



August 2015

FROM INFORMATION TO KNOWLEDGE ON CELLULAR LIFE

Interview with Dr G.N. Chaldakov (PART 1)

*Interviewer: Darina Velcheva, Public Relations Expert, Medical University, Varna, Bulgaria**Translator: Milena Popova*

Dr George Nikov Chaldakov was born on 23rd February 1940 in Burgas, Bulgaria. He graduated in Medicine in December 1966 in Varna, Bulgaria. Since 1970 he has been working at the Laboratory of Electron Microscopy, later renamed Laboratory of Cell Biology, which is now a part of the Department of Anatomy and Histology of Medical University, Varna. Since 1998-now he has been a Guest Scientist at the Institute of Cell Biology and Neurobiology, National Research Council, Rome, Italy. He is Guest Professor at University Medical Faculty, Nis, Serbia, *Doctor Honoris Causa* of University of Medicine and Pharmacy, Cluj-Napoca, Romania, and Fellow of International Academy of Cardiovascular Sciences (FIACS).

Dr Chaldakov was Visiting Research fellow in: 2nd Department of Pathology, Semmelweis Medical University, Budapest, Hungary (1976, 1981), Institute of Arteriosclerosis, University of Münster, Münster, Germany (1985, 1986), Department of Pathology, Japan Stroke Prevention Center, Shimane Medical University, Izumo, Japan (1986-1987), Department of Anatomy and Developmental Biology, Royal Free Hospital School of Medicine, London University, London, UK (1991-1992), and Medical University, Kanazawa, Japan (Visiting Professor, 2003-2004).

Recently, his major research field is cardiometabolic adipobiology. His research group is the founder of new fields of study, adipobiology and adipopharmacology (*Curr Pharm Des* 2003; 9: 1023-1031). Dr Chaldakov is teaching medical and dental students in Cell Biology and Neurobiology. In 2014 he was awarded with the Honorary Blue Ribbon Sign of Medical University, Varna.

Dr Chaldakov is Editor-in-chief of the international scientific journals *Biomedical Reviews* and *Adipobiology* and one of the editors of *Cell Biology International*. He is the Chairman of the Bulgarian Society for Cell Biology (BGSCB) and the International Symposium on Adipobiology and Adipopharmacology (ISAA), the fourth of which is to be held from 28th to 31st October 2015 in Bucharest, Romania. Since 1990 BGSCB, in collaboration with Medical University, Varna, has been organizing *Biomedical Forum*, a program of continuing medical education (CME) consisted of 8-10 state-of-the-science (SOS) lectures per academic year.

Dr Chaldakov's personal message: *The joy of doing science and education is a supreme kind of brain-and-heart friendship (BHF) and devotion*. He often writes articles and op-eds (short for "opposite the editorial page") published in Bulgarian magazines and newspapers. He is the author of four books of essays (in Bulgarian) and one autobiographical book entitled *George 50 Years in Research* (in English). Dr Chaldakov has published 198 research articles, reviews and book chapters, having 1218 citations (according to Research Gate, 22 August 2015).*

The reason for this interview with Dr. Chaldakov is the release of the second, extended edition of his textbook of Cell Biology intended for students of Medicine, Dental Medicine and Biology, as well as for all curious PhD students, physicians, university teachers, and biologists. The textbook consists of 335 pages of text, micrographs, schemes, tables as well as *science-in-fiction* (science in short stories).

Interview with Dr G.N. Chaldakov (PART 1)

Dr Chaldakov, what is the main objective of your textbook of Cell Biology?

My aim is to help university students including PhD students and young physicians, dentists and biologists to travel from information to knowledge on cellular and matrix MSF in order, in a meaningful way, to enable them to get to know and understand pathogenesis – cellular and molecular mechanisms - of diseases and respectively their prevention and therapy. I told them “You know I would like *to knowledge* you.” Certainly, we should know the scientific facts, however, I believe that above all, we need them in order to embed these facts into hypotheses, principles and knowledge. One of the objectives of didactics and scientific research, as Arthur Schopenhauer says, is „not so much to see what no one yet has seen, but to think what nobody yet has thought about that which everybody sees“. That is why I tried to write a textbook on a conceptual, integrated and interactive basis, a sort of Translational Cell Biology, Bench-to-bedside (BtB) Cell Biology.

There are more than 50 years of research in your CV. How come you have been following continually for so many years?

Yes, in 2012, thanks to the financial support of the Mayor of Burgas, I published my autobiographical book in English - *George 50 Years in Research. Autobiographic Sketch*. Curiosity, genetic and memetic given to me by my parents, has inspired me to get in touch with great teachers – Dr. Asen Hadzhiolov Jr. at the Department of Biochemistry in Sofia, and from my third year in medical school - with Prof. Delcho Zhelyazkov and Dr. Petko Uzunov at the Department in Pharmacology in Varna. Today I take pride in having so many talented students, most of whom have become famous scientists and doctors, working in Varna, St. Louis (Missouri), Göttingen, Kanazawa, Sofia, New York, Bogota, New Orleans (Louisiana), Cambridge, Tokyo, Atlanta (Georgia), Cologne. And I would like to mention some of them: Peter Ghenev, Tanya Tenkova-Heuser, Krikor Dikranian, Anton Tonchev, Danko Georgiev, Kosta Kostov, Iliyan Ivanov, Vanya Goranova, William Moreno, Rouzha Pancheva, Wale Sulaiman, Kamen Valchanov, Boryana Popivanova, Yulia Yosifova-Karol, Galina Marinova, Mariyana Hristova.

When in the autumn of 1960 you set off to Sofia to study Medicine, your father had given you a plate where in red

calligraphic letters on blue background was inscribed WHAT DID I ARRIVE HERE FOR? The answer “To study, not to drink!” helped you to become a good doctor and scientist. You have handed down the plate to your son, and he will pass it on to your grandson. You call this “The flow of genes - *perpetuum mobile* of life.” What is the most important thing that children need to learn from their parents?

Healthy lifestyle and love for knowledge, CURIOSITY (in Bulgarian, *lyuboznanie* – an unique symbiosis of “love” and “knowledge”) - after „mummy“ and „daddy“ – this, in my soul and mind, is the most cherished Bulgarian word. The family and friends, too, of course! Those who I call Brain-and-Heart Friends (BHF) - three interwoven words that make up the core of my concept of life, which is already known in Bulgaria and abroad.

What has influenced your development as a personality and scientist most of all?

My parents, teachers and friends. That is why my five published books of essays so far and the textbook of Cell Biology begin like that: “Plato learned from Socrates, Aristotle - from Plato, Alexander of Macedonia - from Aristotle, Friedrich Nietzsche - from Fyodor M. Dostoevsky, Carl Jung - from Sigmund Freud, George Palade – from Albert Claude, Günter Blobel - from George Palade, Luigi Aloe - from Rita Levi-Montalcini, Marco Fiore - from Luigi Aloe, Hristo Photev – from Ivan Peychev, Petya Dubarova – from Hristo Photev... The author of this book - from his parents, teachers and friends.”

And what do you think is the formula for health?

Modern health doctrines are predictive, preventive and personalized (precision) medicine. In short, „the formula for health“ is a healthy lifestyle. It involves a healthy diet, brain and physical activity and absolutely no smoking, no narcotics/ drugs. I gave up smoking 10 years ago, I had been a fool for smoking for 40 years. Do you happen to know which the best way to quit smoking is - never start smoking. The same goes for drugs and other harmful to health habits. The example of parents is really important - I remember neither my father smoking, nor my mother. My wife does not smoke, neither does my son - this is how we’ve brought him up. My grandson Nikifor, who is now 12 years old, most probably will not become a smoker, either. After all, the Bulgarian Aesop - Radoi Ralin - warned us a long time ago: „Smoking is an internship for impotence.“ Then, in the early 1980s, I wrote an article

in the Kultura (Culture) newspaper, entitled „Radoi Ralin is Right!“ Please note, to exteriorize such a statement for a man being one of the greatest dissidents in these years in Bulgaria was somehow a courageous action. The article’s subtitle was: „Smoking or sexual potence, choose for yourself.“ A lot of male students quit smoking, and lots of female students thanked them for that.

I wish this marijuana, which is being propagated lately, did not become legal, just like all other obsessions, „this purposeless bulimia, this orgy of desires“ (Umberto Eco), preached by neoliberalism, such as gay parades, gay marriages ... I have elaborated on the pending biosocial crisis in my article „Quo vadis, Homo sapiens? What is to be seen through Overton window“, published in July 2015 in the online edition of *Literaturen sviat* (Literary World).

I have read somewhere about the beneficial effect of cannabinoids...

Marijuana is a part of the neoliberal culture, which in my view as I said before, causes lots of troubles to mankind and the society. As far as cannabinoids and their receptors are concerned, well, this is a whole science, and it should be done under medical prescription rather than being so „liberal.“ Just like the populist electioneering of some politicians on „parents‘ informed consent“ on vaccination or non-vaccination of their children. Long ago, in 1750, the famous English literary critic and lexicographer Samuel Johnson wrote: „*Populism* is the last refuge of a scoundrel.“ He is also the one who uttered the wisdom: „There is nothing which has yet been contrived by man, by which so much happiness is produced as by a good tavern or inn.“ But only after learning your lessons, after doing your work – thus I admonish my students incessantly. I remind them, in the way my parents did, the „success formula“: WHAT DID I ARRIVE HERE FOR?

THE IMPLEMENTATION OF LONG-TERM PREVENTIVE PROGRAMMES ENSURES HEALTH FOR THE NATION

Interview with Dr G.N. Chaldakov (PART 2)

What is the essence of a healthy diet?

A healthy diet and physical activity prevent diseases, on the other hand, the consumption of over-salted, over-fatty, high-calorie food and the lack of exercise are powerful risk factors for the development of cardiovascular diseases (more correctly, cardiometabolic diseases - atherosclerosis, hypertension, obesity, type 2 diabetes mellitus and metabolic syndrome). Healthy eating is a lower calorie diet, which, however, does not apply to sportspeople because they require much more energy, which should be compensated. You shouldn’t eat too much animal fats, carbohydrates and salty food, you should „overdo it“ with fruits and vegetables. And a glass or two of red wine a day. The cooperation between the owners in food industry sector and the governments are a part of the strategy to combat these diseases. The statistics in the United States indicate that, as a result of this, 513 885 strokes and 480 358 heart attacks were prevented in 2006. This medicinal product has a huge economic impact: 32 billion dollars are being saved annually - according to the data of scientists from Stanford

University in Palo Alto (*Annals of Internal Medicine* 2010; 152: 481-487).

For further information related to calorie restriction and the related to it genes *Sir* (silent information regulator) and proteins SIRT (sirtuins) you can ask David Sinclair at Harvard Medical School in Boston and Mark Mattson at the Laboratory of Neurosciences, Biomedical Research Centre in Baltimore, or search for it in PubMed. Here I’d like to mention that some of my BHF among the doctors are vegetarians - the most famous of them, of course, is Prof. Kosta Kostov, a pulmonologist and editor-in-chief of *InSpiro* – a journal for respiratory medicine and inspiration, the only one in the world, combining science - poetry - jazz.

Important: All of us, especially children and young people, should get de-mcdonaldized! From 1st February to 2nd March 2003 the American filmmaker and journalist Morgan Spurlock carried out and documented the following experiment - every day he had breakfast, lunch and dinner at the restaurants of McDonald’s. Consequently, three products were obtained:

(i) Morgan put on 11 kg and his liver and other laboratory tests indicated a significant damage to his health, (ii) his documentary *Super Size Me* was nominated for the Academy Award for the Best Documentary Feature, (iii) the book *Do not Eat this Book. Fast Food and the Supersizing America* became the most consumed book in the USA. The Bulgarian Svilen Dimitrov made the animations for the film *Super Size Me* – and he is welcome to make *Super Salt Me*, addressing the worrying situation of too much salt in Bulgarian diet. Because all of us - doctors, politicians, businessmen and citizens – must put an end to the Bulgarian “song of the goat” (*tragedy*, I will say more about it later). EU and NATO do not care about this - the health of the Bulgarians is not a Euro-Atlantic value for them.

And what about you, are you a vegetarian?

I am not, but my son has been a vegetarian for 15-20 years.

You’ve also mentioned that each doctor should be a teacher in health as well.

Yes, exactly. And I often repeat this to my students. Ages ago, the wise Chinese people paid the doctors for the number of healthy people in the area, not for the number of patients they had examined. Thus they couldn’t rob the Chinese Health Insurance Fund. The new requirement that was introduced in our country, which is really a rather positive thing, is that it is already compulsory for everyone of us to undergo a prophylactic blood test for cholesterol, glucose, pro-inflammatory and other biomarkers once a year. Predictive, preventive and personalized medicine are extremely important concepts of modern biomedicine. Thus, for example, men at the age of 40-45 must have their prostate and prostate-specific antigen examined, while on the other hand, women must periodically undergo preventive examinations for cervix and breast cancer. I’ve publicly written that Prof. Aleksandar Chirkov has harmed the Bulgarian Healthcare as much as he has contributed to it, because he put the stress on cardiac surgery, which is the final therapeutic stage of the cardiovascular diseases. It’s a pity Dr. Chirkov, with all his talent and Todor Zhivkov’s communistic support which he used, rarely or never at all discussed effectively preventive medicine of cardiovascular diseases.

At the same time countries (Finland, Japan, the USA), which have organized and implemented long-term preventive health programmes, have already achieved significant success. The results of the investment in preventive medicine become visible in 10-15-20 years’ time. As I have said before: “To act

and think preventively and within a long term, and not within the term of office and in a highway-like way, is the privilege of wise politicians – people-loving ones (demophiles).” The fact that politicians in our country do everything from one term of office up to the next one turns out to be a significant issue. Yes, a highway could be completed much more quickly and the results could be evident. But the pending demographic catastrophe, which I call demostrophe, requires *long-term* preventive programmes that run on a daily basis - from early childhood to adulthood. Prof. Violeta Yotova and Assoc. Prof. Rouzha Pancheva are more profoundly acquainted with the pediatric aspects of cardiometabolic diseases. It is high time politicians listened more carefully to the top scientists, doctors and teachers. Perhaps to the good poets, as well.

There are scientific laws - if the parents of a person have died of a heart attack or stroke before the age of 45-50, their children are at risk and they might suffer from an early heart attack or stroke. Therefore, starting from neonatal, even intrauterine age, they should live in a preventive environment - and that prevention should be *long-term!* This is exactly what the science called exposomics deals with today (exposome is the total number of adverse health internal and external factors that a person is exposed to - from the English word “expose”, including intrauterine and neonatal life, when the developmental programming takes place - and has impact on the human health in adulthood). Every aspect of the human being is a result of the action of the genome, exposome and memes of an individual, i.e. of biology, the external environment and culture. “The world is in the research laboratories, not in the banks.” These are the wise words of the Israeli President Shimon Peres. In the research laboratories, but not in the one of the Commander (the nickname of one of the Bulgarian former Prime Ministers), or, as I call him now, the Laboratory Technician. The problem is that there are no Bulgarian politicians that would listen to the Israeli President - and understand him. So how could they hear my friends and me!

„To be a flower, is profound responsibility“ - wrote Emily Dickinson. I’d like to paraphrase it: „To be a politician, is profound responsibility.“ To teach people to be health-aware is beneficial, people-loving action. This is an effective state policy for healthy Bulgarians in a healthy Bulgaria.

Precisely the politicians (and our gullibility to choose them) are to blame for the fact that “the song of the goat” still goes on (Gr. *tragos* - goat, *aeidein* - sing) - tragedy (*tragoidia*) in our Bulgarian style - the most alarming national phenomenon that

must be urgently and for a long term curbed in order to avoid the demostrophe. According to data of the National Statistical Institute in 2012 these and other diseases have caused the death of 109 281 Bulgarians - a whole big Bulgarian city! 71 644 of them have died of stroke and heart attack, 18 299 – of cancer. On the other hand, significantly fewer children were born during the same year - 69 121. Thus, the induced (not natural) decline in the population of Bulgaria is 40 160 per year from a total of 7 284 600 Bulgarian citizens on 31 December 2012. Dividing 109 281 by 365, we get 299 – that’s horrible, that’s the number of people dying every day in Bulgaria!

And is it possible to prevent cancer?

Yes, it is. However, the scientific answer to this question can be provided by the colleagues who deal with these diseases - for example, Prof. Temelko Temelkov, Prof. Aleksandar Hinev, Prof. Bogomila Manevska, Prof. Petar Genev, Prof. Nadezhda Deleva, Prof. Iskren Kotsev, Assoc. Prof. Valeria Kaleva, Assoc. Prof. Dimitar Kalev...

Recently there has been a lot of talk about personalized medicine, i.e. therapy based on human genes. What do you think about this?

Yes, here we talk about something much more profound. Today, this is also designated precision medicine, which is an emerging approach for disease therapy and prevention that takes into account variability in genes, environment and lifestyle for each person. Thus, the Centre for Translational Medicine and Cell Therapy, opened quite recently, at St. Marina University Hospital in Varna is an initiative with high scientific and practical application potential and prospects. I hope that the Centre will become the *locus biomedicus* for conveying basic science, lectures, auditoria to the bedside of patients, the popular in Western countries bench-to-bedside (BtB) translational education and science. Perhaps I myself will have access to the Centre and thus a dream of mine will come true: translational cell biology. Now it is presented in some of our research projects and related publications, also in my textbook of Cell Biology, where I *lead* (Lat. *ducere*, English *education*) students from MSF to DPT – the curious ones know what these abbreviations stand for. At the Centre it will be possible the genetic profile of a person to be examined and consequently to be assessed their susceptibility to a particular disease and whether a particular drug will be effective or not. For example, it is well-known that some of the drugs used for treating breast cancer have a therapeutic effect on some

women, while they do not have such an effect on others. Another “translational” example is stem cell transplant - this is cell therapy - it could be a drug of choice in some diseases:

And another important thing: it is not fatal to be predisposed to a particular disease. The fatal thing is if this predisposition is not detected in good time and the necessary prevention and treatment does not start. This is the genetic part of predictive and personalized medicine and respectively - therapy. One of its branches is called Pharmacogenetics, which is well-known to Assoc. Prof. Maria Zhelyazkova - the daughter of my teacher. About epigenetics of diseases you can ask Dr. Trifon Chervenkov from the University Laboratory of Cellular Immunology.

In his book “The Biology of Belief” the American specialist in cell biology Bruce Lipton claims that it is not the nucleus but the cell membrane that is the “brain” of the cell, because the signals from the environment pass precisely through it and depending on them, the cell reacts in a certain way, including at the level of gene expression. What do you think about this?

In my Cell Biology it is written: „The membrane surrounding the cell is the first supramolecular structure arising in the course of cell evolution. It is the centre of the interactions between signal and receptor molecules, called receptor-mediated signal transduction, it is the core of cellular life.“

„The membrane is the „brain“ of the cell“ - perhaps this could be a nice metaphor, if it were written, for example, by Günter Blobel - the creator of the signal hypothesis, one of the apotheoses in modern cell biology. I am learning from George Palade, Albert Claude, Christian de Duve, Rita Levi-Montalcini, Günter Blobel, Luigi Aloe, John Heuser...

The “colleague” Bruce Lipton reminds me of the poem *Declaration* by the great Bulgarian poet Konstantin Pavlov. Here’s a part of it:

*The flame of each petty truth
does not attract me.*

*Satellites of the oil lamps
are the flies.*

*I am an even vainer insect -
the sun is my little candle.*

Is it possible to stop cell aging?

45-50 years ago the American scientist Leonard Hayflick discovered that human cells (*in vitro*, in culture) have a limited number of division, about 50 times – this is called

the Hayflick limit. After that the cells begin to grow old (senescence). It was found that this is due to the shortening of the end parts (telomeres) of chromosomes – look at this beautiful micrograph, taken from Wikipedia: the telomeres are the white balls at both ends of each of the chromosomes, coloured in blue.

Later on - in 2009 – Elizabeth, Carroll and Jack were awarded with the Nobel Prize for the telomerase, an enzyme that restores telomeres and the cell continues to be divided. There were talks about “a fountain of life”. However, if cell division continues uncontrollably, this may result in carcinogenesis - birth of cancer cells. Similar to most biological processes, in cell division and cell aging, at least for the time being, it is difficult to control the delicate balance of health and disease. Cell biology is self-regulating, relatively stable but delicate, sometimes romantic matter. Is there any greater challenge for curiosity! - for students, teachers and scientists. Please pay attention to the fact: Carroll Greydar, one of the Nobel Prize winners for telomerase, was born in 1961 in San Diego, California - if I had been there, she would have been my

student. She became a Professor at the Faculty of Medicine of John Hopkins University in Baltimore in 1997, i.e. at the age of 36 - a phenomenon that rarely happens in biomedicine in Bulgaria - Anton Tonchev and Drozdostoy Stoyanov are the only examples I know, elected for professors under 40 years of age.

One more thing: what I said about calorie restriction-*Sirtuins*, increasingly investigated by David Sinclair, Mark Mattson and other researchers, applies to biology of aging – it is called aging science. Accordingly, there is a *Journal of Aging Science* and National Institute on Aging Research in the USA, which is exactly where Mark Mattson works. Unfortunately, for the time being “The Fountain of Youth” is only in the picture of the German painter Lucas Cranach, painted in 1546, and in my article “Hormesis, Resveratrol and a Fountain of Youth”, published in *InSpiro* in 2008.

Please allow me to finish this biochronological topic with a verse by the great Romanian poet Lucian Blaga:

The child laughs: The game is my wisdom and my love.

The young man says: Love is my wisdom and my game.

The old man whispers: Wisdom is my love and my game.

ASSOCIATIVE THINKING IS AN ESSENTIAL PART OF MY DIDACTICS

Interview with Dr. G.N. Chaldakov (PART 3)

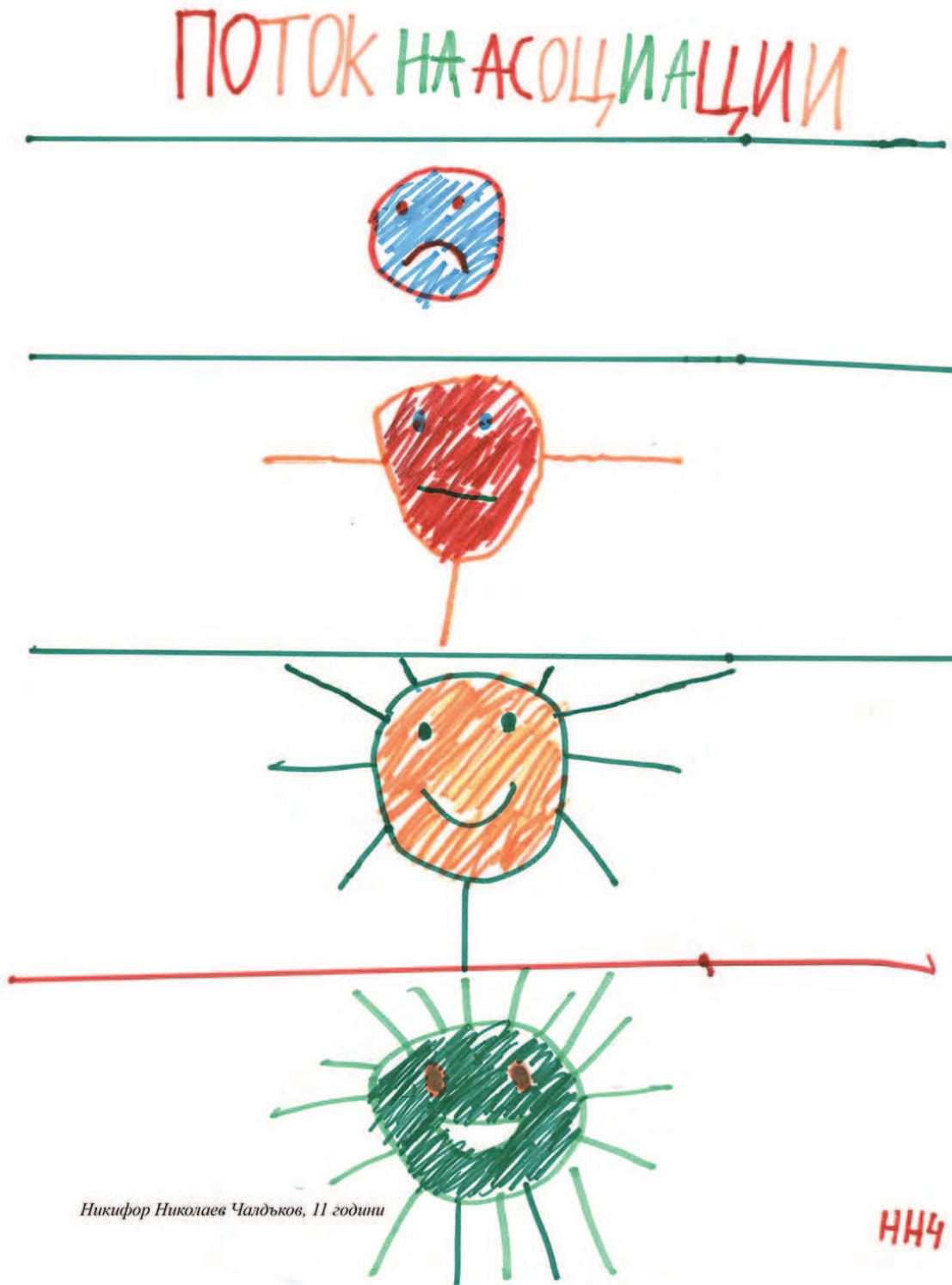
You are a member of the editorial board of several scientific journals, including *InSpiro*. You apply the approach of combining science and art also in your textbook *Cell Biology*, in which you explain the complex world of the cell through examples, curious facts, historical and artistic references. To study *Cell Biology* in such a way is undoubtedly intriguing.

That's right, this, as well as imagination and associative thinking are an essential part of my didactics. You know *stream of consciousness*, a writing style of James Joyce, Samuel Beckett, Franz Kafka and other famous writers. An essential component of my teaching style is *stream of associations*, as illustrated by my grandson's picture on the inside back cover of *Cell Biology* textbook. ** “Imagination is more important than knowledge because knowledge is limited” - says Albert Einstein. Poets turn imagination into metaphors, scientists - into hypotheses and concepts, into knowledge. F.M. Dostoyevsky, Peyo Yavorov, Hristo Photev and Konstantin Pavlov have

given me more than George Palade, Albert Claude, Rita Levi-Montalcini and Günter Blobel (great scientists, Nobel Prize winners). This is a paraphrase of Einstein's great thought: “Dostoyevsky has given me more than Gauss.”

I wish students were acquainted with: *The Little Prince* by Exupéry, *Winnie the Pooh* by Alan Milne, *Alice* by Lewis Carroll, *We, the Sparrows* by Yordan Radichkov, *Don Quixote* by Cervantes, *Crime and Punishment* by Dostoyevsky, *Zorba the Greek* by Nikos Kazantzakis, *There is no Such a Book* by (Dr) Lyudmil Stanev. Also they should know about the theater director Krikor Azaryan, here's one of his wise thoughts: “Can you imagine what life would be like if you felt the pain you inflicted? The world would be completely different.”

This is a lesson in moral philosophy, a poignant voice of “the intimate acoustics of human soul” – I teach my students such lessons, as well. And I advise them that they are going to learn much more from the lectures of the philosopher of our University - Alexander Stoychev.



**A drawing entitled *Stream of Associations* by Nikifor N. Chaldakov (11).

Have you got a favorite verse by the great Bulgarian poet Hristo Photev?

All of Photev's poems are my favorites... I will now recite a part of "I Was at the Very Top...":

I was at the very top of my youth.

I used to be wild, disproportionate and handsome.

*I loved you with no mercy - with rage -
and I wonder I am still alive.*

And the end: *And I'm sorry I am still alive.*

Hristo Photev himself loved reciting this poem of his.

And one more:

My heart was in its prime strength.

It wasn't an ex-one as it's now.

Gathering the chlorophyll of every spring

It burst out – the snow turned to green.

Reminiscent of Federico Garcia Lorca, right:

The golden girl

bathed in the water

and the water turned to gold.

And what is the source of your inspiration?

The unknown in biomedical science. A good poem, a painting, a melody... and charming women and good wine, of course! For example, listen to the Lorca's *Ditty of First Desire*:

Soul,

turn orange-colored.

Soul,

turn the color of love.

Prof. Mihail Davidoff from the Medical University in Hamburg describes your textbook of Cell Biology as wonderful artwork with an original conception and perfect accomplishment. Do you believe that the textbook will help future and present physicians become better professionals?

Yes, I hope so. I also believe it will be beneficial both for the knowledge and even more important, for the mode of thinking of the curious students, teachers, PhD students, doctors and biologists. My textbook was written *in-depth* and it is advisable to be read *in-depth* if the reader wants to acquire *in-depth* knowledge on Cell and Matrix Biology and its importance for the understanding of diseases, prevention, therapy. To

be a textbook author, is profound responsibility - come on, remember Emily Dickinson again...

You are a Guest Scientist in Italy and Guest Professor in Serbia and Japan. Could you say that Bulgarian students are among the most curious ones?

There are curious and talented people in all countries. The countries providing care, incentives and appreciation for the curiosity and talent make a progress and they can boast better health and quality of life (QoL). However, I am really worried about the over-liberal doctrine (not just in the economy) and the globalization, the Americanization and other variations on this topic. I am worried about our vulnerability to the actions of the most detrimental human symbiosis, the one of the talented amorality, of "the sustainable amorality," as Dostoyevsky called it. Anyway, He expressed his conviction: "I will not and cannot believe that evil is the normal condition of mankind. And yet how simple it is: in one day, in one hour everything could be sorted out." Hopefully, so be it in Bulgaria, too.

What have you been working on at the moment?

The English edition of my Cell Biology, which will be entitled *Principles of Cell Biology*, and the organization of the 4th ISAA in October in Bucharest.

Is there a question you cannot answer?

Well, I do not have answers to a plenty of questions - that is my serious answer. And here is a facetious question I have no answer to: "Once a man learns to ride a bike, he can do it forever. Then why, once a man gets to *know* women he cannot *know* them forever?" Dr Valcho Yordanov – a pharmacologist, psychiatrist and psychoanalyst – eventually he might know the answer to this consequential question.

Your message to our future students.

My message to the present and future students is: Be healthy and curious! Be a true BHF. Love each other - and forever! Respect your parents, patients and your teachers. Follow the Ten Commandments and the Hippocratic Oath. I sign my message:

Sincerely yours,

George N. Chaldakov, GF (Grandfather), BHF, MD, PhD, DHC, FIACS



July 2015, Nikifor and George Chaldakovs, *Adipobiology*, *Biomedical Reviews* and other journals in the Library of Medical University, Varna. At the end of this interview Dr. Chaldakov said: I grew up in the laboratories, libraries and pubs (LLP), a concept of education we have established in the early 1960's, recently defined as standing for lifelong learning programme, also abbreviated LLP – there are millions of euros there, students may apply to EU for fellowship grants.

And with your permission, here's one of my attempts to write „vertically“:

A fortiori

The bird is not jealous of the airplane.

The fish is not jealous of the dolphin.

The grass is not jealous of the flowers.

A man who crawls is jealous of

A man who walks.

A man who walks is jealous

Of a man who flies.

A man who flies is not jealous of

Someone else who flies.

In other words: „To transform jealousy into admiration“ and „Help me to elevate you“... (written in 1869 on the door of a school in the city of Kotel and rewritten in the novel “Elevation” by the young Bulgarian writer Milen Ruskov).

*Conceptual contributions and a selective list of related publications:

I. Concept of the secretory function of vascular smooth muscle cells

1. Chaldakov GN, Nikolov SD. Ultrastructure of the arterial smooth muscle cell. In: Wolf S, Werthessen NT, editors. *The Smooth Muscle of the Artery*. New York City, NY: Plenum Press. *Adv Exp Med Biol* 1975; 57:14–20.
2. Chaldakov GN, Kadar A. Microtubules in arterial smooth muscle cells in vivo and in tissue culture. An electron microscope study. In: W. Hauss, R. Wissler, R. Lehman, editors. *State of Prevention and Therapy of Human Arteriosclerosis and in Animal Models*. Rheinisch-Westfälische Akad. Der Wissenschaften, 1978, p. 211-231.
3. Chaldakov GN, Vankov VN. Morphological aspects of secretion in the arterial smooth muscle cell, with special reference to the Golgi complex and microtubular cytoskeleton. *Atherosclerosis* 1986; 61: 175-192.

II. Hypothesis of pharmacotherapy of atherosclerosis targeting tubulin/microtubules

4. Chaldakov GN. Antitubulins – a new therapeutic approach for atherosclerosis? *Atherosclerosis* 1982; 44: 385-390.
5. Chaldakov GN, Vankov VN. Antifibrotic approach in the therapy of arterial occlusive diseases: new considerations. In: G. Trubestein, editor. *Conservative Therapy of Arterial Occlusive Disease*. Stuttgart, New York, Georg Thieme Verlag, 1986, p. 224-226.

III. Interactive (triactome) hypothesis of atherogenesis

6. Chaldakov GN, Fiore M, Ghenev PI, Stankulov IS, Aloe L. Atherosclerotic lesions: possible interactive involvement of intima, adventitia and associated adipose tissue. *Int Med J* 2000; 7: 43-49.
7. Chaldakov GN, Fiore M, Ghenev I, Beltowski J, Rancic G, Tunçel N, Aloe L. Triactome: neuro-immune-adipose interactions. Implication in vascular biology. *Front Immunol* 2014 March. DOI: 10.3389/fimmu.2014.00130

IV. Cardiometabolic adipobiology

8. Chaldakov GN, Stankulov IS, Hristova MG, Ghenev PI. Adipobiology of disease: adipokines and adipokine-targeted pharmacology. *Curr Pharm Des* 2003; 9: 1023-1031.
9. Töre F, Tonchev AB, Fiore M, Tunçel N, Atanassova P, Aloe L, Chaldakov GN. From adipose tissue protein secretion to adipopharmacology of disease. *Immun Endoc Metab Agents Med Chem* 2007; 7: 149-155.
10. Chaldakov GN, Beltowsky J, Ghenev PI, Fiore M, Panayotov P, Rancic G, Aloe L. Adipoparacrinology – vascular periadventitial adipose tissue (*tunica adiposa*) as an example. *Cell Biol Int* 2012; 36: 327-330.
11. Chaldakov GN, Rancic G, Fiore M, Panayotov P, Beltowski J, Bojanic V, Aloe L. Adipoparacrinology of atherosclerosis: Evidence updated. *Immun Endoc Metab Agents Med Chem* 2012; 12: 2-7.

V. Neuroadipocrinology

12. Sornelli F, Fiore M, Chaldakov GN, Aloe L. Adipose tissue-derived nerve growth factor and brain-derived neurotrophic factor: results from experimental stress and diabetes. *Gen Physiol Biophys* 2009; 28:179-183.
13. Chaldakov GN, Fiore M, Tonchev AB, Aloe L. Neuroadipology: a novel component of neuroendocrinology. *Cell Biol Int* 2010; 34: 1051-1053.

VI. Hypothesis of metabotropic potentials of adipokines and neurotrophins

14. Chaldakov GN, Fiore M, Tonchev AB, Dimitrov D, Pancheva R, Rancic G, Aloe L. *Homo obesus*: a metabotrophin-deficient species. Pharmacology and nutrition insight. *Cur Pharm Design* 2007; 13: 2176–2179.

VII. Nutritional products and neurotrophins

15. Carito V, Venditti A, Bianco A, Ceccanti M, Serrilli AM, Chaldakov G, et al. Effects of olive leaf polyphenols on male mouse brain NGF, BDNF and their receptors TrkA, TrkB and p75. *Nat Prod Res* 2014; 28:1970-1984. DOI: 10.1080/14786419.2014.918977.