

Feeding Dogs

**Dry or Raw?
The Science Behind the Debate**

Dr. Conor Brady

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Dedicated to the four great women in my life – my mother Joan for fueling first my passion in the subject and then the work ethic that sustains me to this day; my most-adored dog Meg who showed me everything I was doing was wrong; my ever-patient wife Elaine, my enabler, I could not have done it without your love and support; and finally to my daughter Holly – never stop asking questions.

About the Author

After college, I spent 5 years in guide dogs as a pup supervisor and guide dog trainer. Fourteen years ago while I was working in Guide Dogs Australia, the true powers of raw feeding came to light. Since then, bar a couple of years as a producer myself, I have been a full-time writer, speaker and dedicated advocate for natural canine food and health (available at my website www.dogsfirst.ie). As a dog lover and keen researcher, the subject fascinates and consumes me, providing me with near bottomless rabbit holes that demand exploration. I live with my wife and daughter in Wicklow, Ireland, and am proud father to a slightly odd blue roan cocker called Dudley. What he lacks in brains and finesse he makes up with single-minded determination, although that statement is equally true for the both of us.

Conor Brady, PhD

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Introduction

Everything was fine until I moved to Perth, Western Australia. Before that I was a dog trainer in the disability sector, happily pursuing a lifelong ambition of working full time with dogs, something I truly loved. Then, while working in Australia in 2009, two things came to my attention which forced me back to the office. Back to the laptop, back to research and long, dog-less days spent trawling through veterinary libraries and journals. It felt like no sooner had I started my career, then it was all over.

Before I get to these two events, a little background is needed. For as long as I can remember, I have been obsessed with dogs, much like you, I'm sure. There are seven of us in our family but each of our family dogs, four in total since the very day I was born, has been profoundly attached to me. Not inexplicable. In their eyes I provided everything they needed. It was my job to feed and walk them.

More than that, though, I lavished attention on them. They went everywhere with me, whether I wanted their company or not. There are countless stories of my first dog, Prince, escaping the garden to sit outside my school all day – ears erect, head cocked, patiently waiting for me. If I'd go in one supermarket door but out another, he'd wait outside the entrance all day and sometimes into the night before we found him.

There was the time my Dad's friend hid behind a wall to scare me. As I passed the wall, he jumped out and gave me a terrible shock. I cried out, which pleased him. But what he hadn't anticipated was my little ginger bodyguard, Prince. He came hurtling up and actually did the stereotypical rip-the-seat-of-the-pants bite on him. The sight of him running around the yard shouting and flapping his arms with my dog hanging off his butt made my scare worthwhile. I guess the strongest bonds are forged on these fearless acts of devotion. God, I loved that dog.

Suffice it to say, the time my parents spent driving an hour to the animal shelter and waiting in the car for their teenage son to emerge every Saturday morning for 3 years was apparently worth it. I went on to feed my interest in animals, obtaining a degree in zoology and ultimately leaving college with a PhD

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in Animal Behaviour, investigating the effect of nutrition on both the behaviour and digestive morphology of mammals.

In 2006, upon leaving college, I was accepted into Irish Guide Dogs and schooled as a dog trainer. For me, this was the dream achieved. My role as guide dog trainer and ultimately, pup supervisor, guaranteed me total puppy immersion from 9 to 5 – a job second to none for canine enthusiasts.

Pup supervisors have to visit each of their 40 pups twice a month during their first year, train the owners as well as the pups and keep tabs on their general development. From a behavioural point of view, it was a fascinating opportunity to watch the pups mature. I took detailed notes on all aspects of their life, both mental and physical. I documented the changes that could occur from the smallest tweaks to their environment. Few people out there today have such access to animals *in vivo*, that is to say, non-caged, non-laboratory animals that are out and about in their natural surroundings but at the same time under relatively strict control, certainly dietary control. There was a steep learning curve.

I left Irish Guide Dogs in 2009 and set off for Perth, Western Australia, to help establish a pup training program, walking dogs in the sunshine being considerably more attractive than walking them in the lashing rain at home. It was while I was in Perth that the two life-altering realisations came to me, one in the dog world and one in my own, which ultimately forced me back underground into the lonely, gloomy realms of laborious research.

The first realisation occurred while I was doing some work on the side, as most trainers do. I began to notice that an exceedingly high number of Perth dogs received long-term doses of very serious medications: steroids, non-steroidal anti-inflammatory drugs (NSAIDs), antibiotics and antihistamines. For the large part, these dogs were suffering recurring skin and gut conditions. These medications were potent tablets, powerful injections, creams and eardrops. In fact, of the 18 dogs that I began to see regularly, a whopping seven received long-term steroids or NSAIDs. Seven of 18 dogs! Can you imagine a random sample of 18 kids in a school?

And they weren't attending one rogue vet in Perth. This was a casually accepted epidemic of sick dogs or more commonly (but incorrectly) termed 'allergy dogs' — hot spots; flaring skin conditions; itchy, sore feet; weeping eyes; mucky ears; almost always accompanied with some form of recurring diarrhoea, poor condition or weight loss. All the pills and potions used at this point were, in essence, an attempt to relieve the dog's symptoms. When the symptoms

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disappeared, the drugs were hailed a success. When their effects wore off, more drugs were administered, and so on.

I was uncomfortable with this, having seen the effects of these immune-suppressing drugs during my time with Guide Dogs. Steroids and NSAIDs are an incredible development in medicine. Steroids can shut down various parts of the immune system, immediately ridding you of the symptoms resulting from an immune system that is working overtime, such as rashes, itching and swelling. NSAIDs, don't so much work on the immune system itself but inhibit the production of prostaglandins, which represent the chemicals that promote inflammation. For many sick people, including transplant patients and anyone suffering with an auto-immune disease (where the immune system goes awry and begins to attack the body), these drugs are absolute lifesavers.

However, as the saying goes with some of the more impressive drugs, 'the bigger the front, the bigger the back', meaning the more amazing the results, the greater the potential for side effects. In the case of steroids or NSAIDs, excluding the fact that they prevent your immune system from doing its job correctly, their dark side involves a heavy impact on various organs, namely, the liver and kidneys. They are known to negatively affect joint integrity by weakening connectivity over time. They disrupt how your body deals with fat so your weight can balloon, compounding the issue. Then there is behaviour. It's unfair to ask anything complicated of a working dog on steroids. They appear a little tetchy, lack focus – although perhaps what we are seeing is the side effects of the underlying illness. Whatever the reason, it makes steroids a wholly unsuitable drug for long-term use, particularly in younger animals.

More to the point, drugs like steroids, NSAID's and pain relief do not provide the patient with a cure; unlike antibiotics, which do work to kill an infection, they are not designed to remedy the underlying issue. They merely serve to mask the symptoms, a short-term bandage to reduce your discomfort, giving you time to think and act. Break your ankle? Take a painkiller with an anti-inflammatory agent and let the bone re-set. Have a heart attack? Take these drugs, but to avoid a recurrence, you need to eat right, lose weight, de-stress and exercise.

As opposed to fighting strange symptoms, such as a funny rash or constantly upset gut, they often serve as a form of smoke detector; alerting us to a bigger issue lurking beneath. It's like putting a fresh plaster on gangrene each week, if you do not tackle the underlying cause, the issue is likely to continue to boil away under the surface. Symptoms will remerge, often growing to affect other systems

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and materialising in an increasing array of forms. Over time the plaster gets bigger and bigger and has to be changed more regularly. More and more medications are required until eventually either the underlying disease kills you or your exhausted immune system permits something else to do it.

This is the modern way of things. Since the accidental discovery of penicillin a hundred years ago (from a simple fungus), our health system has turned wholeheartedly toward chemistry. The average medical practitioner's approach to health is now, 'When the symptoms pop up, we have great pills here to get rid of them'. We see a similar approach applied particularly to patients with cancer.

The survival rate of cancer is much improved these days, but we seem to be ignoring the fact that cancer rates continue to soar in the general population. Today, incredibly 1-in-2 of us may be affected by it. With diabetes and heart disease showing similar trends, we are very clearly looking through the wrong end of the telescope.

Did you know we used to pay doctors to keep us healthy? Makes sense, doesn't it? Now it seems we pay them only when we're sick. But why would you keep paying a mechanic for an un-fixed car? Strange knocking sound from your engine? Here, pop these earmuffs on! Funny smell? Here's a peg for your nose! Spurred on by vast profits from multinational drug companies, health care has now become sick care. And all the while we ignore the fact that prescription drugs dished out by doctors are now the second biggest killer in the United States.

The true route to health care is not disease *treatment* but disease *avoidance*. Should you be unlucky enough to get a disease, you must find the *cause* of the symptoms you are experiencing — known as the aetiology of disease.

This point alone is perhaps the crux of this entire book.

I wanted to know the aetiology of the disease affecting my Perth dogs but it's exactly where things always seem to get a bit murky. Everyone had an answer. Unfortunately, all the answers were different. For dogs, Perth, apparently, is the allergy capital of the world. The offending antigens (substances that cause a negative reaction in your body) were suspected to be a wide range of things — from the grass and carpets they lie on, to the air they breathe, the food they eat, the dust mites they nibble, the fleas in the sand and, somewhat bizarrely for meat-eaters, the beef and chicken in their diets.

As everyone knows, everything in Australia is dangerous! So, it's hardly surprising that there is a whole host of potential allergens that bother dogs. From

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the top ten most poisonous spiders and snakes in the world to the man-eating sharks in the water and the deadly weather, we can now add vicious pollen and fleas.

In this way, recurring skin and gut conditions have become the casually accepted norm for many Perth dogs today, an irritating part of daily life in a converted desert. But I wasn't convinced. It simply didn't add up. Not only were humans not affected to anywhere near the same degree, but I was seeing dogs overreacting, sometimes quite violently, to the likes of a fleabite. Two even suffered mange outbreaks, something I hadn't seen in a dog since my shelter days and then only in the worst cases. Mange (certainly *Demodex* mange, the more common and less harmful cousin of *Sarcoptes* mange) can only get hold of very sick, stressed or weakened animals. The mite that causes mange is, invariably, on and off them throughout their lives. Just like fleas, these critters are normally kept in check by a healthy, in-balance body and robust immune system. For a well-cared for dog, mange should be no more common than scurvy for a well-fed human. So, if a dog presents with mange, the focus of a more holistic-minded vet would not be simply on the mites or fleas running rampant on the dog, but essentially what is wrong with this dog *under the hood*. Why couldn't his immune system keep these baddies at bay? Is he sick? Is he stressed? Or is an insidious disease lurking in the background, sapping his reserves? But these well-pampered Perth dogs did not appear to have any of these conditions. They were young, robust, well-fed and well-cared for pets.

Apart from the fact that these dogs were clearly distressed, something we would all find upsetting, I was vexed by the absolute lack of veterinary explanation that followed all their expensive and invasive tests. The affected dog owners would hand me over a lengthy report with an apologetic 'I dunno' expression, like it might be something they could be doing wrong.

The reports were always the same. Either a vague reference was made to an unexplained, recurring mystery allergy, such as atopic dermatitis, which means a skin disorder with no known cause. Or it would be accompanied by a dizzying list of potential allergens, always including mundane challenges like pollen and dust mites. As if these Perth dogs were some of the weakest animals in the world.

Whatever the cause, the solution was always the same – some incredibly scientific and exorbitantly priced pet food and a barrage of expensive, powerful, synthetic drugs to keep the dog's *symptoms* in check, often administered monthly.

This bothered me considerably. Of course, there was a *cause*, we just hadn't identified it yet. And I couldn't stop thinking about it.

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The second thing that happened to me in Perth occurred around the same time as all the above was going on. It led to my own personal eureka moment. Perhaps not on par with the importance of Sir Isaac Newton's, but for me it was certainly akin to discovering gravity as it changed the course of my career and my life forever. It was when my wife began to complain about my snoring. Now this was a new grumbling for me to deal with. I was horrified when the other occupants of the house, who actually lived some distance down the hall, verified it, in spite of us being separated by a spare room, bathroom and linen cupboard. Rather than give the houseowners time to ponder their new life with a hippopotamus, I took action and started asking around for some advice. Having exhausted some of the more popular ideas and remedies, I found myself standing at the door of a holistic, food nutritionist person.

Now for anyone who knew me, this was an event. Having been immersed in science for years in college, my stance on *heebie-jeebie* medicine was clear. I didn't like it. The countless stories of their failures under scientific scrutiny were enough for me to label the whole lot of holistic and homeopathic practitioners, water diviners, psychics and astrologists, as crackpots – refugees from the 1960s eking out a living from gloomy tents in carnivals.

The very ordinarily dressed lady sat me down in her ordinarily decorated office in front of a machine that, to my surprise, was already familiar to most of us. Unlike the more uncomfortable pinprick test under the skin, used to test the body's reaction to various proteins, the Vega Test is a quick, noninvasive technique (that I'm still unsure about).

Essentially, you sit there holding two little rods. It uses a harmless current to detect the body's reaction to various food groups. She was going to test over 200 foods, so we got to chatting and it quickly became apparent that this lady knew her stuff. She was a scientist. She had the same degree as me, was going on to obtain a master's degree in nutrition, then to work as a nutritionist in a hospital before specialising in food allergies full-time. I began to relax and answer her questions.

When does this occur? Have you any other symptoms? What did you eat prior to your issues developing? How are your movements? FLINCH! I'm Irish. We are positively averse to talking seriously about anything concerning reproductive organs or bottoms. And all the while, her cute little machine made perpetual chirping noises, which I took to be good.

Once she established that my snoring was worse after poker nights and parties, she quickly diagnosed me as possibly gluten-sensitive, at which point her machine dutifully gave a rather over-the-top electronic wail, which I took to be bad.

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And bad it was. Testing out her diagnosis, we verified that my snoring (and blocked nose, waxy ears and headaches) was, indeed, much worse after poker night. This was due largely to my beer consumption. Like all the nice things, beer is of course, wheat-based (as is bread, cakes, biscuits, pizza, muffins, batter, crackers and anything else tasty in the average person's life). I was distraught. We had had some good times, wheat and me. I hadn't realised how friendly we'd become or how hard it would be to say goodbye.

Dietary sensitivity is a very new realm of science, only really gaining popularity in the last two decades. Like all new sciences, it is initially causing a lot of confusion. At best, there's scorn, such as the general perception in social media, 'Ah, sure, everyone's wheat intolerant now!' Or worse, there's cynicism about its effects – even its existence is regularly scoffed at by totally unversed, medical professionals. The problem is that food sensitivity is a very, very sneaky little issue. When viewed from the outside, it has many different symptoms ranging from mild to severe, and without further testing, your doctor is hard pushed to come up with a diagnosis.

Added to this, doctors have no way of finding out exactly what you had been eating a week previously, nor could you recall it reliably. In this way, many gluten intolerants (up to 30% of Europeans believe it or not) never even realise they are in the gang. Off they go, not-so-happily about life, suffering regular bouts of undiagnosed inflammatory disease — from gastrointestinal upset, headaches, acne, asthma and mood swings to poor joint formation and arthritis, resulting from its consumption. Incredibly, those with coeliac disease, where the effects of gluten are far more dramatic and even life-threatening, wait an average of 10 years before a diagnosis is made.

Which symptoms you express is down to your genetic makeup. When I eat gluten, I get mucus and inflammation, particularly in the nasal area. A few hours later I'm rattling the panes with my death snore, sucking the whole world in on itself like a black hole. We are still together, my wife and I, by the way. While I'm a sub-par night breather, I'm told I'm an above-average cook.

I was 30 before I was diagnosed as gluten intolerant. This was something that was unheard when I was growing up. If something like food intolerance had been mentioned, you would be frowned upon in that typically Irish way we have for dealing with unusual happenings. Like people wearing sunglasses, it was something to be suspicious of and derided, maybe prayed over, but certainly not investigated. Everyone had simply ignored my stuffed nose over the years. I was

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the snotty kid with the tissue attached to his hand, as was my father and likely his father (or mother) before him.

You'd often hear my mother saying, 'We didn't have allergies when we were growing up, you just got a slap in the head and were told to eat your lunch!' She said this as she plonked her delicious, warm, gluten-tastic scones in front of me. In fairness, this was something she said for most issues identified in the last 50 years, but I'm only just coming to realise how much truth there is to that statement. Back then, food sensitivity and a whole host of other health issues, including asthma, diabetes and childhood cancers, were significantly rarer in the general population. We now know they were less prevalent, allowing for increased awareness and diagnosis in the present day. This alone is fascinating. Why are all these chronic conditions increasing year after year?

So Mum, I'm not soft or weird. I'm a grown man with sensitivities, which result in me getting the sniffles.

Ok, at this point you are possibly thinking, where is this guy going with all this? A perfectly reasonable question, considering you have just forked out some hard-earned cash on another of what is a growing line of canine nutrition books and so far, all you've heard about is my holidays, sleeping habits and at times, fraught relationships with my wife and mother. Here it is, the eureka moment, if you haven't already come to it yourself.

After banging my head against the veterinary wall for a few months and getting no closer to a solution for all the sickness I was seeing in the dogs around me, I had the beginnings of an idea. If 30% of European humans are still unable to deal with gluten effectively, and we are pretty good at breaking down plant matter, then how well do carnivorous dogs fare? After all, these days, gluten-laden wheat is the mainstay of their diet, approximately 50 - 60% of it, in fact. Plus, all my sick dogs were eating it. How did dogs develop systems that were better able to cope with all the gluten, than me?

This seemed like an obvious enough question when you consider that the ability to digest plant matter, certainly wheat gluten, decreases as you move from herbivore to omnivore to carnivore. You will learn that dogs diverged from wolves around 30,000 years ago, depending on who you talk to. Wolves have been out-and-out carnivores for at least 5 million years, normally consuming a diet of almost all animal matter. So, if it takes a lot of time and many thousands of generations to develop a system that can cope with a new food group, how are today's dogs coping with this transition to incorporating a wheat gluten diet in only five decades?

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The answer is, we don't really know. This is understandable to a point because gluten intolerance is still a very new issue in humans, really only a few decades old. But I like to know things! Equipped with my research background and my access to pups, I started reading everything produced by the leaders in the field at the time. Both were Australian vets as it happens, Ian Billinghurst (author of *Give a Dog a Bone*) and Tom Lonsdale (*Raw Meaty Bones*).

Now partly versed, I began conducting a few tests. First, I changed three of my absolute worst, most steroid-dependent dogs to an all-natural, cereal-free, raw meat and bone diet. The trial dogs were one Golden Labrador, one Cocker Spaniel and one absolute nutter of a Labradoodle. They were from different breeders and all suffered recurring skin rash, with two also suffering continuous stomach upset.

In the 5 months before the changeover, these three dogs had racked up a costly 19 veterinary visits specifically for their ailments. There were multiple diagnoses, multiple causes and multiple uses of medicine. I alerted the overseeing vets to what I was doing and said I'd come back with results, one way or the other.

Within days I knew it was working. The dogs instantly stopped itching. Their skin cooled. Their poos were suddenly nice and firm and didn't stink. They drank less and urinated less. Two weeks into the change, their hair started to grow back on bald spots. Very soon, the dogs were off their steroids, apparently allergy-free. Four weeks later, they looked incredible with softer coats, better muscle tone and a new focus, now back in training. Four months after the change, all the dogs were positively thriving. One pup returned to the vet for a skin care follow-up. Without using a single drug, their issues had expediently been resolved – which the best vets in Perth couldn't manage.

The results of this simple test were pretty astounding to me, these being the worst cases I could get my hands on and my head started racing. Was this just the removal of wheat or was there perhaps a whole lot more going on here that I didn't know about. For a researcher, this is like hitting a thick vein of gold. How far does this go? But it was only the lack of veterinary interest that had taken me to the position I'm in today. Interest is perhaps the wrong word, but they certainly didn't join me in my jitterbug in their corridor. This for me, as someone who has always been naturally inquisitive, something that has been honed and greatly accentuated by 8 years in college studying science, was completely unacceptable. 'You, sir, are a trained scientist! Here I am presenting the results of a little trial that had gotten your worst cases off recurring drug use and into full recovery and you don't bat an eyelid?' No follow-up investigation of their own. No questions. They simply refused to believe me.

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It's fair to say I was very put out by it. Within 3 months of my little Australian food trial, I had quit my dream job with Guide Dogs and reluctantly but determinedly reentered the research world full-time, ending up 10 years later with the book you are about to read.

While I was writing this book, between the research and dozens of interviews, I have embarked on a number of enterprises, mostly in an effort to keep the money coming in to meet the mortgage. As most of you know, making a living in the pet world without ripping people off can be very tricky. I began writing in-depth articles for my website *www.dogsfirst.ie* which proudly had 250,000 readers a month by the start of 2019. I took my canine nutritional seminar 'What Do Dogs Eat?' on the road.

In 2011, I created *Gráw Dog Food* – the word stems from the Irish for love, *grá* (pronounced *graw*). That was 3 years of my life I will never get back. It was terribly hard work, most certainly because I did most of it by myself for the first year. In 2013, I had a bit of luck with it on the TV show "Dragons' Den" and nearly half a million Irish people were introduced to Dr. Conor Brady and the world's finest raw dog food. It was the boost I badly needed, and the business took off.

However, with an increase in demand came an increase in issues. Making money from good dog food is difficult. You need to get paid for the better ingredients you use; to achieve that takes very solid business acumen – a field where I was sorely lacking. Soon my costs overran my abilities and I was forced to accept that my strengths were less product manufacturing and more examining the research that surrounds it. That is what I have been trained to do and being seen as a pet food manufacturer was not working out for the message I was trying to put out. So just a few years after I had started, I left pet food manufacturing behind. But I have learned so much. Besides something close to a degree in business, the experience gave me an irreplaceable insight into the meat chain, and indeed, pet food manufacturing as a whole. I befriended a number of competitors, some dry manufacturers, mostly raw, and was often permitted in to see how things were done. Some were ok, most were...less so. As they say about sausages, once you see it being made, you rarely want to eat them afterward. I have had the luxury of examining the pet food industry from both sides of the divide.

Since then, I have been full-time researching, writing and lecturing on canine nutrition and the pet food world as a whole. In that regard, the result of my efforts can be summed up as follows: once you peek behind the curtain, it becomes apparent that what you have been watching is possibly one of the greatest

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orchestrated money-making shows on earth today, one where you pay with your money and your pet pays with his health. This should come as no surprise. The UK dog food industry is worth £1.1b per year, the same size as their entire music industry; a market that doubles when you include cats and treats. With so much money at stake, most pet owners have been duped into feeding overpriced junk foods of the poorest quality. The industry is little more than a profitable dumping ground for the world's food waste, and you are paying top dollar for the pleasure of feeding it to your best friend. With little by way of regulation to protect them, all the indicators are now screaming that chronic illness in pets is at an all-time high. It has never been more important for you, your pet's guardian, to get informed on the subject that matters most to their health, well-being and longevity.

This book is an amalgamation of the available literature on the subject of canine nutrition. It studies the nutritional cause of many canine diseases we take as the norm today. It is a factual account of the colossal importance of good nutrition and it is written in the hope that it will be of assistance to both veterinarian, and dog owner alike.

In the following chapters I attempt to present a strong, scientific argument for a vast array of topics, covering a large selection of health issues. In the first section, I tackle the age-old argument concerning whether the dog is a carnivore or omnivore. This is the most important consideration as to how we might feed the animal once in our care. The second section concerns the many issues with dry pet food as a food source for the dog. The third is an analysis of how things have gotten so bad, in particular, the role of manufacturer pseudoscience in our corporate-funded veterinary sector. The final section concerns what and how you might feed your dog properly.

I try to support all my points with independent, peer-reviewed studies. While doing so, I try to filter out the industry-produced nonsense which is no small feat. Trawling through studies in this manner is laborious work. It takes a little skill, a lot of patience and often the determination of a Jack Russell at a ridiculously large branch. Sometimes though, when a relevant point is found in the dank pages of a 1970 *Nature Journal*, conducted by a now largely forgotten Japanese scientist, it provides you with that little eureka moment and makes the labour worthwhile. This book is a collection of those sorts of studies.

In an effort to paint as broad a picture as possible, I have touched on a great variety of topics, few of which I pretend to be a great specialist of. I have done my best to do justice to each section. Any additions or, indeed, corrections a true

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specialist may have, thereafter, ideally with attached references, will be very gratefully received with the intention of revisiting the text in the future. Please send these corrections to me directly at www.dogsfirst.ie. I sincerely hope you enjoy reading this book as much as I suffered putting it together.

***Warning:** This book may contain some tests on laboratory dogs that were sacrificed—none of which I was ever, or will ever be, involved in. However, as the worst of these sorts of experiments wind down, we can glean some useful information.*

The Science of the Human Food and Drug Industries

Despite Jenner first discovering vaccines in 1796, it's fair to say modern medicine didn't really kick off until nearly a century ago with the discovery of antibiotics. Alexander Fleming, it seems, did not maintain the most orderly of labs but it was this very fact that helped him to discover penicillin, saving many millions of lives in the process. Apparently, Fleming returned from holidays one day in 1928 and noticed he had left a window open. Through it blew in some *Penicillium notatum* spores which contaminated a culture plate of *Staphylococcus* bacteria he had also accidentally left uncovered. Thankfully, he was skilled enough to notice the ring around the fungus where the bacteria could not grow. This was the start of antibiotics, and it was this discovery, together with our new fascination with chemistry as a whole, that really jump-started our current slavish addiction to all things chemical.

We are told today that when you get sick, modern medicine has never been better equipped to save you. There's a lot of truth to that and we are all suitably appreciative when it happens. The advances in medicine over the last century have been incredible. We moved from vaccines and sanitation in the 19th century to anaesthesia, germ theory and antibiotics by the start of the 20th century. By the 1950s, we had organ transplants, stem cell therapy and a plethora of incredible drugs, from various vaccines and antivirals to steroids and antiinflammatories. We are now in an era of artificial intelligence and nanobots. Modern medicine now ensures that you are not only quite likely to survive most maladies but live longer

than ever before after the event. There has literally never been a better time to be sick. This is lucky because so many of us are doing exactly that.

Today, while it is casually accepted that one in two Americans will be diagnosed with cancer in their lifetime, thankfully only 185 per 100,000 will actually die of it. This is a disease where more than 90% of cases are attributed to environmental factors, most of them ingested. Cancer, heart disease, obesity and diabetes are affecting more and more people each year – four diseases that are already shown to have a very strong nutritional basis. For the first time in recent history, Americans are living shorter lives. The entire system is in overdrive studying these diseases, millions of man hours committed, amazing treatments developed, billions of dollars poured into health sectors clogged with rich but poorly-fed casualties, and while we focus on the *symptoms*, an actual solution to the *cause* of all this dis-ease in our basic constitution seems as stubbornly elusive as ever.

Compare modern medicine's approach to these diseases with the notion of a hefty sugar tax that a single person could enact with the swipe of a pen. Now that, we are told, is complicated. And yet, proper taxation of terrible foods coupled with tax reductions on whole foods, ideally coupled with government initiatives encouraging home cooking, health adverts on the TV, celebrity endorsements and even mail shots of tips and tricks, would very quickly, very cheaply and very obviously reduce junk food feeding to the level of an occasional 'treat'. A truly effective tax modifies behaviour. The result would be national weight loss. We would have less disease, be more active, work harder and assumedly be happier. We would have more money for education, for the environment, for the poor and the starving. This simple approach has just one critical flaw. It profits only the people. Multinationals struggle to make insane profits on healthy humans. And that's not fair because they have rights, too, and theirs, it seems, are more important.

Health care is, in every sense of the word, vital. Good health is the glorious state most of us hope to find ourselves in for the majority of our lives. And yet, like so many good things in life, you only appreciate it when it's gone. I now think of health as a 0 to 100 scale, where 0 is top health, up to 50 is good health, 50–80 is a few creaks and a few warning lights perhaps (take it easy, a better road is needed). 80 to 99 is varying degree of sickness and 100 is death. Incredibly, few of us care about our health until 80% of it is gone. Now you need modern medicine.

Because it only kicks in when you are sick and it rarely if ever treats the cause of disease in the first place, it's fair to say modern medicine has little to do with

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actual *health* care today. It now concerns itself primarily, if not totally, with *sick* care. Health care, on the other hand, involves a multitude of disciplines such as, but not limited to, nutrition (including the use of food and herbs as medicine), both physical and mental health management, stress and sleep management. Sadly, modern medicine, be it of the human or every-other-animal kind, considers these disciplines add-ons to sick care and are commonly referred to today as *alternative therapies*. In fact, veterinary medicine has gone one further today and put in place legislation that ensures sick care is the first port of call for all pet owners with a health issue. Their reason, we assume, is that the true value of these other scientific disciplines wane considerably for a patient presenting with stage IV cancer. But this, while often true, is not where most of these disciplines are strongest. While eating a high sugar/carbohydrate diet during out-of-control cancer growth is sure to quicken your demise, nutrition, physical and mental health are critical to not only *avoiding* such dis-ease in the first place but recovering from disease should one come knocking. The very fact hospitals serve such terrible food is but one, albeit highly telling, sign of how disconnected things have become in this regard. That modern doctors feel it's OK to prescribe head pills for outwardly depressed people following a single 20-minute appointment is another. In fact, America's lethal addiction to properly prescribed tablets tells us all we need to know about dangerously broken our 'healthcare' system is today.

Accounting for an ageing population, prescription drug use in the United States is exploding. Kantor *et al.* (2015)¹ report the prevalence of prescription drug use among people aged 20 and older had risen to 59% of Americans. From 2000 to 2012, the percentage of people taking five or more prescription drugs nearly doubled (from 8–15%). The prescription drug market in America alone is today worth \$450 billion per year, a market that Reuters says is growing at 6–9% per year,² growth they expect to continue long into the next decade. In part, this increase in demand stems from a major drive by pharmaceutical companies to focus on 'lifetime' drugs, including those for hypertension, heart failure, diabetes, cancer and other consequences of a nation eating the worst diet on the planet. But antidepressants and opioid-based drugs are gaining ground.

A 2011 report by the National Centre for Health Statistics found that 11% of Americans over the age of twelve years are on antidepressants.³ To support this sudden and growing need for mood stabilisers is a litany of bad science that makes for depressing reading. Irving Kirsch, a lecturer in medicine at Harvard Medical School, conducted a major review of all the published data but also the unpublished data on antidepressants which were hidden by drug companies. It found that most (if not all) of the benefits were due to the placebo effect.⁴ A

third of meta-analyses of these antidepressant studies were written directly by pharma employees,⁵ with a difficult-to-decipher amount of the rest being industry-sponsored. More worryingly, a study published in the *British Medical Journal*, looked at documents from 70 different double-blind, placebo-controlled trials for antidepressants. They found that pharmaceutical companies were not disclosing the full extent of side effects and serious harm revealed in their trials.⁶

We found that a lot of the appendices were often only available upon request to the authorities, and the... authorities had never requested them. I'm actually kind of scared about how bad the actual situation would be... if we had the complete data.

Sharma *et al.*, (2016)⁶

Even more worrying is the growing market for opioid-based painkillers. It is reported that pharmaceutical companies are knowingly making their prescription opioids, such as OxyContin, increasingly more powerful while sowing misinformation about their addictive properties.⁷

It all began in 1996 when American drug giant Purdue Pharma held more than 40 national 'pain management symposia' at fancy locations all around North America, inviting thousands of American doctors, nurses and pharmacists to attend. Once there, they were drilled on the firm's new star drug, OxyContin, and they were recruited as advocates. The US government publication on the whole affair, titled "The Promotion and Marketing of OxyContin: Commercial Triumph, Public Health Tragedy", makes for a sickening read.⁸ This 'new' (it's a semi-synthetic version of morphine) 'wonder drug' (studies show it had no benefit over other similar drugs, Van Zee, 2009)⁸ simply took best advantage of a new market that was emerging from the relaxation of laws and the general liberalisation of the use of opioids in the treatment of chronic, non-cancer pain. And they did it the tried and tested way – by influencing physicians. In fact, Van Zee (2009)⁸ uses eight studies to clearly demonstrate how Purdue was able to first determine and then target the physicians who were the highest prescribers for opioids across the country and then incentivise them.

And they were very successful. Prescriptions for their drug increased 10-fold, from 670,000 to more than 6 million between 1996 and 2002. When others saw what was going on, they wanted in on the game, too, and soon the market was flooded with highly addictive painkillers. Crucial to their success, though, was hiding how addictive their drugs can be, which eventually got OxyContin in some

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trouble. On May 10, 2007, Purdue Frederick Company Inc., an affiliate of Purdue Pharma, along with three company executives, pleaded guilty to making false claims about OxyContin's addictiveness and was ordered to pay \$634 million in fines.⁸

With no monopoly on pain, America is now consuming 80% of global opioid pills even though it has less than 5% of the world's population. This has resulted in tragic amounts of addiction and death. In 2016, two-third of the more than 63,600 drug overdose deaths in the United States involved an opioid,⁹ equating to around 115 deaths a day. More than gun crime and car crashes combined. Thanks to the efforts of these charming companies, there is now a common but dangerously incorrect perception that prescription drugs are less harmful than illicit drugs.¹⁰ Prescription drugs are killing more than 100,000 Americans a year.^{11,12} To clarify, that is 100,000 people dying as a result of taking drugs that were properly prescribed by a doctor and *excluding* the 60,000 Americans who die from their opioid addiction each year, many of whom quickly turn to cheap Mexican heroin and synthetic Fentanyl as a cheaper way to fulfil their terrible, unending need. Around every single one of those poor people is a family torn apart.

And all this goes on, necessarily though somewhat unbelievably, with the full approval of the Food and Drug Authority (FDA). In 2013, with the epidemic raging, the FDA permitted the sale of a powerful opiate called Zohydro, despite the near unanimous objection of its *own review committee*.¹³ It's patently clear that commercial concerns trump that of a doctor's opinion in corporate America.

The small bit of good news is that opioid deaths and misuse now appear to have peaked in the United States and, while opioid abuse continues to climb in Europe, it is nothing like the rates witnessed in America.¹⁴

The medical profession is being bought by the pharmaceutical industry, not only in terms of the practice of medicine, but also in terms of teaching and research. The academic institutions of this country are allowing themselves to be the paid agents of the pharmaceutical industry. I think it's disgraceful.

**Arnold Relman (1923-2014), Harvard Professor of Medicine,
former Editor-in-Chief of *The New England Medical Journal***

It goes almost without saying that the root of the problem in this instance is corporate influence. When human health systems interact with big industry, it produces outcomes not in keeping with the patient's best interests. This includes

influencing a doctor's behaviour, the creation of favourable results¹⁵ from industry-sponsored research and ultimately increased product usage. Corporate-funded studies are significantly more likely to favour the sponsor's product compared to the comparator drug in head-to-head trials.¹⁶ Colossal review studies that amalgamate all industry-funded studies produced over a lengthy period reveal they consistently favour those sponsored by the industry, beyond 96% in fact.^{17,18} How do they do it? The answer is copious amounts of pseudoscience.

By definition, pseudoscience is a set of ideas, practices or claims that present themselves as science but do not meet the criteria to be properly identified as such. Pseudoscience comes in many forms but more often than not involves bias, whether deliberate or otherwise, a lack of openness to evaluation by other experts (this is where studies are first scrutinised by a board of peers prior to publication) and a general absence of systematic practices that are critical to sound scientific method. Used almost exclusively today by marketeers, pseudoscience is sadly not only a highly effective strategy but thanks to near bottomless budgets, it is practically an art form. This means that to the untrained eye, even to the trained one, it is often very difficult to separate the wheat from the chaff.

In his highly lauded follow-up to *Bad Science*, titled "Bad Pharma: How Drug Companies Mislead Doctors and Harm Patients", a highly recommended if deeply unsettling read (not one for the holiday, don't make the same mistake I did), Ben Goldacre explains many of the tricks used by the industry to produce the results they want. The British medical doctor lays out for us in forensic detail how devious, how unregulated and how morally bankrupt our drug industry has become.

In relation to the studies our drug industry produces, there are many ways to get the results you need.

First, drug companies are not required to publish the trials that didn't work or, worse still, those that found side effects. Furthermore, researchers are free to do as many trials as they wish and publish only those results where they fared positively. It's like flipping a coin 100 times and only publishing a 10-flip section where heads (good results) appeared eight times and tails (minor side effects) appeared only twice. Then there's clever sampling methods; very small sample sizes, handler bias, flexibility with design or definitions, interpretations of outcomes, ranging all the way up to the massaging and even withholding of vital data, and good old blatant lies.

As the saying goes, bad science gets results.

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Behind all this terrible over-prescription, addiction and death are usually smart and almost certainly well-educated doctors prescribing what they feel is best for their patient at the time. So, simply producing bad science is not enough, you need to insert it into the medical psyche and big pharma do it by targeting health sectors and universities with their vast cash reserves. Assistant Professor Roy Moynihan spends a lot of time speaking out against the cosy financial relationships between our health systems and big pharma. In 2006, his *British Medical Journal* piece titled “Who Pays For The Pizza? Redefining The Relationships Between Doctors And Drug Companies”, a reference to the fact drug reps still today use the method of buying lunch (invariably pizza, go figure) for anyone in a doctor’s clinic that is willing to listen to their sales pitch, is a terrifying read.¹⁵ From the very first line ‘twisted together like the snake and the staff, doctors and drug companies have become entangled in a web of interactions as controversial as they are ubiquitous’ to the last ‘the flipside of this sense of entitlement is of course indebtedness, which, as Katz points out, is to be repaid by support for the patron’s drugs, with a sense of obligation in direct conflict with doctors’ primary obligation to their patients’ – the bias and impact on patient welfare is truly terrifying.

It has to be said at this point, in Europe we are guilty of assuming this is just a US thing, that we have another level of protection from such infiltration, but nothing could be further from the truth. In Ireland, a Business Post investigation revealed big pharma is funding the positions of numerous medical and nursing positions, with one-third of our Health Service Executive’s (HSE’s) most senior doctors receiving money directly from big pharma.¹⁹

In his piece, Moynihan draws our attention to the fact that the process of hooking doctors likely begins from the moment they step into college. The University of California, in San Francisco (UCSF) has a reputation for having one of the strictest policies in the United States on financial ties between researchers and study sponsors. While most other institutions do not feel the need to advertise a researcher’s relationship with a company if it is worth less than \$10,000 in any given year, UCSF researchers with any ties worth more than \$250 must disclose it to the institution. Second, anyone conducting research at the college is expressly prohibited from having any other form of financial tie with that sponsor while that research is being conducted. And yet, a little digging reveals a worrying amount of undisclosed ties between academics and biotech companies, including numerous paid-speaking arrangements (ranging from \$250 to \$20,000 a year), paid consultancies (mostly less than \$10,000 but up to \$120,000 a year), paid positions on advisory boards and even equity holdings in said companies (mostly over \$10,000 and ranging up to \$1million).

THE SCIENCE OF THE HUMAN FOOD AND DRUG INDUSTRIES

People tend to assume that doctors are sitting at home each night, after long days in the office, reading and correctly interpreting scientific papers and drug trials for every product they recommend. However, this is an extremely daunting task. The depth of the deception coupled with the sheer volume of information now coming out means you need to be something between an academic and an investigative journalist to tease apart the nonsense around a single drug, let alone *all* the drugs they prescribe daily.

Milton Packer is an American doctor and leading cardiologist known for his clinical research concerning heart failure. In a recent piece titled “Does Anyone Read Medical Journals Anymore?”,²⁰ he notes that young physicians no longer even pretend to keep up with the medical literature. At a meeting of two hundred young physicians, Packer asked how many actually read an issue of *any* journal that was delivered to them, electronically or physically. The answer was zero. Not one. When pushed if they picked a single journal in their field of interest and try to keep up there, not a single hand went up. Packer then asked if these young physicians has read a *single paper* on *any topic* from start to finish? Silence. Stunned by the response, Packer asked why, and the answer was: ‘We don’t know how to read them. And most papers will subsequently get contradicted by another paper published somewhere else. So, it makes no sense to read any single paper.’ He could sympathise, in part, with this response as he, an eminent and highly regarded cardiologist, must read dozens of papers every day and even then, feels he is not staying abreast of the information arising in just his field alone, something to which I can greatly sympathise.

The reason for this deluge is perhaps best highlighted by a piece in the *British Medical Journal* titled “Why Doctors Don’t Read Research Papers? Scientific Papers Are Not Written To Disseminate Information.” The piece explains how modern authors are eager to get their names in print less for reasons of enlightenment and more for reasons of self-interest.²¹ The issue is science. Scientists and indeed universities have moved toward a ‘publish or die’ mentality. Frequency of publication is now the deciding factor in a university employing an academic as it is what the university in turn is judged on, something that will be reflected in the cash investments they can attract. In fact, universities are hiring new faculty members based on little more than their publications list.²² There is now pressure to publish, the inevitable result of which is quantity over quality. One tactic adopted by ‘salami slicers’ is to divide decent works down into the smallest publishable unit in order to lengthen their publication list. The other, clearly, will be questionable research. The result is in 2006 alone, approximately

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1.3 million peer-reviewed scientific articles were published. As of the last count, and not including the predatory or fake journals, from 2001 to 2006 the number of available scientific journals increased from 16,000 to somewhere close to 23,750.²³

It seems to me that we should for an experimental period of a year, declare a moratorium on the appending of authors' names and of the names of hospitals to articles in medical journals. If the dissemination of information is the reason why papers are submitted for publication, there will be no falling off in the numbers offered... But if far less material is offered to the journals, we shall have unmasked ourselves.

Healy, 1976²⁴

So expecting our young doctors to stay abreast of the 'science' is no small task, certainly not when you're studying to be a doctor. Young doctors, out of necessity, are left placing large amounts of faith in the supposition that 'good science' supports each of their lessons and thus decisions in practice. However, as the prescription drug epidemic at least in America clearly demonstrates, an environment of weak regulation and clever-but-self-serving science that is poorly understood, if read at all, by the practitioner leaves our health practitioners vulnerable and open to abuse. It is leading to bad decisions with potentially dire consequences for the patient. More simply put, in a class action lawsuit filed in Ontario, Canada alleging that Purdue was 'negligent in the development, manufacture, distribution, marketing and sale of OxyContin', Dr. David Juurlink, Associate Professor Of Medicine, Paediatrics and Health Policy, Management and Evaluation at the University of Toronto makes the following observation:

...doctors swallowed the firm's promotional messages 'hook, line and sinker'...

Nor is it just in the drug sector that we see a pollution of the science. America is in the grasp of an obesity (and, thus, heart disease, diabetes and cancer) epidemic. This, too, is fuelled by a lot of very bad science, albeit from a different type of drug pusher. Independently funded studies find correlations between sugary drinks and poor health, whereas those supported by the soda industry do not.²⁵ Marion Nestle,²⁶ Professor of Nutrition, Food Studies and Public Health at New York University, highlights how corporate influence is destroying the credibility of the food industry's research. She uses two examples to support their systematic abuse of the science.

First, Nestle highlighted an article by *The New York Times*,²⁷ which exposed a new organisation of academic researchers, the Global Energy Balance Network, who promoted physical activity as a more effective method than calorie control for preventing obesity (e.g. rather than avoiding sugary sodas). The group was supported by Coca-Cola. Nestle then introduced us to a study published in the prestigious *British Journal of Nutrition*. It concluded that cocoa flavanol compounds ‘improved accredited cardiovascular surrogates of cardiovascular risk, demonstrating that dietary flavanols have the potential to maintain cardiovascular health even in low-risk subjects’.²⁸ The study, which followed well-established scientific protocols, was funded in part by Mars Inc. Nothing wrong so far. The problem, Nestle points out, is not the science itself, but how they used it.

On September 27, 2015, Mars took out a whole page ad in *The New York Times*. It stated ‘cocoa flavanols lower blood pressure and increase blood vessel function in healthy people’. As Nestle (2015)²⁶ explains, what was not explained was that cocoa flavanols are largely destroyed during all but the most careful processing of chocolate. But Mars didn’t mention chocolate, specifically. As Nestle states, they didn’t have to.

Multinationals use science like a drunken man uses a lamppost, for support rather than illumination.

Adapted from a quote by Andrew Lang

Michele Simon is a public health lawyer specialising in legal strategies to counter corporate tactics that harm the public. From her platform www.EatDrinkPolitics.com, she has been researching, writing about and exposing the food industry and its politics since 1996. In her analysis of the US Academy of Nutrition and Dietetics (AND), titled “And Now a Word From our Sponsors: Are America’s Nutrition Professionals in the Pocket of Big Food?”²⁹, Simon presents some damning findings. Besides its growing list of food industry sponsors, including a long-term affiliation with The National Cattlemen’s Beef Association and processed food giants ConAgra and General Mills, the AND allows their sponsors to give Continuing Education lectures to members. The messages taught by Coca-Cola include sugar is not harmful to children, aspartame is entirely safe – including for children of 1 year and the Institute of Medicine (IOM) is too restrictive in its school nutrition standards. At their 2012 annual meeting, of the major attendees, only two out of the 18 represented whole, nonprocessed foods.

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While large review studies conclude that through the sale and promotion of ultra-processed food and drink, multinational corporations are ‘major drivers of global epidemics of non-communicable diseases’ and as such should play no role in any strategies laid out to combat said diseases,³⁰ it seems every major nutrition group in the United States is still happily supping from the corporate teat. The American Dietetic Association lists Coca-Cola, Hershey’s, Kellogg’s, Mars and Pepsi among its fourteen sponsors. The AND is the same. Representing over 7,000 US dietitians, their journal describes itself like this: *The Journal of the Academy of Nutrition and Dietetics* is the premier source for the practice and science of food, nutrition and dietetics. The monthly, peer-reviewed journal presents original articles prepared by scholars and practitioners and is the most widely read professional publication in the field. The American Journal of Clinical Nutrition thanks the following sponsors on its website (www.ajcn.org): Abbott Nutrition, Bush Brothers Inc., Cadbury, Campbell Soup Company, The Coca-Cola Company, ConAgra Foods Inc., The Dannon Company Inc., DSM Nutritional Products Inc., General Mills, GlaxoSmithKline, Consumer Healthcare, Kellogg Company, Kraft Foods Inc., Mars Inc., Martek Biosciences Corp., McDonald’s, McNeil Nutritionals, Mead Johnson Nutrition, Metagenics Inc., Monsanto Company, National Dairy Council, Nestlé Nutrition Institute of Nestlé USA, Pepsi Co, Pfizer, Pharmanex, POM Wonderful LLC, The Procter & Gamble Company, Sara Lee Corporation, The Solae Company, The Sugar Association Inc., Tate and Lyle, Unilever North America and Welch’s.

Even the US government seems to be doing its bit to ensure Big Sugar holds its lofty position in the American food pyramid. In the midst of a terrible obesity epidemic, with the average citizen consuming approximately 100 lb of sugar a year, the US Department of Agriculture decided to employ a new methodology for recording how much sugar people were eating, shaving 20 pounds of sugar off the average American’s annual intake in the process. Covered by *The New York Times* (NYT), Dr. Michael Jacobson, executive director of the Center for Science in the Public Interest, worries that this new lower figure might ‘take some pressure off companies that make sugary foods’.³¹ The NYT dug further and revealed an e-mail from Jack Roney, the then-director of economics and policy analysis at the American Sugar Alliance, where he states ‘we perceive it to be in our interest to see as low a per-capita sweetener consumption estimate as possible’.

With such powerful interests pulling the strings, obese America just can’t seem to get on top of its raging diabetes crisis. According to the US Centre for Disease Control, by 2050 diabetes will affect one in three Americans. When Mayor Bloomberg proposed a soda portion size limit in New York City, the AND

issued a statement declining to support the ban, saying that the education of sound nutrition should be reemphasized (as that's been working so well to this point – kids, just say no to the tasty, legal highs you can buy with your own money each day, think of your future waistlines).

So much research is sponsored by industry that health professionals and the public may lose confidence in basic dietary advice.

Nestle, 2015²⁶

And as with the prescription drug epidemic, don't assume your doctor will be able to protect you from this. Nutrition does not rank highly on their agenda. Authors note doctors are grossly under-trained in nutrition in favour of time spent on medication and surgery.^{32,33}

From drugs to food, from sports to politics, when it comes to decisions that affect consumption, it's difficult to think of a single example where corporate influence was for the common good. Our primary defence to the tidal wave of useless and often harmful products is *good* science but it seems, with the tide of bad science now at epidemic proportions today, that barrier is wholly ineffective. The most widely accessed article in the history of the Public Library of Science, was written by John Ioannidis, an epidemiologist and maths legend at the Stanford University School of Medicine. Titled “Why Most Published Research Findings are False”, Ioannidis turned his attention to the 49 most widely cited studies found in the world's three most prestigious medical journals (*The Lancet*, *The New England Journal of Medicine*, *The Journal of the American Medical Association*) published between 1990–2003. He found that in more than 40% of them, their findings were significantly exaggerated or flat out wrong.³⁴

The issue of bad science is now so endemic that Richard Horton, editor-in-chief of the world's most respected, peer-reviewed medical journal, *The Lancet*, states:

Much of the scientific literature, perhaps half, may simply be untrue.

Horton, 2015³⁵

Horton cited small sample sizes and flagrant conflicts of interest as the chief protagonists, concluding with the remark that science ‘has taken a turn towards darkness’. And he is far from alone in his sentiments among editors of top scientific journals:

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It is simply no longer possible to believe much of the clinical research that is published, or to rely on the judgment of trusted physicians or authoritative medical guidelines. I take no pleasure in this conclusion, which I reached slowly and reluctantly over my two decades as an editor of *The New England Journal of Medicine*.

Dr Marcia Angell, former Editor-in-Chief of The New England Journal of Medicine

Richard Horton, now 58, has been the Editor-in-Chief of *The Lancet*, the prestigious British medical journal founded in 1823, for twenty-three years. He began working there when he was just 33 years old. He is one of the world's most eminent scientists, of that there is little doubt, but even he too is clearly fallible, leaving little hope for the rest of us. Horton will never be forgiven by many for being the editor that published the paper that forged unfounded links between the measles, mumps and rubella (MMR) vaccine and autism in children back in 1998. Concerns were first raised in 2004 and many times in the years following but it wasn't until 2010 that *The Lancet*, following the General Medical Council's decision that its lead author, Andrew Wakefield, had been dishonest (and was later censured), and the paper was retracted (essentially struck from the record). The debacle became one of the biggest and ongoing calamities for the MMR campaign and public health in general. By all accounts, Horton now deeply regrets sitting on the decision for so long.³⁶ Indeed, it appears a lot of what Horton has done since has been shaped significantly by the event. But it is his words to the *Guardian* newspaper in 2010 that should frighten us the most:

Wakefield "was dishonest", said Horton. "He deceived the journal." *The Lancet* had done what it could to establish that the research was valid, by having it peer-reviewed. But there is a limit, he said, to what peer-review can ascertain.

Boseley, 2010³⁶

Peer-review are two words that are supposed to instil in us a measure of calm reassurance that 'the science' is sound. We can trust it. It has been verified typically by a group of colleagues with specialty backgrounds or an Editorial Board of Reviews. But with so much insidiously false, self-serving science appearing *daily* in a now vast array of journals that are of questionable quality themselves, it can be hard to keep up. Even if directed to the paper in question, these falsehoods are

so delicately and expertly woven that it can take a team of top scientists in that very field many days to undercover where the treason had been committed.

I remember, upon submitting my doctorate, I had to go through the *viva* process. It was terrifying. In science, there is always a fear you will be found out because there are always better scientists around. Better biologists. Better behaviourists. Better statisticians. And for peer-review, you are meant to ship in a couple to critically interrogate your work, your workings and your conclusions. If you're not cheating at any point, there is nothing whatsoever to fear. Few get through unscathed. Most walk out beaming with 'minor corrections' one or two have a bit more to do in some places. I have yet to hear of a fail but no doubt they occur. The point is: they are not there to 'do' you. Your supervisor would not let your work embarrass them. Sitting in front of me I had two 'friendly' scientists, one was my supervisor and the other a professor from my own faculty that, while I would be on a first name basis in the corridors, friends we were most certainly not. The other two scientists were two heavyweights of my field. Both were flown in, put up, wined and dined but of cash payment there was none. Peer-review is a voluntary process. You don't get your name on anything. There is no formal recognition you were even there. You are expected to contribute your valuable time (there are heads of departments, extremely busy people) for nothing more than the advancement of science. Herein lies the problem. While we would like to think everyone is in it just to move our understanding forward, we have clearly seen there are too many scientists out there with more self-serving motives in mind. The chances of these types wanting to conduct peer-review is considerably less. Moreover, your team picks who sits opposite you. This opens the door to all sorts of shenanigans. And all the time the people on the other side of the table are working with the data I hand them. Little more.

This, it seems, is peer review of the highest quality. You're going for a doctorate after all. When publishing a science paper, the legitimacy of 'peer-review' goes downhill steeply from this point.

...some systems are very different. There may even be some journals using the following classic system. The editor looks at the title of the paper and sends it to two friends whom the editor thinks know something about the subject. If both advise publication the editor sends it to the printers. If both advise against publication the editor rejects the paper. If the reviewers disagree the editor sends it to a third reviewer and does whatever he or she advises. This pastiche—which is not far from systems I have seen used—is little better than tossing a coin, because the level of

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agreement between reviewers on whether a paper should be published is little better than you'd expect by chance.

Lock, 1985³⁷

Peer review, it seems, has never been a standard over which anyone can really stand. A systematic review of all the available evidence on peer review concluded that 'the practice of peer review is based on faith in its effects, rather than on facts'.³⁸

Richard Smith was editor of the *BMJ* from 1991–2004. While at the *BMJ*, he used to amuse himself by inserting very major errors into papers to check how thoroughly their reviewers were going about their business.^{39, 40} In his words 'nobody ever spotted all of the errors. Some reviewers did not spot any, and most reviewers spotted only about a quarter'. It's fair to say, in peer-review, he sees some room for serious improvement, but his 2006 book "The Trouble with Medical Journals" lays out just how critical the problem now is. Smith states that medical journals have become little more than 'creatures of the drug industry', riddled with fraudulent research usually conducted by the pharmaceutical companies themselves.

This is why Robbie Fox, the great 20th century editor of the *Lancet*, who was no admirer of peer-review, wondered whether anybody would notice if he were to swap the piles marked 'publish' and 'reject'. He also joked that the *Lancet* had a system of throwing a pile of papers down the stairs and publishing those that reached the bottom. When I was editor of the *British Medical Journal* I was challenged by two of the cleverest researchers in Britain to publish an issue of the journal comprised only of papers that had failed peer review and see if anybody noticed. I wrote back 'How do you know I haven't already done it?'

Smith, (2006) in "Peer review: a flawed process at the heart of science and journals"

This is why Horton and many others in his position admit perhaps half of what the top journals publish may be false. Big brother is *not* watching. When the study gets published, and it will somewhere, eventually, the paper will be either readily accepted by the wider scientific community (they cannot *prove* their conclusions false) or it will be rejected (proven false). How long that process takes will vary. But being proven false, as the Wakefield study demonstrated, does not mean the paper has been *redacted*. It takes serious malpractice for a paper to be pulled and

this takes time. In this way, a misleading paper, much like a terrible fart, can hang around for too long, polluting the atmosphere for everyone but its creator.

Starting to feel a little uncomfortable? The only solace I can offer you is that when I read a study I always ask myself: can these findings be used to sell something? If not, my trust-meter happily jumps a click or two. If the study concerns an effect on a disease and the answer is negative – *x causes y*, so don't do it – I listen with an open mind. However, any positive findings in relation to disease – *x prevents y*, so take it OR *x does not cause y*, so take it – do not get my trust. That finding has to be repeated a number of times by people not profiting from the result. Of course, discerning who is funding what is the most confusing task of all. Not sure that has helped, actually.

Bad science today is clearly at epidemic proportions. We are now in a time that if we don't read the scientific evidence, we are *uninformed* but if we do, we risk being *misinformed* (a line I adapted from Mark Twain, who first said this in relation to reading the newspaper). Knowing this, the irony of my using scientific references as the supportive structure for this book is not lost on me. Seeing our top journals struggling to tease the wheat from the chaff, it leaves me (your average researcher) on rockier ground when using numerous studies to support my arguments. I try to filter the best that I can but as you will soon understand, this is no small task. I primarily use studies because our vet sector need to see them to act when in actual fact a simple test using their most gut sick or itchy clients would tell them all they needed to know.

In 2019, Roy Moynihan, one of the most vocal advocates for the preservation of evidence-based medicine, was back – this time teaming up with another eighteen relative giants in the field. Published again in the BMJ, they re-highlight the issue – the commercial distortion of the scientific evidence must stop. This time they offered some immediate solutions to stem the destruction of trust in the science, including research being conducted without industry ties and government reforms to ensure both product testing and regulatory agencies are independent of industry.⁴¹ In short, get them out of both research and regulation or full disclosure where they are in.

With all this in mind, let's take a look at the companies behind the top pet food brands, their affiliation with the veterinary industry, the science used to support their stance and the regulators in place to make sure they're all behaving themselves.

TAKE-HOME POINTS

- ✓ With the majority of pet food regulations and information coming from the United States, we begin with an analysis of the US human drug sector, assuming the science employed here is at least as robust as that used to buoy the pet sector.
- ✓ The US prescription drug market is exploding. It is currently worth half a trillion dollars a year and growing by 6–9% a year.
- ✓ Eleven percent of Americans over the age of twelve years are on antidepressants. The science supporting this market is highly questionable. At least a third of meta-analyses are written by pharma employees and side effects are not being disclosed.
- ✓ OxyContin was the first ultra-successful opiate-based pain killer. When restrictions were eased, PurduePharma was able to target the physicians who were the highest prescribers for opioids across the country and incentivised them. The market exploded.
- ✓ America is now consuming 80% of global opioid pills even though it has less than 5% of the world's population. In 2016, opioids were killing 115 Americans a day – more than gun crime and car crashes combined – and make addicts out of countless more.
- ✓ Excluding deaths from opioid addiction, prescription drugs (that is drugs properly prescribed by a doctor) are accountable for more than 100,000 American deaths per year.
- ✓ The problem is the influx of industry cash into the scientific process from those who wish to use it for marketing purposes.
- ✓ From how data are collected to how you process that information, there are many ways to get the answers you need – participant recruitment, sample sizes, massaging the data and handler bias are all commonly employed. It is not required that researchers publish the trials that showed the drug was ineffective or where side effects were seen. This is the scientific equivalent of flipping a coin 100 times and publishing only the 10-flip section where heads came up eight times in a row.

- ✓ Of 49 of the most widely cited studies found in the world's three most prestigious medical journals from 1990–2003, more than 40% were found to be significantly exaggerated or flat out wrong.
- ✓ The same corporate corruption of not only the science but also of the authorities and regulatory bodies can be seen in the food sector.
- ✓ Bad science in the human sector is now at epidemic proportions. Horton, editor of *The Lancet* stated, 'of the scientific literature, perhaps half, may simply be untrue'.
- ✓ Doctors are bamboozled by the deluge of bad science. Studies show they are no longer staying abreast of the scientific literature. Faith is placed in the regulators but, as we see with the prescription drug epidemic, the regulators are more than struggling, sometimes they are part of the problem, such as seen with the big sugar and the obesity epidemics.

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