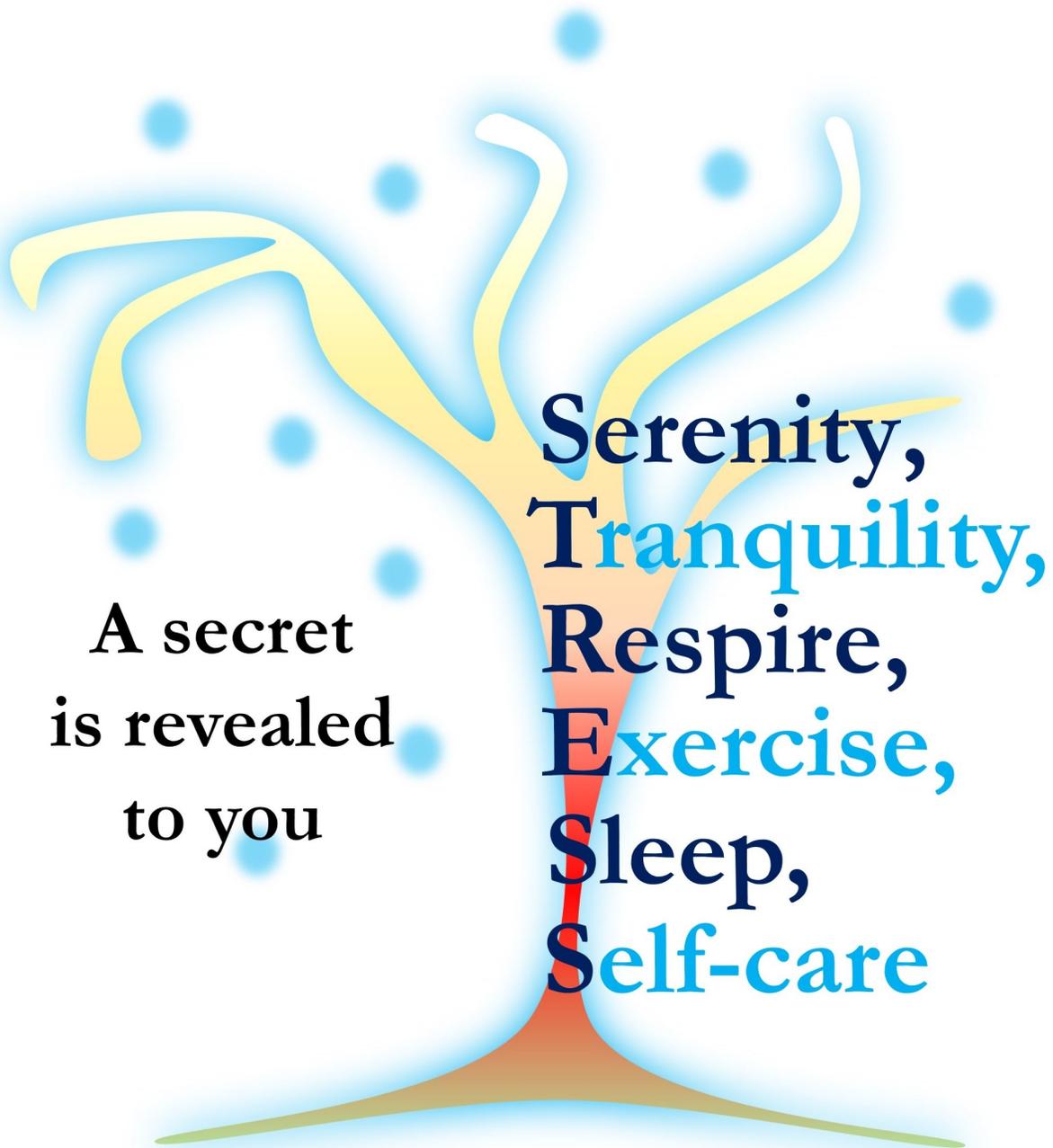


Laurent Chatre



**A secret
is revealed
to you**

**Serenity,
Tranquility,
Respire,
Exercise,
Sleep,
Self-care**

**This story is yours
with us,
between unconditional love
and betrayals...**

Laurent Chatre

Serenity, Tranquility,
Respire, Exercise,
Sleep,
Self-care

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To Emeline, Lucie & Lisa.

I would like to thank all the people, including my relatives, who supported me, through their enthusiasm, in this project.

This is for you, public. You must learn, understand, and think about it. Knowledge must be widely disseminated, for better understanding, for better balance, for universal sharing.

For Humanity.

This book is the result of a long reflection, by a researcher, what am I saying, a discoverer, me, in biology, specialist in stress and bioenergetic metabolism.

For you who are going to read me.

Why this book ? By who ?

What a hell of a “stress” ! Whether acute or chronic. Whether it's psychogenic, with overflowing anxiety or settling depression. Whether physical with a well-localized injury. That he is neurogenic with damage to the nervous system. The famous "stress" is **a sensory and emotional experience that** can really become unpleasant, and be confused with pain. But unlike pain, a form of stress, stress may not be pain. This is the ambiguity of this global phenomenon that invades our daily lives, our own lives, as well as our environment. Badly perceived, badly experienced, poorly understood, “stress” is the scapegoat of many ailments, and many illnesses. This same "stress" that we want to fight at all costs with antioxidants, with new ways of eating, with anti-stress methods. However, is it necessary, constantly ?

The familiarity being of rigor, your new book brings you all the elements so that you can understand, and act. Scientific elements with an open reflection.

Is it necessary to constantly fight this “stress” ? Shouldn't we understand it better, support it better, and influence it better ?

Imagine if the day you were reading this book was your last day, and you looked back, and realized that tomorrow may never be too late, only, and if only, you decided to change your habits for better stress, which will make many more days await you. This book is here for that, for you !

At the base of this “stress”, there is THE word which dates exactly from 1925. This term comes from the work of the endocrinologist Hans Selye, a doctor, born in Vienna in Austria, who developed his research in Montreal in Canada . Hans Selye is the founding father of the word "stress", this terrible word so misused today, contrary to its original definition. The **"General Adaptation Syndrome"** or **all the physiological means that allow a person to adapt to a new event** , that was stress ! A nonspecific response of the body to any solicitation, nothing more, nothing necessarily bad. Hans Selye wrote more than 1,700 articles and 39 books, including one in 1956 in which he describes perfectly what stress is according to him with, at the start, an "alarm" stage, then a "reaction" stage, and possibly an "exhaustion" stage (*Selye, H. (1956). The*

stress of life. McGraw-Hill).

Hans Selye even develops the term " **Eustress** ", the name of good stress, a positive, life-saving, and beneficial stress ! Unfortunately, this last term was too quickly forgotten to give stress only its dark side, " **Distress** ”.

Stress is, in fact, an extraordinary force deep within each living cell, a complementary positive and negative part, a real dynamic Yin Yang. Stress, positive or negative, is not specific to humanity. On our planet, all living organisms, including plants, bacteria, and even viruses are subject to it. How is it possible ?

At the base of this “stress”, there is a whole world that is still poorly understood, an invisible world that lives in each of our cells, and which influences us : the world of the reactive species . A world of 4 large families of biological molecules **whose destinies have been linked for billions of years .** Commonly, awkwardly, these are the oxidants. Through this book, you will learn the roles of these different families that govern all our daily lives, long before we are born, and until our death. You will also learn all their positive and negative implications in aging, in the diseases that can threaten you, as well as their reactions to your daily habits, habits that can put you at risk. **A whole story, your story !**

By whom this book ? French scientist, author of more than 30 scientific publications in international journals, and 3 international patents, researcher in biology & science popularizer, I am a specialist in biological stress, in other words reactive species, and bioenergetic metabolism including through mitochondria, real powerhouses present in living cells. Currently, I am developing my work on reactive species and mitochondria in the brain, particularly in brain cancers including glioblastomas and brain metastases, hypoxia, i.e. lack of oxygen, and brain cancers. ischemia, in a research laboratory in Caen, Normandy.

I obtained my doctorate in Medical Biology and Health (PhD) at the University Victor Ségalen Bordeaux II in Bordeaux, France, in 2005. During my thesis, I studied, in plants, the link between stress, protein production (biomass), and protein trafficking in cells. Part of my work was conducted in the laboratory of Prof. Chris Hawes at Oxford Brookes University in Oxford UK, and another part in the lab of Prof. Federica Brandizzi at the University of Saskatchewan in Saskatoon in Canada. So I traveled a lot, with diverse ways of thinking about the

invisible mechanisms of life. It was there that I began to train myself, to become a full-fledged scientist, thanks to extraordinarily human and brilliant people.

After my doctorate, I returned to the Canadian laboratory for a very intense post-doctoral internship in the publication of articles, still in the field of plants, and in intracellular trafficking influenced by stress, and by mitochondria. My laboratory moving to the University of Michigan in the United States of America in 2007, laboratory currently working on the stress of plants including in space in collaboration with NASA, I chose to return to France for a new post-doctoral internship. This is how I then worked for 11 years in the “Stability of nuclear and mitochondrial DNA” group directed by Miria Ricchetti at the Institut Pasteur in Paris.

The Institut Pasteur, it must be said and underlined, a great house as mythical as it is bubbling with scientific creativity, with a past as extraordinary as it bears hope.

I met many scientists there with different collaborations, each as rewarding as the other. I thus developed my research on reactive species and mitochondria. **I have therefore been working on “stress” in all its forms for more than 15 years now.**

My work at the Institut Pasteur focused on accelerated aging, infections including with *Helicobacter pylori*, the first bacterium known to cause gastric cancer, septic shock, pre-eclampsia, a disease of pregnancy, regenerative medicine with in adult muscle stem cells, the intestinal microbiota, and the famous antioxidants. **Each time, in each of my research, reactive species were the major players in health issues.**

In 2018, I felt the urge to take off with all the kindness, support, and encouragement of my Pasteur colleagues. I thus joined a research laboratory in Caen in Normandy, France, to focus my work on the brain, and associated diseases including primary cancers, glioblastomas, cerebral metastases, and lack of oxygen.

Thus, since 2018, I have been a “former Pasteur member” with an equally strong attachment to this great house which will always remain, in my heart and in my mind, as an honor to have worked there, as well as an extraordinary pride.

Finally, from Paris, and now Caen, I have in parallel developed a whole scientific popularization aspect for the public in the written press, radio, television, and in various festivals. You can find my interventions on the internet with filmed conferences accessible and adapted to the public.

This is how, on the strength of all my experiences, all my research and all my scientific popularization interventions, I decided to go far beyond to author this book, the fruit of a long reflection for make you aware of the importance of this moment, now, a key in your life. An essential moment when there is still time, if you wish, to change for your health and well-being.

For this, nothing beats giving voice to all these reactive species, as simply as that. This story which has just started with these few words, it is your story that the reactive species will tell you, it is that of your life. **A story mixed with time, made of unconditional love and betrayals, with twists and turns, and a denouement as extraordinary as these reactive species themselves.**

I pass the pen, it is the beginning of your story (with us)

We,
the reactive species,
we are here to show you the way,
to guide you, to accompany you, but for that,
one condition to follow, you must listen to us until the end.

Be quiet,
Breathe,
Listen and,
we will protect you,
this, whatever the event in your life.

We are both
your General Adaptation Syndrome,
the engine of your daily energy,
the key to your survival against devastating diseases,
against attacks from bacteria, viruses, fungi, and parasites,
And
your reason for living with all our ambiguity, between good and evil.

With these few words, we salute you, you who decide to take the time to listen to us. We will tell you about what your peers have discovered about us. All about us ? Close to here. Already enough to know us well ? Yes, it's a good start. We are an "interactome", a large set in interaction, of 4 families of molecules : ROS, RNS, RSS, and RCS. We will come back to what our names mean. **United, we (you) govern. Separated, we destroy (you).**

You should know that scientists have only extensively studied one of our families, the one that served to designate our illness, your illness, oxidative stress with our family of ROS. The large American library PUBMED for the life and biomedical sciences was already striking in figures in 2020 : worldwide, more than 30 million scientific publications, "stress" is found in nearly 900,000

publications, "oxidative stress" in more than 220,000 publications, our ROS in nearly 89,000 publications, and all of our 3 other families in less than 15,000 publications. Studying ourselves, together, is the challenge that will reveal many secrets about stress. Scientists are finally starting to take an interest in it . This is also the case for the author of this book, Laurent Chatre, whom we will simply call **Laurent** , who is interested in all of us, and some of his discoveries will be mentioned in this story, your story with us...