Seeking Thyroid Truths

A Guide for the Curious

Petros Perros

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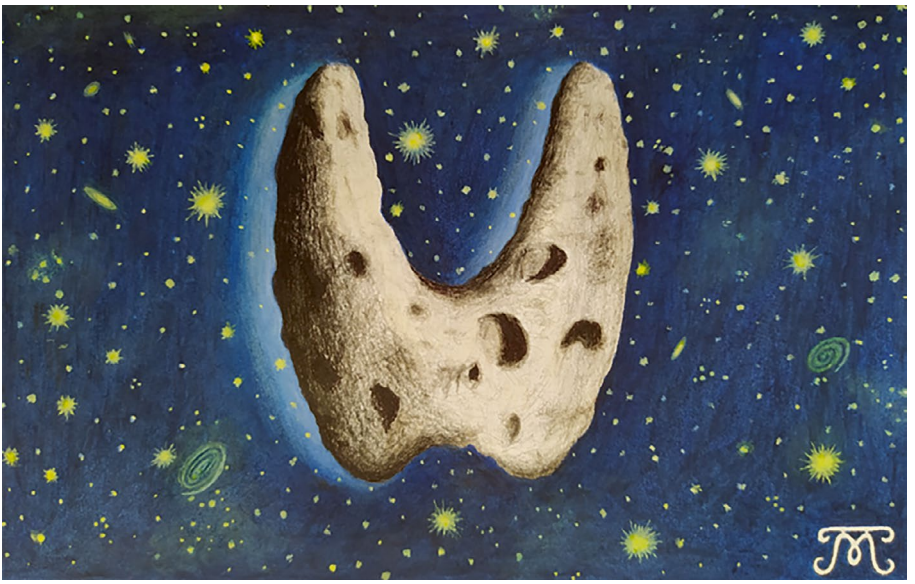

What could space possibly have to do with the thyroid? NASA astronauts on the Space Shuttle programme had numerous tests before and after flights. Thyroid blood tests showed some abnormalities after flights in the early expeditions. This was due to iodine being used to purify water. In later Space Shuttle flights, measures were taken to remove iodine from drinking water [1]

To Shirin, Tash, Ali and Adam

Prologue

'The intention of this book is to provide the means by which good quality information about the thyroid gland and its diseases can be found, accessed, weighed and judged'

Who Is This Book for and What Is It About?

This book is for patients with thyroid diseases and anyone interested in the thyroid, including carers of thyroid patients, members of the lay public, medical students and healthcare workers (nurses, pharmacists, trainees in endocrinology, family doctors) who deal with patients. The focus in on the thyroid, but the concepts apply to any field of medicine if the reader is interested in exploring and understanding the evidence, while thyroid themes are used as examples.

There are numerous questions relating to the thyroid that the best experts are unable to answer with certainty, yet people with thyroid problems have to make judgements that affect their health. Doctors for a variety of reasons often do not deliver the amount and depth of information needed by those who suffer from thyroid diseases. Inevitably such information is sought elsewhere, usually the internet. The end result is frequently confusing, disappointing and sometimes perilous. This book will not offer opinions about why you may be having problems with your thyroid, nor will it encourage you to spend your money on remedies of questionable value. The intention is to provide the means by which good quality information about the thyroid gland and its diseases can be found, accessed, weighed and judged. It will

hopefully enable you to assess the quality of the information and make good decisions about health. It is a guide that can lead you to the original sources of up-to-date knowledge and help you answer your questions. To do so, you will need to navigate treacherous waters and dodge misinformation, bias, conspiracy theories and a multitude of opinions often based on other people's opinions. *Seeking Thyroid Truths* is a companion for such a journey. The reader can refer to it time and again when faced with specific questions about the thyroid to help with the search. The book also contains anecdotes and explanatory examples and can be read like a story. Besides practical advice about finding and assessing medical evidence, I offer my own opinions in the last chapter, on a specific topic of great importance (in my opinion). It would be foolish to claim impartiality though care was taken to minimise it.

Success in finding truth is not guaranteed, in fact that would be a highly unrealistic expectation, but an Odyssean journey may be rendered less Herculean.

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Introduction

'Those who argue against empowering people without a PhD in health sciences, underestimate their ability.'

A Star Patient

I remember my first day as a consultant like it was yesterday, from the moment I woke up, to entering the office where my predecessor's presence still lingered, to my first outpatient clinic on the same afternoon, to getting home in the evening eager to tell my family about my new job. It was a great day and the variety of endocrine cases that crossed the threshold of my consulting room was beyond my expectations.

My encounter with my star patient, a man called Vero, happened a few weeks later. His family doctor rang me during my morning ward round. She sounded very excited and wanted to forewarn me that a referral was on its way about the most amazing case of 'myxoedema' that she had ever seen and would I like him to get started on levothyroxine immediately? I offered to see Vero the same afternoon and 3 h later there he was. He came from Serbia and had recently travelled to the UK to join his cousin's family. He was only 52 but looked much older. He shuffled into my consulting room accompanied by his cousin who also acted as a translator. He slowly lowered himself into the chair and stayed motionless, apathetic, almost lifeless. His skin was like parchment and slightly

yellow, the tissues around his eyes puffy, his hands were freezing cold, his pulse slow and his feet swollen. When prompted to answer my questions, it became obvious that he was hard of hearing, his voice was gruff, his speech slow, his tongue too big for his mouth and he had a 'goitre' (enlarged thyroid gland). 'Myxoedema' is a medical term that means severe thyroid underactivity. And Vero indeed had myxoedema at its most extreme. The lab tests were as expected 'off the scale' and the reports had stars all over highlighting that the 'TSH was greater than 100 mU/L' and the 'free T4 less than 1 pmol/L'.

Vero had lived all his life in a remote village in the mountainous region between Serbia and Bulgaria. Access to healthcare was difficult and it seemed that during his teenage years he had started to develop the symptoms that he now presented with. You may be surprised to know (as was his family doctor) that I did not treat Vero with thyroid hormones. There were three clues that made me doubt that this was straightforward hypothyroidism (thyroid underactivity), of the type that we usually see in the developed world ('Hashimoto's thyroiditis' or 'autoimmune hypothyroidism'): (a) he was a man (in the UK more than 90% of people with hypothyroidism are female), (b) he came from a mountainous area, (c) he had a goitre. These suggested that the underlying problem was not destruction of his thyroid gland due to Hashimoto's thyroiditis, but lack of the raw material (iodine) that the thyroid needs for making thyroid hormones. Additional tests confirmed that he was severely iodine deficient. Being somewhat concerned that he may not be able to take iodine supplements by mouth consistently, I leaned on my colleagues in pharmacy who were very kind to respond to my highly unusual request for an injection of iodinated oil, which repletes the body of iodine for over a year. Vero walked into my consulting room a new man a few months later. He was animated, talkative and looked the picture of health. He never came back despite multiple invitations for clinic appointments. I took that to be a good sign of someone who had recovered completely and had no need to see an endocrinologist and hopefully adhering to the dietary advice that he was given. I was not destined ever to encounter another case of myxoedema as striking as this for the rest of my career as an endocrinologist.

As recently as the late nineteenth century, doctors would not have been able to help patients like Vero. His story is an example of how science expands our knowledge, which when applied can change people's destiny for the better. What drives science is our desire to unravel truth. This yearning has a long history and is one of the defining characteristics of our species.

Seeking Truths

Seeking truths implies knowledge of what truth is. This has preoccupied some of the best minds in the history of mankind, often driving them to insanity. I have avoided entering that philosophical battleground and have assumed that

there is a common understanding of what we consider true in our daily lives. Where and how to look for it is a condition for reaching the evidence, but then you have to decide whether your bounty is truthful, and that is the centre of attention in this book.

Two and a half thousand years ago, Aristotle and Plato wrestled with ideas about truth in their own way, and this struggle was captured by a great artist on one of the walls of the Vatican. My first encounter with that fresco in real life planted the seeds for writing this book.

Aristotle and Plato

My first visit to the Vatican Museum came late in life. Previous experiences of places like the British Museum, the Louvre and the Uffizi Gallery, were marked by an intense sense of awe and emotional fatigue triggered by the abundance and magnificence of what was displayed.

'Florence syndrome' is known to afflict some people who come face to face with objects of exceptional beauty and causes a collection of physical and mental symptoms [2]. Whether I suffered from it I am not sure. But the feeling of personal worthlessness in comparison to the creators of such works was overwhelming, as I staggered out of the Uffizi Gallery onto the north bank of the Arno on a scorching August afternoon in 2006.

When it came to the Vatican Museum, I was better prepared. I decided I would concentrate on one room (the Sistine Chapel) and specifically the paintings on the ceiling and the altar wall by the great Michelangelo Buonarroti.

Reaching the Sistine Chapel entails walking through long corridors full of opulent Renaissance art, which invites the visitor's attention and is highly seductive. But I remained composed and I surprised even myself for resisting the distractions beckoning from all directions.

I was nearly at the entrance of the Sistine Chapel, full of anticipation and excitement, when my defences were breached by the sight of Raphael's 'The School of Athens'.

Aristotle the empiricist points down to earth, while Plato the visionary draws attention to the skies. Both men were in search of knowledge and truth, but they differed in their opinions of how to reach them (Fig. 1). I was mesmerised by this gigantic and magnificent fresco. It took my breath away and delayed my entry into the Sistine Chapel by some 30 min of jaw-dropped staring.

Choosing the word 'truth' as part of the title of this book was not a hasty nor an easy decision. It carries a heavy weight and implies a promise for unveiling truth, which is burdensome. So, writing about the truth in relation to the thyroid turned out to be a bigger challenge than I thought.

Fig. 1 The School of Athens by Raphael [3]

In medicine and in science, truth is pursued through 'empirical' knowledge, which tallies with Aristotle's teachings. That is, observation, experimentation, collection of facts and analysis, from where conclusions are drawn and 'hypotheses' (assumptions or theories) are constructed. Such hypotheses have to be testable, otherwise they are meaningless. A hypothesis that thyroid cancer is caused by genetic 'mutations' (or faults) can be explored by comparing genes from thyroid cancer cells with non-cancerous tissue. To propose that 'hypothyroidism is blue' is impossible to test scientifically although it may carry some literary value.

Truth occasionally reveals itself in a manner that defies doubt. There are instances when it is anticipated and expected like the last piece in a jigsaw puzzle. When it finally arrives, it is accepted with little hesitation because it is a perfect fit. In the late 1980s, a race was well on its way to find the gene for the 'TSH receptor'. The TSH receptor is a protein that sits on the surface of thyroid cells onto which TSH (thyroid-stimulating hormone, made in the

pituitary, which is another gland) docks in and switches on many functions of thyroid cells.

Several laboratories all over the world dedicated financial resources, time, effort and brain power to find the TSH receptor gene. Such great interest was justified not only because of the central importance of the TSH receptor in how thyroid cells work, but also because it could bring better understanding of thyroid diseases and open up opportunities for new treatments. The TSH receptor gene was eventually found and a truth emerged about its precise location and the sequence of the DNA building blocks that made up the gene. It was then possible to synthesise it, transplant it in bacteria, yeasts or non-thyroid human cells and it functioned and behaved as predicted. Cracking the TSH receptor gene has expanded our understanding and new treatments are currently in development as a result.

Other truths are much more elusive. The documentation that some patients with hypothyroidism continue to experience symptoms despite receiving treatment is one such example. Numerous studies have been performed over the past 30 years and we understand this phenomenon a little better now, but it largely remains unsolved, and it is already evident that it will not be as simple as a missing piece in a puzzle.

In health sciences, the other face of truth is the living experiences of people afflicted with illness. Knowledge that comes from scientific studies and living experiences of patients are two separate ways to the truth. They both have their own limitations, but both contribute in their own unique way to understanding and alleviating human suffering.

Analysing the individual stories of patients could never identify the cause of 'Pendred's syndrome' (a rare inherited disease that causes an enlarged thyroid gland and hearing loss). Making a decision between a 'thyroidectomy' (removal of the thyroid gland by surgery) and radioactive iodine (used to treat some forms of thyroid overactivity) is helped by knowledge of the effectiveness and safety of each of the two options. But that alone is not enough for making the right decision for an individual patient. Here is where the unique living experience of that person and of others that have undergone these treatments complements scientific knowledge.

Both Aristotle and Plato were in search of truth and both deserve respect. In this book, the focus is on the Aristotelian method of pursuing scientific knowledge and truth through facts and critical thinking.

Getting close to the truth through scientific knowledge requires accessing information. If you search 'thyroid' on Google, half a billion items pop up. 'Thyroid treatment' yields around 200 million hits. Advice is plentiful and comes from various sources. Some originate from medical institutions and

organisations, individual healthcare professionals and patients who want to share their experience and do something good for others. Others are from hard selling profit seekers who mercilessly flog their products: books, diagnostic tests, supplements, vitamins, minerals, herbs, dubious 'online services', 'treatment plans' and 'protocols'.

This information overload is usually not a good start for someone who has been wondering about having thyroid disease, who has been diagnosed with one or for anyone who has an interest in thyroid diseases. Even when confining the search to the medical literature, the evidence can appear to be contradictory and confusing.

At the end of my last working day as a doctor, I placed my personal belongings in a cardboard box, locked the office, removed the sign with my name on the door and headed towards the lift. As I passed the window that faces the car park, the remains of the Old Infirmary that housed wards 10 and 12 caught my eye. It was where I spent many days and nights as a houseman 37 years earlier. Now its ghost was standing silent, lifeless and bare

waiting for the demolition workers to put it to rest (Fig. 2). It did not feel sad. It had fulfilled its purpose and it had come to its natural finishing line, like retirement I thought.

Before the lift doors shut, two ladies in light brown 'domestics' uniforms entered. Their faces were familiar and we exchanged a cursory 'hello'. They looked at me up and down and peered into the box with my odd bits and pieces (photos of my family, some books, a small wooden carved elephant gifted by a patient from Mumbai, an old CD player and my favourite classic guitar CDs). 'My last day at work' I said. They wished me happy retirement and one asked 'What kind of doctor are you…eh…were you?' I reckoned 'endocrinologist' might complicate things, so I replied, 'I dealt with thyroid problems…' and prepared to give a short explanation. 'I know what that is!' said the other woman. 'That's when you get fat and you feel tired all the time'. I smiled as I was reminded of what I call the thyroid equation:

$$\text{Getting fat} + \text{Feeling tired all the time} = \text{Thyroid trouble}$$

The main fault of the thyroid equation is that most of the time it is wrong. For example, one study showed that hypothyroidism is present only in 4% of obese people [4], and another showed that fatigue was as common in hypothyroidism as for the rest of the population [5].

The lift had reached ground level and I walked on towards my car. Isn't it funny? I thought. Of all the possible causes of gaining weight and feeling tired, the probability of thyroid disease being the culprit is certainly not on the top of the list, yet this sample of public opinion rated it so.