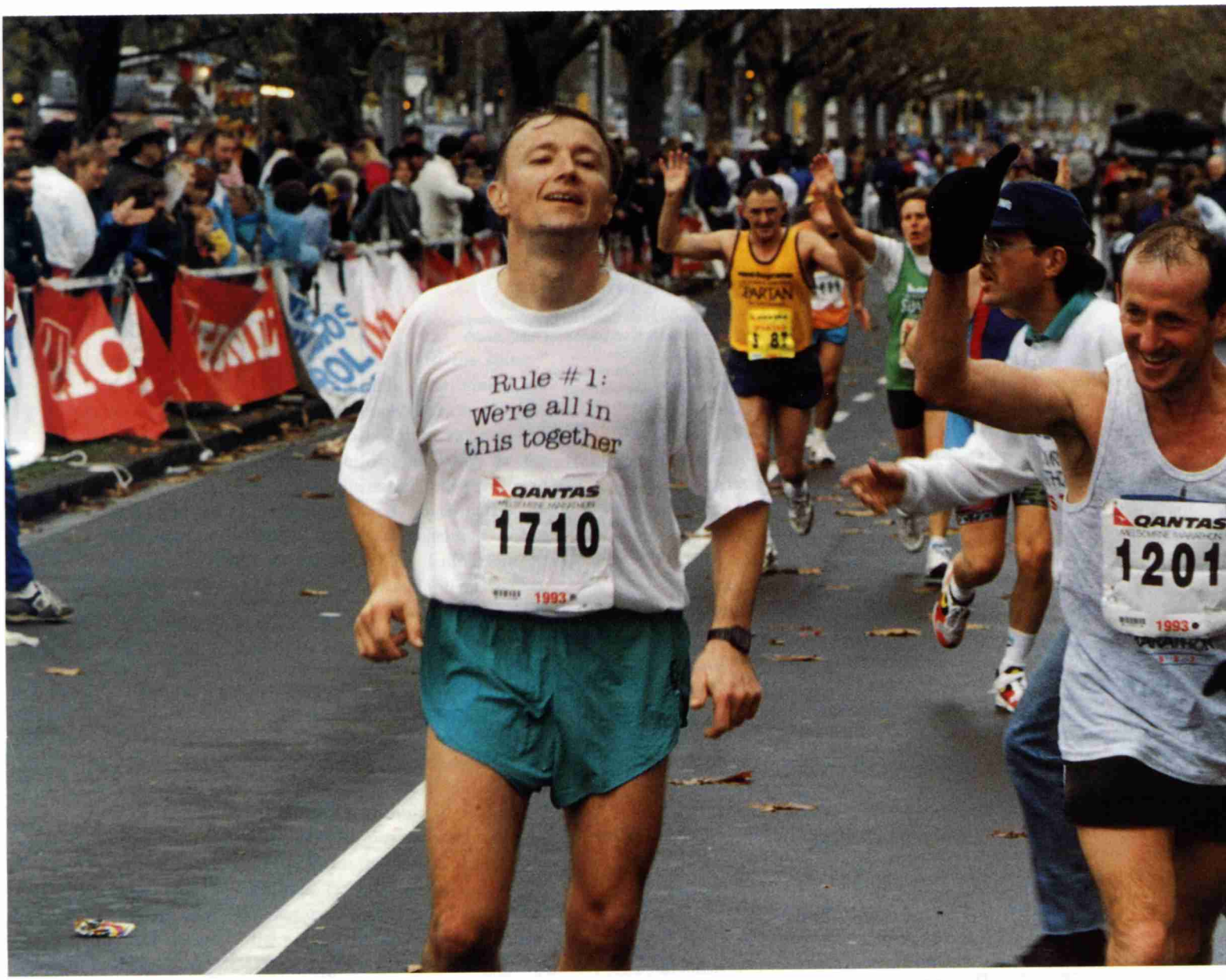


Jaroslav Boublik completing the Melbourne Marathon in 1993.

FOR OVER TEN YEARS I LIVED MY LIFE in the regimented world of modern scientific research. I travelled widely, specialised in neuroendocrinology - the study of the central nervous system hormones and their receptors - and achieved various honours in my profession, including a Fulbright Fellowship and a postdoctoral fellowship at the Salk Institute in San Diego. This was my life and there was never a moment that I doubted my passion or belief in science and what it could enable us to do.

But I had no idea at the time that my life was to be turned upside down. It began in late 1992, during my preparation for the Melbourne Marathon, which was to be run in June the following year. I was experiencing real difficulty. During training runs I was struggling at about the 20km point; despite drinking along the way and attempting to preload with water and sports drinks prior to the runs, I would suffer profound dehydration. The common term is "hit the wall" and hit it I did! No matter what I did I wasn't able to keep sufficient fluids in my body; I would lose all energy

Dr Jaroslav Boublik completed his initial training in classical medical research before turning his interest to complementary medicine 7 years ago. He is currently Scientific Director of Wild Medicine, a complementary medical research and development consultancy.

by JAROSLAV BOUBLIK

THE HYDRATION EQUATION

Balancing the flow of water through life

Problems with profound dehydration as a marathon athlete led neuroendrocrinologist Jaroslav Boublik to investigate a herbal formula developed by naturopath Leonie Hibbert. Success with this led to a research and development partnership that is now investigating a holistic scientific approach to cellular hydration at a fundamental level.

and have to stop the runs. To say this was frustrating is an understatement. I began to doubt my ability to achieve the goal I had set myself. My wife was seeing a natural health therapist, Leonie Hibbert. She suggested that I see Leonie because she had some interesting formulas which were a combination of herbs, and other things I didn't understand, that might be able to help me.

Sceptical as I was I went to see Leonie and the one hour session ended up being at least two hours of intense discussion. From that point on I started using the *Aqua Formulas*, or at least the original versions of the Formulas, and my life started to change. My training improved dramatically. I went into the marathon well-prepared, with a 44km run under my belt. Most of the long distance practice runs in the lead up to the marathon were done throughout the latter part of summer; during the hottest part of summer I was completing 30km runs. I can remember a number of them where, even though the runs were done in the early part of the day, the temperature was getting up to 35°C near the end of the run - but at no time did I have problems with dehydration. After my previous experiences, I can only attribute this remarkable improvement to the *Aqua Formulas*. I had not changed anything else in my diet, training or rest patterns.

I completed the Melbourne Marathon in a reasonable time of 4hrs 20 mins. I was using the *Aqua Formulas* during the race every half-hour or so. The only problems I had were due to rain and wind in the third quarter, at which point my pace slowed appreciably. At no time was there any difficulty with temperature control or maintaining energy levels. At the three-quarter mark I was able to pick up my pace considerably, running the final kilometre in my quickest time for any kilometre of the race.

I believe the *Aqua Formulas* were the main reason I was able to finish the run with such high energy. I can only attribute this to them being able to very effectively keep my hydration levels high throughout the race. I had weighed myself before and after the marathon and found that I had only lost 600 grams of

body weight; this is remarkable, as a typical marathon runner may lose up to 5 kilos – most of it body water.[1]

To further convince me of the effectiveness of the *Aqua Formulas*, the day after the marathon I flew to a conference in Las Vegas; a 20 hour flight broken only by brief stops in Auckland and LA. No matter how well I pulled up after the marathon, I was concerned about the potential for lactic acid build up during the flight, and very painful stiffening of my muscles. I had noticed all through the training that I hadn't really had trouble with this, even on the days following my long distance runs which had meant 4-5 hours of constant exertion. However I fully expected to be in agonising pain with the stiffness and deep soreness one feels after intense exercise such as the marathon. To my great surprise and pleasure, I got off the plane in Las Vegas and went for a run the following day, just to turn my legs over, and found that I had *no pain at all*.

From my scientific background I found these outcomes fascinating: my ability to overcome "hitting the wall"; my increased time for the last kilometre of the race; my unbelievable recovery from the marathon itself; and then no pain after 20 hours of flight, when even the most rested person can feel stiff and sore after such a trip. My only logical conclusion is that this was an extraordinary example of how well the *Aqua Formulas* contribute to and maintain a high level of hydration, and how effectively they stimulate the clearance of metabolic waste products.

I was thus keen to see the *Aqua Formula* being made more available. After discussions with Leonie, *AquaConneXions* (now *Wild Medicine*) was born. I often feel like the shaver man who "liked the product so much he bought the company" except in this case there was no company until we created it. But I believed, without necessarily being able to scientifically "pigeonhole" them, that the *Aqua Formulas* have a very important role to play in our health, both individually and on a global scale. Hydration is *vital* for every biochemical process in the body from brain function and skin condition to digestion and elimination.

DRINKING WATER IS NOT ENOUGH

It became important to Leonie and myself to understand how and why they work; then to set about not only making them available to others, but also educating them about the importance of hydration. We wanted to shout to the world that *simply drinking water is not enough!* Proper hydration, on a cellular level, is imperative to our whole health and wellbeing.

Some 6 months after *Wild Medicine* was formed I left my position as a laboratory head at the Baker Medical Institute in Melbourne. I ended a ten year career in conventional science to pursue the issue of hydration via research, product development and getting the message to the world. The journey since then has been endlessly fascinating, very challenging and periodically frustrating - but we are committed, and with commitment comes satisfaction.

The science of hydration is in its infancy, as a search of the scientific literature will show. Very few biochemists have specifically asked questions about cellular hydration - despite the fact that water is the single most important nutrient for cells and biological systems in general. Perhaps this very ubiquity is what leads to the issue of cellular water being overlooked so comprehensively. Of course what is important about cellular water is not its mere presence or absence but the rates at which it moves within the system. For instance, water influx rates are the limiting variable in the uptake of nutrients into all cells.[2] These nutrients include oxygen and glucose – the essentials for cellular respiration. They also include virtually every other water-soluble nutrient and, because they travel in tandem with lipid (the fat particles found in blood serum), most lipid- or fat-soluble nutrients as well. Clearance rates of metabolic waste products are dependent on the rate of water outflow, so any improvement in the rate of water outflow will result in an improvement in the speed and extent to which metabolic wastes are cleared.

The thirst reflex helps control cellular hydration. We so often respond to this reflex inappropriately, either consuming fluids other that water, or we eat food. A common result is a dyhydrated individual who reports never feeling thirsty.

The movement of tides is an apt analogy. The tide of cellular water carries in nutrients and fuels; the ebbing tide washes out the waste products. Of course in the cell these two processes are occurring simultaneously and are mediated by a variety of mechanisms. One of our research projects is to determine which of these processes the *Aqua Formulas* affect. The water transport processes are both active[3] and passive.[4] There are specific water channel molecules that act like pores in cell membranes. Some of these are simply able to be opened and closed and allow water to move passively down osmotic gradients. Others are driven by molecular pumps and are used to move water and dissolved species such as electrolytes and other entities of small molecular weight against osmotic gradients. Still others are water specific and simply pump water into, and out of, cells to satisfy many, as yet unknown, requirements. It is via these pumps that water exhibits a set of characteristics that are more akin to a hormone than a simple molecule.

In one of the only reviews in the scientific literature of the effects of cellular hydration on cell function, Dieter Haussinger of the Heinrich Heine University in Dusseldorf has stated, "Most importantly, small fluctuations of cell hydration, i.e. of cell volume, act as a separate and potent signal for cellular metabolism and gene expression."[5] In the studies of Haussinger's group, in which cultured rat liver cells (hepatocytes) are used as the experimental model system, they have shown that under the influence of a range of factors, including

peptide hormones, simple molecules and ATP (Adenosine Triphosphate - the cells' "energy currency"), the cultured hepatocytes lose water and move into a catabolic state, that is, their tissue starts breaking down. When the same cells are exposed to amino acids, insulin and a range of drugs they gain water and move to an anabolic state, that is, they start building up their cell structures. It was previously thought that these various factors caused the catabolic or anabolic states directly but Haussinger et al. have shown that it is the change in hydration state, not the direct effect of the various factors, that controls the anabolic/ catabolic switch.[6] This has important implications for our understanding of the hydration state as it would appear that it is the hydration state itself that is critical - even though it may also be influenced by a wide variety of other factors, including environmental, emotional, and nutritional states.

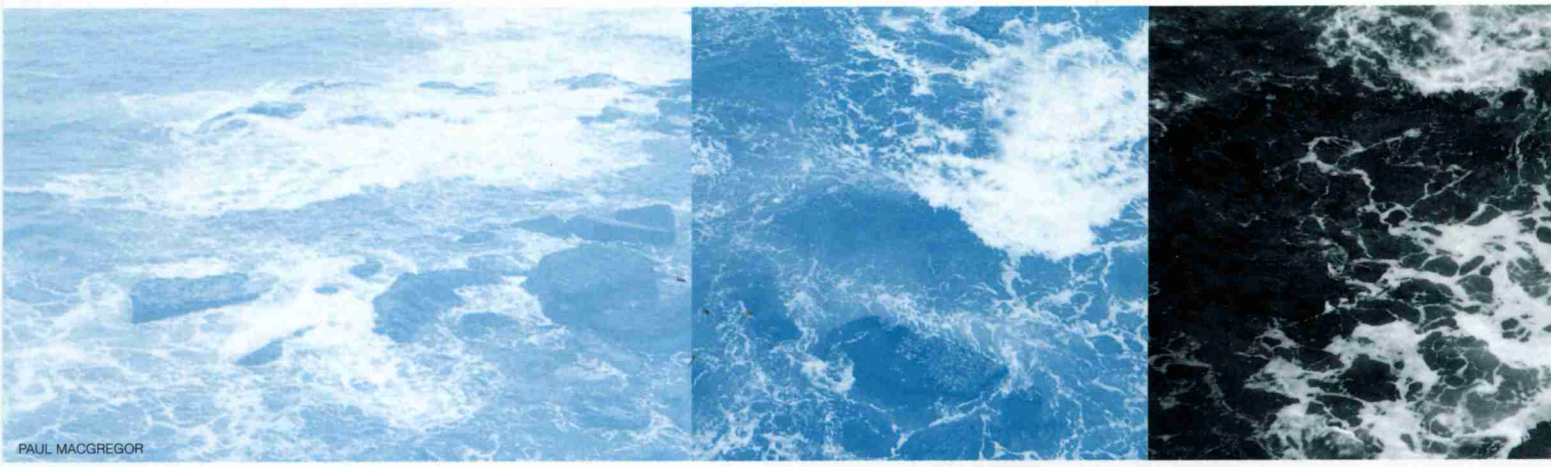
The *Aqua Formulas*, by acting directly to raise the hydration state of the cell, can quickly switch catabolic metabolism to anabolic and thus reverse cell degradative processes. When coupled with the direct effects of increasing uptake of nutrients and assisting with clearance of toxins there is significant potential for positive effects on cells and therefore tissues in both normal and pathological states.

In a holistic view of the body there is another component to the control of hydration state and that is the thirst reflex. This has been well studied and much is known about the neuroendocrinology and neuroanatomy of the reflex arc.[7] We know that drinking occurs when a decreased water fraction in the cerebrospinal fluid is sensed by one of the peri-ventricular organs – the organum vasculosum of the lateral terminalis or OVLT for short. The OVLT sends messages to behavioural centres to stimulate the individual (or animal) to seek water and drink. This assumes that there is access to water.

PROBLEMS OF NOT DRINKING WATER

Unfortunately in our modern world we so often respond to this reflex activation inappropriately. We either consume fluids other than water - many of which (such as contain caffeine, alcohol or excess sugar) are actually dehydrating - or we eat food. This leads to several problems. First, consumed food must be digested, requiring the secretion of gastric and other digestive fluids. These digestive fluids contain a large fraction of water, which is temporarily unavailable to the rest of the body, and thus this secretion serves to further dehydrate the organism. Second, the repetitive use of an inappropriate response (either food, or fluids other than water) serves to downgrade the reflex. We have a powerful ability to suppress "noise" in any response system; it only requires a few instances of inappropriate response for a reflex to be treated as "noise" and effectively ignored. This results in the common state where a dehydrated individual reports that they are never thirsty. Less commonly the ignored reflex arc will open without feedback inhibition. When this occurs, the individual has an insatiable thirst, and is always drinking. All too often, however, the fluids consumed are those that exacerbate the problem.

To address the issue of resetting the thirst reflex the *Aqua Formulas* contain components including Bach Flower Essences and homoeopathics (as well as those of



PAUL MACGREGOR

the core technology) and these appear to reset the thirst reflex. Thus two often-reported consequences of the use of the Formulas are, on the one hand, the activation of thirst in an individual who has not experienced thirst, often for years, and on the other, the control of unsatisfied thirst.

The long term biological effects of less than optimal hydration are only just starting to be investigated. There are scant publications on this topic but one paper, published in 1981, suggests that in the last decades of life losses in body water (up to 5 litres over 10 years in men of 80 years of age) showed the best correlation with decreased function and increased morbidity.[8] This alone deserves research attention.

In the 5 years that the *Aqua Formulas* have been available we have had many individuals and practitioners who have made use of the *Formulas* with success. One of those, John Coleman, wrote an article, in the previous issue of *Diversity*, on his studies of Parkinson's Disease.[9] John's protocol has used the *Aqua Formulas*, together with Bowen Technique, to effect healing in Parkinson's sufferers, including himself. We worked closely with John in the refinement of the use of the *Formulas* in his protocol and would be happy to do likewise with other practitioners with specific research interests. We are also planning a series of research studies to further elucidate the mechanism of action of the *Formulas*, in part to validate their use but, more importantly, to use them as a tool to improve our understanding of this little-studied area of biology – cellular hydration.

VERONICA CASETTA

The movement of the tides is an apt analogy. The tide of cellular water carries in nutrients and fuels; the ebbing tide washes out the waste products. It is not the mere presence of water in the body which is important, but the rates at which it moves in and out of cells.

The task we have set ourselves is enormous, and has only just begun, but I feel passionate about how important hydration is. I'm excited about what this technology has the potential to do in any situation where hydration is compromised. Most, if not all, people who read this are suffering some degree of dehydration and their health is being affected. Virtually every athlete we have spoken to and tested exhibits signs of dehydration; the improvements in performance and recovery following even short periods on the *Formulas* are often surprisingly large. The Aqua Hydration technology can help solve these problems and I'm proud to be part of the solution (no pun intended).

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