# Ivan Damjanov Interview

**Pećina, Marko**

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Ivan Damjanov, Emeritus Professor of Pathology, The University of Kansas School of Medicine, Kansas City, Kansas, USA. He received his MD and PhD degrees from the University of Zagreb, and honorary doctor degrees from the University of Novi Sad, Serbia and Charles University, Prague, Czech Republic. As a Diplomate of the American Board of Pathology he worked at several University Hospitals in the USA, and also taught at four Medical Schools, including University of Connecticut, Hahnemann Medical College and Thomas Jefferson University in Philadelphia, and University of Kansas. He is best known for his research in developmental biology, tumor markers immunohistochemistry and medical education. He is a corresponding member of the Croatian Academy of Sciences and Arts.

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**1. Two years ago, when you and I started talking about these alumni interviews, you probably never thought that you will be asked to do one with me. But it is now your turn and I am glad that you consented to let me interview you.**

You are right, this was not in our initial plan, but I must admit that I am pleased to comply and answer a few questions that you prepared for me (Figure 1).

*Figure 1. Interviewer Marko Pećina and the interviewee Ivan Damjanov, Zagreb, April 2022.*

**2. Let me start with a question about your name. How did you get it?**

I was born in 1941 in the Kingdom of Yugoslavia in a city called Subotica, which is now in the northern part of the Republic of Serbia. Five days after my birth, Hitler declared war on Yugoslavia and a few days thereafter the entire country fell apart into several smaller parts, some of which were annexed to the neighboring countries allied with Germany. My native town was occupied by Hungary. The Hungarian authorities had a list of officially approved i.e., permissible names. From that list my parents chose a name that was both Croatian and Hungarian. In Croatian the little Ivan is called Ivica, and my grandfather shortened it to Ica, or its vocative, Ico, and that's how my friends still call me. Upon my emigration to the US I became Ivan again. However, my name was pronounced now with an American twang and beginning with an "ay", unless I taught my interlocutors how to pronounce it correctly. My last name presented additional problems to anglophone people and I played with the idea of changing the "j" in my last name to a "y". However, my daughters objected, and we did not do it. Americans like shortcuts and thus, for practical reasons, my residents shortened my last name and started calling me Dr. D ("Dee").

**3. How did you come to Zagreb from your Subotica, the town of your birth?**

A simple answer is by train, following the decree of my father. I grew up in a patriarchal family and my father had almost absolute authority to do whatever he wanted. He studied veterinary medicine in Zagreb in the 1930ies and in his mind that was the most cultured city in Yugoslavia. Thus, he decided that his son must get the best possible education and transferred me to Zagreb as soon as that becomes feasible. Soon after my eleventh birthday he managed to enroll me into the Classical high school in Zagreb, despite the protestations of my mother and grandmother. To appease them he bought a house in Zagreb and shipped me away together with my grandmother to join my uncle who was studying engineering there. I loved my high school and still like Latin, the language that we studied for 8 years with our beloved professor Marijan Bručić (Figure 2).

*Figure 2. Graduation party, Classical High School, Zagreb 1958. Ivan Damjanov is first from the right in the front row. Professor Marijan Bručić was the headroom teacher who led these students from their first grade till graduation. Several of the students on this photograph have achieved prominence in Croatia: Ana Karić, dark-haired woman to the left of the professor became a famous actress. Smiljko Sokol, the men with a moustache to the left of her became professor of law, and wrote, together with two other lawyers, the Constitution of the Republic of Croatia in the 1990ies. Krešimir Veselić, next to Damjanov, became a university professor of mathematics and a corresponding member of HAZU.*

**4. Do you feel that Zagreb is your real home?**

I was already asked the same question in another interview in Spain and I answered it quoting Rudyard Kipling: " We've only one virginity to lose, and where we lost it there our hearts will be". I lost my sexual and intellectual virginity in Zagreb, and thus I know for sure where my heart will be forever.
In Split, where we bought an apartment a few years ago and still spend a part of our retirement, they often ask me from which part of the "region" I came from. I tell them that I am from Zagreb. Even though I have spent more than 20 years in that town and still go there to vote and pay my taxes, I do not speak with a real Zagreb accent and do not use the local slang. My interlocutors would therefore usually ask me "Where are you *really* from?". To cut the discussion short I would tell them that I am actually an American from Kansas. Unfortunately, were I to speak English to Americans, they would immediately recognize that I have a non-American accent. For the hard-core nationalists, I am thus neither a good enough Croat nor an American. I must disappoint them, however, since I feel at home on both sides of the Atlantic and do not give a hoot about them nitpicking about my real nationality.

**5. What do you remember of your student days in Zagreb?**

Optimism of the memory has wiped out from my mind the remembrances of all bad days. All that remain are recollections of the nice moments. I liked attending the lectures at the Medical School and I dutifully went to most of them, indiscriminately paying attention to most of my professors. I was an obsessive

note-taker, and regularly transcribed my notes into well organized notebooks. While paying attention to my professors I also tried to imitate them and I also tried to learn how to teach, how to explain complexities of biomedical sciences and, most importantly, how to ask questions, anticipating what could show up on the oral exams that we had at the end of each course.

Some of my professors stand out in my memories more than the others. For example, we were all awestruck by professor Drago Perović , the anatomist who drew in front of us on the blackboard intricate parts of the human body. Since I do not know how to draw, I was actually discouraged by his bravura performance, realizing that I could never visualize in my mind or draw with pen or pencil all those anatomic details like my professor. Little did I know then that I will spend my life in pathology, an epitome of a morphologic discipline.

During the first two years of my studies, I was most attracted to physiology. Soon after the course began I asked my professor Božović which English textbook of physiology should I buy. On his advice I bought the American translation of the textbook written in Spanish by the Argentinian Nobel Prize winner Bernardo Houssay. It was the first English medical textbook from which I studied in great detail.From it I learned the essential biomedical English terminology and even more importantly I learned how to study and write. I still consider the money spent on Houssay›s book as one of the best investments of my life. And even today I still like medical books, maybe because I was at an early age imprinted by that physiology book.

The physiology lectures were those days given by only two professors, Ljubo Božović and Nikša Allegretti. I was mesmerized by both of them and after the final exam I applied to become a teaching assistant in physiology ("demonstrator", in Croatian) . Professor Božović was a witty joker and his lectures were always entertaining. He also liked to talk informally with us the students. The topics of those informal discussions varied from one day to another and were not always politically correct in the communist society of those days. I still remember how he commented about a well-known clinician who catered to the highly ranked communist politicians, calling him *Incitatus.* To us who knew Roman history from our high school days the message was obvious*:* If the Roman emperor Caligula could promote his own horse *Incitatus* to the rank of a God, who would prevent the communist rulers to promote their personal physician to the rank of a full professor!?

Professor Allegretti was always serious and never smiled. We were always a bit afraid of him. Only later, when I started writing with him a manual for the student's physiology laboratory practicum, did I realize how good a person he was and how much he cared about teaching and medical students in general. Among other things, he and his Department have actually motivated several of my upper-classmen, who were a few years older than I, to write student-generated mimeographed texts (known by us the students as"scripta"). Some of those students, such as Milivoj Boranić and Vlatko Silobrčić became later leading Croatian scientists.Personally, I learned from professor Allegretti many things. Above all I still remember him saying that, if you want to become a professor, it is not enough to know your subject; you must also care deeply about the students you are teaching.

During the third year of my university studies I was exposed for the first time to real medicine in two subjects: pathology and pathophysiology. Pathology was less than inspiring and was taught in a very pedestrian manner. Pathophysiology, on the other hand, was very exciting and we were almost all smitten by the presentations of professor Pavle Sokolić. Needless to say that I do not remember anything from his lectures . Still, if I were to close my eyes, I could see him vividly walking from one end of the lecture room to the other lecturing to us, as if he were a poet or a prophet. Only many years later, I became aware of a line from the Bible: *It is a fearful thing to fall into the hands of the living God* (Hebrews 10:30). But in any case, it was a memorable experience.

At that time there were no textbooks of pathophysiology. My colleague Vlatko Grnja, who became later a radiologist in the US, and I proposed therefore to professor Sokolić, that we will record his lectures on a tape recorder. Our goal was to play back the recorded lectures, decode his words and dictate them to a transcriptionist, who was hired to this end by the Medical School. We spent many days working on that project but, unfortunately, we never managed to complete the task and publish a textbook based on professor's lectures.

A special place in my medical school remembrances is reserved for professor Nikola Škreb. I spoke about him *in extenso* in my interview for the *International Journal of Developmental Biology* (http://www.ijdb.ehu.es/web/paper.php?doi=10.1387/ijdb.120255ja ); thus there is no need to repeat it here. It should suffice to say that he was my mentor, my idol, and protector. He introduced me to science. I owe him more than I could say here.

**6. How did you get to America?**

As a student I worked during my summer holidays as a tourist guide. During the school year I would also moonlight from time to time as a local guide whenever I was called by the tourist agency. One of those days, during my fourth year of medical studies, I had the chance to guide a group of American physicians from Hawaii. Talking to me in private, one of those physicians gave me his business card and suggested that I apply for future training to his hospital on that island. Upon his return to the US, he sent me application forms and all the necessary information on how to reach America and continue my education there. Following his suggestions, I and two of my close student friends

passed the American medical licensing examination, known as ECFMG, which enabled us to continue our education in the US. Three of us moved then in 1967 to Cleveland and I completed two years of my pathology training in the US.

Those days there was a war in Vietnam and I did not want to apply for a US immigrant visa.
After two years of America I returned to Zagreb where I still had a job waiting for me in the Department of Pathology of the Medical School. My wife's and my own parents were elated that we chose to return to Croatia in 1969.

**7. How was it when you returned for the first time from America?**

I went to America two times and returned two times. The first few weeks after my first return to Croatia in 1969, I was in a horrible shock. I could not sleep, I had nightmares and I would wake up in the morning asking myself how I could have ever made such a stupid decision to come back.

Those days the pathology residency training in the US differed significantly from that in Croatia. In America, pathology residents were spending their entire day in the hospital interacting with other clinicians and trainees of other profile, doing aspiration cytology procedures, discussing medical problems and learning pathology in a clinical context. After two years of pathology training in the US I learned about 85% of all pathology I needed for my future practice, with the understanding that the rest I will continue learning on my own for the rest of my life. Instead of that I was told in Zagreb to forget about this "American nonsense" and to apply myself to mastering "my real trade", by which they meant autopsy dissection. Nobody was teaching me anything else and most of us residents were autodidacts learning microscopy and other skills on our own.Most importantly we had only limited access to real clinical material.

After the daily autopsy routine during the morning hours, we were typing our own reports. Needless to say, I became quite a typist, although I asked myself often if that's why I went to medical school. Our contact with clinical physicians treating living patients were minimal, since most hospital facilities were located at Rebro, 3 km away from our Institute of Pathology. I felt that I am stagnating and actually moving away from clinical practice. Instead of being trained to become a clinical pathologist I was supposed to become an autopsy attendant. It is worth mentioning that today in the US the performance of autopsies accounts for less than 5% of a pathologist's daily duties.

After a few months, I adjusted to the new situation and decided to make my own schedule. Accordingly, I would complete my autopsy duties in the morning, type quickly the autopsy report and then spend the rest of the day in the Department of biology working with professor Škreb and my friend Davor Solter, who was an assistant in that Department.

It turned out that I had luck and made a good decision. American financial wizard Kevin Davis defined luck as something that "happens when preparation meets the opportunity". He also said that "you need to put yourself in a right position to have luck." My preparation included two years of pathology training in the US, during which I mastered the basic elements of diagnostic histopathology, started thinking like a pathologist , and learned some new laboratory techniques such as electron microscopy and histochemistry. I also learned how to write scientific papers, review published material and critically approach problems. The opportunity opened up by chance when Davor and I realized that we could produce malignant tumors from mouse embryos transplanted to extrauterine sites. Our discovery that we can produce malignant tumors called *teratocarcinomas* from normal embryos without exposure to chemical of physical carcinogens was published in the British journal Nature in 1970. At that moment I learned the real meaning of the word serendipity.

This paper marked the beginning of my scientific career. It was like an entrance ticket to an exclusive international club of leading embryologists and pathologists working on the borderland between pathology and embryology as defined by the leader of this endeavor Rupert Willis. It helped that professor Škreb became the president of the European Society of Developmental Biology. We suddenly had access to the most important meetings and were talking with movers and shakers of real science. We continued working hard and in four years published a dozen of papers in high impact journals indexed in SCI and Current Contents . I also remember how excited Davor and I were by a letter from the International Agency of Cancer Research in Lyon in which they invited us to write a chapter on mouse germ cell tumors for an Atlas of Laboratory Animal Tumors for the World Health Organisation (WHO).Jokingly, we referred to it as the "Micky Mouse Atlas", yet we were very proud: It seemed that our work began to be recognized by the "big guys" in the outside world.

It was not easy since we were working in a modestly equipped small lab. We had to do essentially everything ourselves , from supervising the mating of animals , isolating the embryos, mixing the chemicals to cutting the frozen sections, or developing the photographs, typing the manuscripts etc. Typing was a special challenge: Those days all major journals required from authors to submit each manuscript in triplicate and that meant typing with carbon paper copies and then correcting each typographical error or starting the page from scratch. But we were young and highly motivated, and nothing was too difficult. Each paper that was accepted for publication was a new stimulus to intensify our efforts. I remember copying into one of my note books the motto of US Marines unit Seabees: "The difficult we do at once; the impossible takes a little longer."

**8. How did you finally decide to move to America?**

It was not easy for me. I am an emotional person, I loved the country of my birth, and I sincerely believed that my scientific career will blossom one day in Zagreb. My mother Ana, and especially my mother-in-law Gela were constantly trying to persuade me and my wife to stay in Croatia. My mother even spent all her savings to build a summer home in Biograd on the Adriatic, where our children loved to vacation. And to be honest, since we had a house in Zagreb, living on two modest but adequate salaries, with a live in maid and grandma available on demand to take care of our children , the day to day life in Croatia was quite comfortable.

In my professional life I made nominally significant progress and earned the title of titulary assistant professor ("naslovni docent"). Nevertheless, I had a haunting impression that my scientific work was not progressing fast enough. Worst of all, I was not able to establish my own laboratory in the Department of Pathology. Old time pathologists running the Department were in principle opposed to any animal or experimental research to be performed on their premises. I felt alienated and frustrated.

In the nineteen seventies the Vietnam war was slowly coming to an end, and also my family situation changed with my mother dying of lung cancer. Davor left for America, and I was unable to recruit any junior colleague to join me in the laboratory. Like my senior pathologists in the Department I was spending afternoons many days per week performing autopsies in smaller hospitals to earn some money. I even wrote articles for newspapers to earn a few dinars. I simply could not accept that "that was it" and finally decided to move the the US.

Once I made up my mind to leave Croatia I accepted an offer from the University of Connecticut in Farmington, CT and moved there in 1974. New life with a new beginning included working in the hospital, studying for the exams to obtain a medical license, and writing grants to obtain funds so that I could establish a research laboratory. Once I obtained the research funding, I realized that I could not handle the hospital responsibilities in parallel with research. Looking around for a more congenial place I finally moved to the Hahnemann Medical College in Philadelphia. My new boss, Dr. Emanuel Rubin (Figure 3) reduced drastically my clinical duties and gave me free reins allowing me to spend most of my time in the research laboratory.

My primary task was to secure good funding of the research operation and also organize the postgraduate doctoral studies in pathology for non-medical graduates. During the next 9 years that I stayed at Hahnemann our Department educated over 30 students who graduated with a master's or doctoral degree in experimental pathology. I was the mentor to 15 PhD students and supervised their theses (Figure 4). Most of these students got jobs in the pharmaceutical industry, but some of them became full time researcher or joined academia in another form. Some of them gave up on science and became medical doctors. Our Department rose to national prominence, and after 8 years at Hahnemann we were recruited to move to Jefferson Medical College in Philadelphia. During one week of June of 1986,under the leadership of Dr. Rubin, 52 of us moved to Jefferson Medical College, into modern laboratories that were renovated for our team. At that time I had 3 NIH research grants , several postdoctoral fellows and graduate students. I even brought 3 young doctors from Croatia to work in my laboratory (Figure 5).

At the same time I became involved in medical student teaching and wrote my first medical students textbook of pathology. I was also in charge of the education of pathology residents. I continued these educational activities throughout my professional life. Unfortunately, even though I have trained more than 200 young pathologists during my 50 years of hospital practice, not a single one of them became a fulltime scientist. Four of them became chairmen in their university departments. One of them even received the highest national award for teaching of pathology, and another one earned the title of the best college professor in the State of New Jersey.

**9. Did you have enough time for science during your professional life?**

Abraham Flexner, a great reformer of medical education in the US studied the American medical schools for several years during the first few years of the 20$^{th}$ century. In 1910 he published the results of his study. In this report he recommended the closure of most US medical schools that did not meet the standards which he defined for the US medical schools for the rest of the twentieth century. He also decreed that the teachers in those medical schools should meet certain criteria. According to Flexner, ideal academic physicians should all have a tripartite career: they should practice clinical medicine, work as scientists in the laboratory and at the same time act as teachers educating medical students and residents. As a young graduate I accepted Flexner's recommendation and from my first days in America till 2018, when I retired, I endeavored to remain a Flexnerian tripartite academic physician.

I think that I was quite successful, although during these 50 years in academic pathology my emphasis changed somewhat from one aspect of my biomedical career to another. For the first 20 years my emphasis was on research and during that time my laboratory was constantly funded by grants from the National Institutes of Health, Bethesda, Maryland. In parallel with my research I was also practicing hospital medicine working in pathology laboratories of my universities and teaching in medical schools. In mid- eighties of the last century, I became more

*Figure 3. With Dr.Rubin, his chairman for 17 years.*

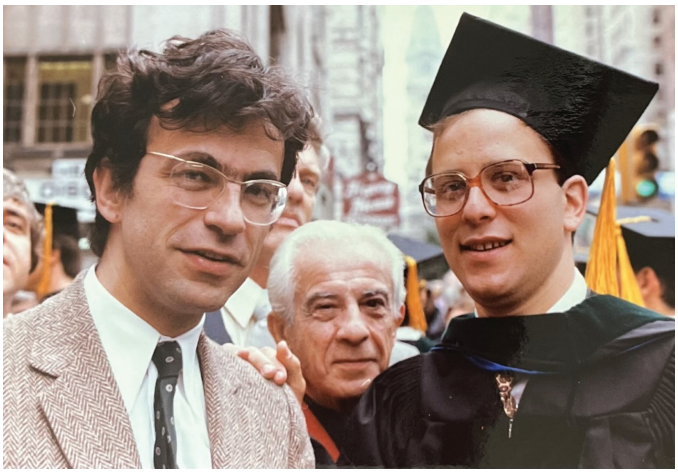

*Figure 4. At the graduation of one of the 15 PhD students whom he s upervised and mentored.*

*Figure 5. Sitting in the right corner, surrounded by members of his research laboratory. Three young Croatian doctors are also present: Hrvoje Vrčić and Božidar Horvat, who were working on their science doctorates (PhDs, to be defended upon their return to Croatia) and Zoran Gatalica, who had already had a DSc degree from Croatia.*

involved in teaching of medical students and my practice of pathology changed because I became more subspecialty oriented. Accordingly, I developed special expertise in the pathology of the gastrointestinal and urogenital tract, with focused interest in the pathology of male and female gonads and kidneys. During the last 20 years I have also devoted a lot of time to my educational activities and have published a number of pathology textbooks and ancillary texts for medical students and residents.

Analyzing my professional trajectory, I must admit that I have betrayed to some extent Dr. Flexner and his ideals. However, we all know that in today's medical practice and research, sub-specialization is the only way to survive and advance, and thus I realized that something had to give in. Furthermore, I am not sure that anybody could be still a true tripartite Flexnerian academic physician. I console myself saying that at least I tried, and in my mind, I followed his recommendations, as much as I could.

In spring of 2010, I attended an international meeting organized in Split by my friend Matko Marušić in honor of the 100 year's anniversary of Flexner's Report. It was refreshing to note that many of us still remained devoted to Flexner's ideals. Once Flexnerian, Flexnerian for the rest of one's life, even though all of us were cognizant that some of master's tenets needed to be changed and adapted to realities of medical practice in the twenty first century. .

**10. What is your most important contribution to science?**

In response to this question I like to joke and say that my most important contribution was to introduce Davor Solter to Nikola Škreb, with whom we then published several notable papers (Figure 6). As you may read in the interview with Davor, thereafter he moved to America and became the most famous developmental biologists of our times and the best known offshoot of the Zagreb School of Developmental Biology founded by our beloved professor.

To answer your question , I eyeballed the list of my publications, reflected about them and then decided that my most important paper was the 1970 Nature publication in which three of us described how to produce embryo-derived teratocarcinomas. We published thereafter a series of articles about teratocarcinomas and embyo-derived tumors, such as the yolk sac tumor. However, as the musicians would say , those were only "variatinons on a theme". The research on tertocarcinomas exploded thereafter and several important meeting dealing with this problem were held, including the best know in Cold Spring Harbor attended by Francois Jacob the French Nobel prize winner. The real advances in the field were published by other groups of scientists who were better versed than us in laboraotory techniques such as tissue culture, cell cloning and manipulation and growth embryos undert controlled conditions, isolation of appropriate growth factors and gene cloning. At the end it was the Englishman Martin Evans who received the Nobel prize ; the Nobel committee in Stockholm had to choose one member of that group that worked in this field. But for me, as another Nobel prize winner, Francis Crick said, "it was important to be there when the piciture was painted". I am glad that my modest "brush strokes" contributed at least something to the final picture that we all had in our minds.The group picture of the last meeting of that "teratocarcinoma group", shown in Figure 7, was held early in the 21$^{th}$ century at the University of Bristol,UK, where Martin moved at the end of his career..

The momentous advances of immunohistochemistry in the nineteenseventies attracted me and I became interested in producing and testing of monoclonal antibodies. Some of those antibodies that we tested with Davor Solter, his wife Barbara B.Knowles and Peter W.Andrews are still used today. I think that these collaborative studies made a significant impact in embryology as well as pathology. Thereafter, after the human embryonic stem cells (ESC) were discovered I was involved in further characterizing them. As predicted by our previous work on mice, we showed that the human ESC represent normal equivalents of malignant stem cells of teratocarcinomas, known by pathologists under the name of embryonal carcinoma. Unfortunately, we did not develop a system that would allow us to transform the benign ESC into malignant embryonal carcinoma cells, one of the several projects that I never completed.

For my sceintific work and the teaching I received several awards, including the honorary doctorates from the university of Novi Sad and the Charles University in Prague, Chech Republic (Figure 8). I am also a corresponing member of the Croatian Academy of Arts and Sciences and the Vojvodina Academy of Arts and Sciences.

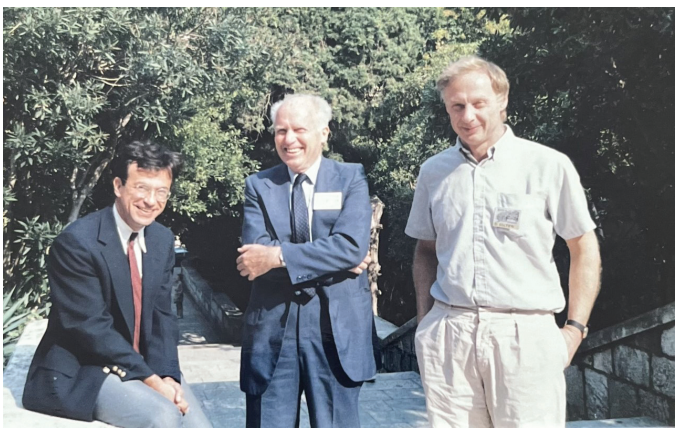

*Figure 6. With Davor Solter standing next to professor Nikola Škreb whom we honored by organizing an international meeting in Dubrovnik.*

*Figure 7. Last teratocarcinoma meeting held in Bristol,UK.Standing behind Barbara B.Knowles, who is in the front row. Martin Evans, the Nobel Prize winner, is standing first from the left in the first row. Davor Solter is in the last row in the middle.Peter W.Andrews of Sheffield,UK, the organizer of the meeting, is standing in the third row to the right.*

*Figure 8. Honorary doctor degree ceremony at the Charles University in Prague including the photograph with the official promotor, Dr. Alena Skalová*

**11. You worked as a hospital pathologist most of your life .Tell us something about this aspect of your professional life.**

Pathology is considered to be a basic medical discipline but it is also a clinical specialty. Traditionally it is considered to be the basis of clinical medicine. William Osler, one of the four legendary founders of the most prestigeous American medical center, The Johns Hopkins University School of Medicine in Baltimore,Maryland, spent his working days in the clinics, and yet found time to personally perform autopsies on the bodies of his dead patients. His famous dictum was: "The way is our pathology, thus is our medicine". I still believe that Osler was right.

Pathology as a science and a clinical discipline has unfortunately been lagging behind other medical specialties for a good part of the 20th century. Then a few major events took place and revolutionized the the practice of diagnostic histopathology. The firt one of those events was marked by the introduction of monoclonal antibodies into the daily practice of pathology. The second revolution took place during the early days of 21st century when pathologists began using the techniques of modern molecular biology to study and analyze the clinical specimens. I was lucky enough to participate in both of these revolutions.

My contributions related mostly to the first revolution as reflected in some 100 papers dealing with immunohistochemistry. Most of these papers I would classify as applied science, but I think that I still contributed to the better understanding of several human disease, most notably some tumors of the urogenital tract. I also lent my expertise to my clinical colleagues with whom I collaborated in elucidating the pathological basis of some important diseases such as diabetic gastropathy or some newly discovered tumor variants. My experimental work on mice helped me understand better some human tumors.

My experience and knowledge I tried to transmit to my residents and students, and for those efforts I received quite a few awards from both groups. Teaching was an integral part of my medical practice, and I used to say that you cannot practice medicine without teaching.I enjoyed it since by teaching others I also learned many new things.The Latin apothegm , "discendo discimus" (by teaching we learn) assured me that I should continue along that pathway. The vicarious pleasure which I experienced when a student of mine would surpass me to become better pathologist than I ever was , cannot be described. I always repeated to myself, as well to others the adage of Leonardo da Vinci who said that "poor is the the pupil who does not surpass his master".

**12. How many papers did you publish?**

I do not know the exact number, since I stopped counting them many years ago. Index Medicus lists under my name more than 330 papers, but not all of them would should be considered as scientific. Furthermore, I wrote quite a few book chapters, gave several interviews or wrote opinion papers for newspapers and magazines, participated in discussions and wrote polemics.

From 1988 to 2003 I was the editor for book reviews for the journal *Modern Pathology*, the official journal of the US-Canadian Academy of Pathology. For that journal I wrote more than 150 book reviews, which I do not list among my publications or in my CV . Thereafter I worked 10 years as the Editor for pathology books for Doody Publishing, an on line medical book review service, and published electronically another slew of book reviews. All this I did because I love books and also because I thought that my write-ups will help others, including the writers of those books, and promote pathology books in general. I am not sure that I succeeded, but my writing contributed to my "name recognition" among the pathologists. As the saying goes, if it not fun, it is not worth doing, and I enjoyed doing it.

**13. How many citations did your papers receive?**

Professional biometricians claim that counting citations could provide a better way to quantitatively evaluate a scientist's overall output than by counting the number of his/her publications. I am very skeptical about either one of these two approaches , but unfortunately people often assign more faith to the numbers than written evaluations of a scientist's opus. Numbers are supposed to be more objective, or at least people believe them more than descriptive evaluations. People quote Lord Kelvin who said something to the effect that "if it cannot be measured it is not science".

Anybody who sat on academic committees charged with evaluating scientists knows that it is much simpler to count the papers and citation, rather than read the published papers themselves. On the other hand, maybe we should ask ourselves what do all those numbers mean and how objective they actually are. And of course we should ask ourselves what for are we using these numerical data. For comparison with others? As proof of somebody's academic value or productivity? For compiling lists of the best and most cited Croatian scientists? Or to boast in front of your friendly journalists who will use the data as sacrosanct, supposedly irrefutable evidence that you are a prominent scientist?

According to Google Scholar my papers were cited more than 17 700 times. Data of this kind helped me a few years ago to get listed in a Croatian weekly magazine as one of the most cited Croatian scientist. But let's not be too serious about this .Please allow me therefore to give you a few examples and thus illustrate how unreliable these "objective numbers" may be and how easy it is to manipulate them.

Example 1. If you analyze my own data on Google Scholar you will see that my citation score has been improved lately by quite a number of citations of the Croatian medical school textbook of pathology, on which I am listed as the first of the four editors. Medical students apparently cited this textbook in their graduation thesis and that bumped up my citation score. Student papers that were not published in a peer reviewed journal contributing to my citation score!? Obviously not a very scientific approach to increasing your citation score. Still, I am glad that my textbook was put to good use by all those students who quoted me and this helped them graduate.

Example 2. My most often cited paper was published in *Nature*. Impressive, since this is a high impact biomedical journal. For this paper I analyzed by electron microscopy two liver cancer derived cell lines, still widely used in the laboratories. However, the reviewers and the editors of Nature decided that my EM pictures were not important and they were thus never published. According to my estimate, my contribution to this paper accounted for less than 1% of the total message. Still, it is worth mentioning that this paper was cited more than 1600 times. Papers that are cited more than 600 times are considered by Science Citation Institute as classics; accordingly, I could brag that I have a "citation classic paper". I am a bit sheepish about this "honor", and mention it only in discussions about the absurdity of "citation fame". As my former chief used to say: "With this data and 3 dollars in your pocket you could get a ticket for the New York subway".

Example 3. My second most cited paper contains my real contribution. In this paper we reported some truly important data about human embryonic stem cells. However, if you scan the list of authors of this paper, you will see that it comprises some 60 names, listed alphabetically to avoid quarrels among the coauthors. Did I contribute 1/60 of the total message or a little bit more? Hard to say, but for all practical reasons answers to such a question are probably not too important. Even the so called objective numbers have their limitations, if you want to accept them. Or ignore them, as we most often do.

At the end, let me also say that I am not completely innocent in this citation game. From 1982 till 1994 I was the Associate Editor of the pathology journal called *Laboratory Investigation* (LI). Dr. Emanuel Rubin, Chairman of my department was the Editor in chief which meant that I was the main "work horse" in the editorial office.
LI was the official journal of the United States-Canadian Academy of Pathology(USCAP), and all the members had to subscribe to it. Most of them were practicing pathologists not interested in basic science papers published in that journal. As such, they were constantly protesting obligatory subscription fees that they had to pay for this journal, which they did not read at all.

In an effort to quell the rebellion of USCAP members against the journal, Dr. Rubin and I introduced into every of the 12 monthly issues a review article and an editorial about one of the research papers in that issue. The membership responded favorably to these new feature, but still complained.
At that time SCI started publishing the impact factor scores of the 6000 indexed journals, included then in their data base. We thought that a good ranking of LI on that list would impress and placate the discontents haranguing against us.. The data from SCI were very encouraging: only 2 years since we began editing LI, its impact factor rose to 4.927, which in those days was enough to rank LI as 93rd on the SCI master list of all journals. For the year 1985 our impact factor rose to 6.338 and we were ranked number 1 on the list of all 40 pathology journals in the SCI data base. Most of these citations were linked to the review articles, but that was not important since our ploy to increase the visibility and the impact factor of LI obviously worked. I should nevertheless, add that these impressive citation data did not placate the discontents. Their protests against LI worked and the leaders of USCAP gave in and decided to publish yet another more clinically oriented journal, *Modern Pathology*. I participated in editing and I am pleased to report that it is now one of the leading pathology journals.

**14. What is your h-index?**

During the last 10 to 15 years h-index became one of the most popular parameters for promoting academic physicians as well as basic scientist at many universities worldwide. This h-index, named after Jorge Hirsch a physicist who invented it in 2005, is regularly calculated by SCI and usually listed in Google Scholar next to each scholar's personal data. According to published data, the h-index for Assistant Professors at most US Universities is 2-5 , for Associate Professors 6-10, full professors 12-24. For members of the National Academy of Sciences the average h-index is around 60, and for the Nobel Prize winners around 70. My h-index, if anybody wants to know, is 58. For those who do not know much about h-index, let me say that means that 58 of my papers have been cited 58 times or more often. It is also worth mentioning that 40% of all biomedical papers are never cited. Hirsch reckons that a h-index over 40 deserves to be considered as excellent and if over 60 exceptionally impressive.

Looking at my statistics it seems that I am OK. The greatest compliment I got from a scientist friend of mine who was impressed but also surprised with my h-index. When I asked him why was he surprised he told me that it is a very high score for somebody who is "not a real scientist". This was a left-handed compliment but it regaled me since it was in keeping with my basic philosophy condensed into a single sentence by the famous ballerina Margot Fonteyn who said: "Take your work seriously but never yourself".

**15. For some time you were quite preoccupied with medical student teaching. How come?**

Yes, with an emphasis on "quite", especially during the 8 years that I was at Jefferson Medical College in Philadelphia. I still think that my collaborators and I produced some important data about teaching, or at least that our data were widely read and were considered by our peers to be interesting. For the projects that I designed with my collaborators I formulated a working hypothesis, designed the appropriate methodology, studied the variables, and tested the reproducibility of the results. Following the advice of Thomas S. Kuhn, an American philosopher and historian of science, we finally tried to see if we could "falsify our data".

To give you an example, let me describe the study designed in collaboration with my colleagues the educational psychologists from the Department of medical education at Jefferson. We wanted to find out if the grades in my pathology course could predict the subsequent performance of these medical students in clinical subjects. To this end we tested the entire class of medical students and classified them according to their psychosocial characteristics, which were graded according to the standard criteria of educational and social psychology. Then we followed them while they were studying pathology and clinical subjects. We found out that students' psychosocial scores were as good predictors of their success in clinical subjects as the pathology grade. However, when we combined the pathology grades and psychosocial scores, the predictive value of such combined data was even more significant. That study was reproduced in several other medical schools and has stimulated more research as well innovative modifications of our approach. It was cited more than 100 times by medical educator from various countries.

For my efforts to improve medical education I received quite a few commendations not only from my peers but also from my Kansas medical students who gave me consecutively 12 yearly awards for excellence in teaching. US pathology educators forming the *Group for Research in Pathology Education*-GRIPE gave me their most coveted *Tom Kent award*. I travelled around the world lecturing about our approach to teaching, but also took that opportunity to illustrate many problems and failures that we have encountered during all these years. I also organized a 6 week remedial course for students with academic problems and taught this nationally recognized course every summer for almost 30 years. It was attended by students from many other US medical schools .I think that it served its purpose since almost all of my students who completed that course also passed the national USMLE examination.

I have written several textbooks of pathology for medical students. The most popular was the book of questions and short answers, which was ideal for students preparing for oral or essay type written examinations, called *Secrets of Pathology*. I also prepared books for postgraduate pathology trainees and Board-certified pathologist preparing for recertification of their specialty diploma. Among these books the best seller was a book on cytopathology which I wrote together with my former resident Dr. Fang Fan, a phenomenally talented cytopathologist. Recently, she told me that our book was ranked as the third most popular pathology book on the American Amazon site.

My book that has managed to survive the longest on the market is a book for students of stomatology, veterinary medicine, pharmacy and related disciplines, called *Pathology for Health Professions* which was first published in 1995 and has had since then 5 additional editions, with total sales of over 100,000 copies. Recently, I recruited my protegee Anamarija Morović Perry, Associate Professor at the University of Michigan, Ann Arbor, Michigan, and her husband Kyle Perry, who is a pathologist at Henry Ford Hospital, Detroit, Michigan to help me prepare the 6th edition of that book (Figure 9). In that context allow me to cite the French writer André Gide: "Le problème, n'est pas common reussir mais comment durer" (The problem is not how to succeed but how to last). I never thought that my book will remain in print for 27 years.

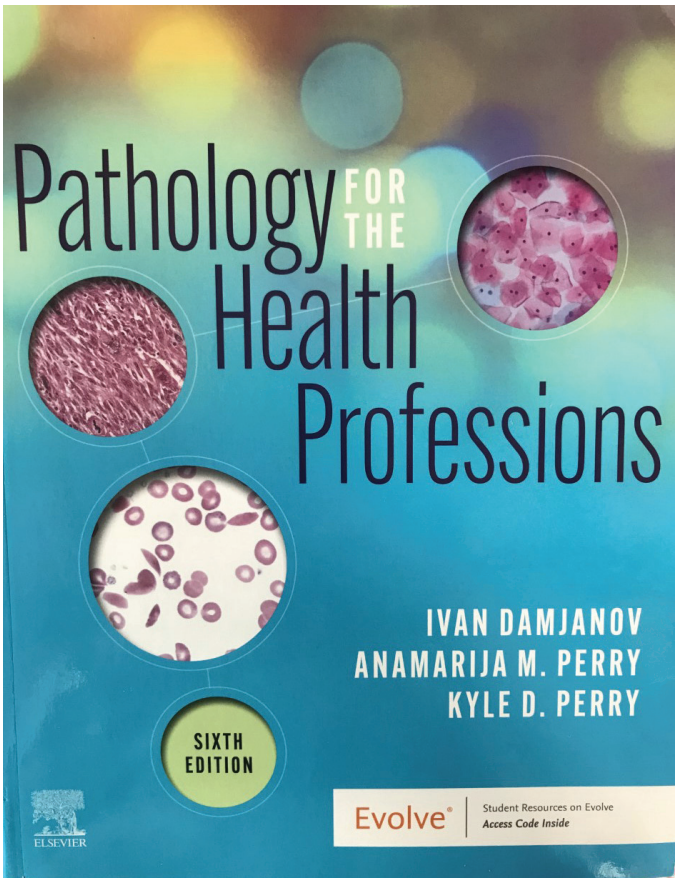


*Figure 9. Pathology for Health Profession,Elsevier, 6th edition, 2022.*

**16. You did quite a bit for your alma mater, The Medical Faculty of the University of Zagreb. What should we mention here?**

First of all I would like to mention my efforts to improve the teaching of pathology. It all began in the nineteen eighties when I suggested to my colleagues in Zagreb that we should translate into Croatian the leading American textbook *Robbins Pathologic Basis of Disease*. The American publisher asked $10 000 for the translation rights and the so called "mechanicals" required for the printing of the Croatian version. Those days there was a financial crisis in former Yugoslavia and the foreign currency for this translation was not readily available. I offered to raise voluntary contributions from Croatian physicians working in the US . Unfortunately, I managed to raise only $5,000 and thus had to pay the rest from my own pocket. In retrospect I think that it was money well spent and this translation became the standard textbook of pathology throughout Yugoslavia. It remained in use for more than 15 years, i.e., even after that state fell apart.

My second contribution to my *alma mater* was realized after 1995 when I persuaded my pathology colleagues professors Dr. Stanko Jukić i Dr. Mara Dominis to help me apply for financial support from the Hungarian-American philanthropist George Soros. Our application in which we asked for funds to introduce computer based teaching of pathology in Zagreb was favorably reviewed and Soros' foundation *Open Society* gave us a grant of $50,000 to accomplish that task. With that money we bought two dozens or so table top computers and paid for the translation and installation of the pathology teaching program which I developed with my team at the University of Kansas. I think that this was a very important first step toward reforming the teaching of pathology in Croatia.

Another contribution to the teaching of pathology in Croatia for which I take partial credit can be traced to the first years of the 21st century. Following on several discussions with my friend professor Jukić, who at that time was the Chairman of the Department of Pathology in Zagreb, I lead the joint effort to produce a modern Croatian textbook of pathology on our own. We wrote first a volume of general pathology, followed by a volume devoted to systemic pathology. Thereafter,with the input of pathologists from all other Croatian medical schools (Split, Rijeka and Osijek), in 2003 we expanded both of these booklets and bound them together into a single 850 page textbook (Figure 10) . I provided most of macroscopic and microscopic photographs and wrote quite a bit of the entire text, serving as its lead editor for almost 20 years. We also enlisted the help of several medical students skilled at electronic drawing on the computer and they produced many of the conceptual drawings, diagrams and algorhythms. To recognize the first student who produced most of the drawings I paid for his airplane ticket to Kansas City, where he and his girlfriend stayed as our guests for a month.

The Croatian textbook of pathology is a technical masterpiece , a beautifully produced book for which I give full credit to Ms. Anđa Raič, the Editor and Director of the publishing house *Medicinska naklada*, Zagreb. Even though she is not a medical doctor, I think that she has contributed more to contemporary medical education in Croatia than anybody else. The fact that she has published more than 1,000 books over the last 40 years speaks for itself. I am sure that without her input we would have never completed our task and Croatia would have never had an original, modern textbook of pathology.

In this context I also must acknowledge the contribution of my good friend and co-worker professor Dr. Marin Nola (Figure 11). Marin helped me write many parts of that book and was absolutely irreplaceable in editing the final text. He spent several month in my house in Kansas working with me on the final text , filling the gaps, removing non-essential parts and selecting the figures. He and I prepared also the manual to help students study the main textbook and also prepare for oral and written examinations. Unfortunately, Marin died the day he delivered the manuscript of that manual to the publisher and thus never saw in print the final product of our 2 year-long effort. I should also add that the Croatian textbook and the manual were then translated into Serbian by professor Živka Eri and her collaborators in Novi Sad, Serbia.

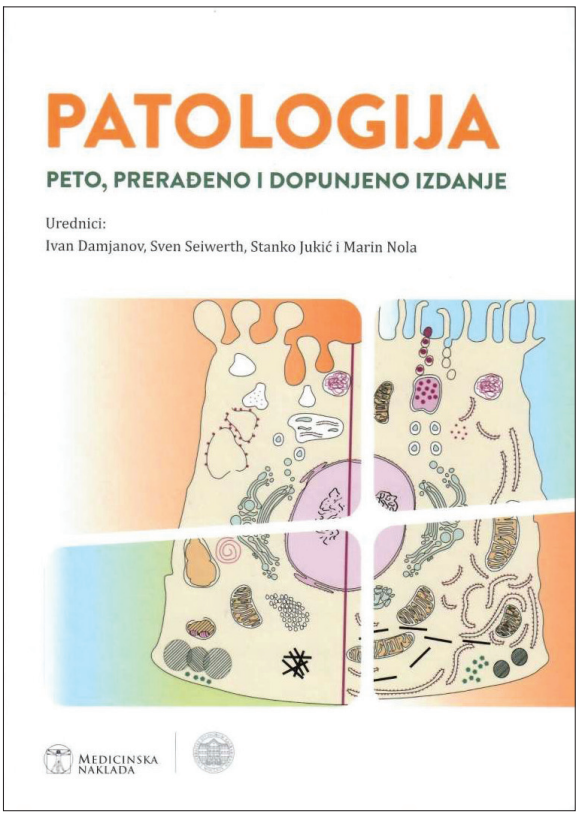


*Figure 10. Patologija, Medicinska naklada, Zagreb,5th edition, 2017.*

*Figure 11. With professors Stanko Jukić and Marin Nola at the presentation of a book that they wrote together.*

**17. You have already entered into the nineth decade of your life. What now?**

Although I am an atheist allow me to cite here the Croatian folk proverb which says that men have dreams but it is up to God to make the final decision. Even though it is impossible for me to predict my future, I also know that I cannot sit quietly in place and do nothing. Just to keep my neural synapses in good repair , or, as I like to say jokingly "to stave off Alzheimer". Nevertheless, I gave up many of my previous activities and responsibilities. Thus, I do not work anymore in a diagnostic laboratory and have no hospital affiliation. Likewise I gave up working on the next edition of my favorite book, the Croatian textbook of pathology, which will now be curated for by my junior colleagues in Zagreb. All the illustration from previous editions I have donated to *Medicinska naklada* to assure that the book remains anchored to that preeminent Croatian medical publisher.

This year I have completed a book with my Indian colleague Dr. Harsh Mohan. This book called *Pathology Simplified,* is based on the Socratic method of teaching, comprising questions and answers. It is specifically aimed at more than 50,000 Indian medical graduates taking the qualifying exam that will allow them to pursue specialization, rather than to stay in family practice for life. On that exam, pathology accounts for 20-25 percent of the entire material and we felt that our book would help these young doctors revisit medical school pathology, which many of them have already forgotten since they studied it in early stages of their medical education.

With my Dutch friend Fred Bosman, another retired pathologist, I took upon myself to edit a well-established periodical *Recent Advances in Histopathology.* This should keep me busy and provide motivation to keep *au courant* with medical literature and nudge me to follow the new developments in the field of clinical pathology for some time. In Croatia I am completing the revision of my textbook of pathology for nursing students and medical technicians. Occasionally I also contribute short pieces and interviews to *The Pathologist*, a UK/US magazine, for which I serve as a scientific consultant. I hope that these assignments will keep my brain from accumulating too much amyloid and shrinking in size too fast.

At the end, I would like to take this opportunity to mention my latest pet project. In brief, I have donated some money from my savings to establish a fund at the University of Kansas that will finance the exchange of medical students between Kansas and Croatia. My fund was designed to cover the travel expenses and defray the costs for room and board of these students. This year 5 Croatian students will spend a month in Kansas (Figure 12). Next year several American students from Kansas will travel to Croatia. My goal is to bring them all together and thus show them that the human nature is the same here and there on both sides of the Atlantic; and that the similarities between people from distant places are much more striking than the perceived differences. It is my way of building imaginary transnational bridges, and playing the role of a *pontifex* (Latin for " builder of bridges").

*Figure 12. With five Croatian students who will travel to America and work at the University of Kansas for a month.*