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Interview with Dr. Gerard Turino by Norma M.T. Braun
May 30, 2017

NORMA BRAUN: Today we're going to be interviewing Dr. Gerard Turino, former Chair of Medicine at Mount Sinai St. Luke's, Mount Sinai West, and we're going to start today because he's got an illustrious career. He's been a wonderful mentor. He remains an inspiration to staffs at every level of training. So, Dr. Turino, I'm going to start with where you were born, and how you got to be where you are, how you were raised, and how you got interested in medicine, and in particular, pulmonary.

GERARD TURINO: Well, I was born in New York City as an infant, and then during my infancy actually my family moved to a house in Brooklyn, New York, and I grew up in Brooklyn.

NB: Uh-huh.

GT: I went to the public schools. I went to a junior high school called Shallow Junior High School and then finally, Manual Training High School.

NB: Mm!

GT: And there I had a great time. I got interested in track, won my major letter [laughs] on the track team, and we won the New York City championship in track the year I was there. So it was just an exciting time. I applied to Princeton University and they accepted me. And so I went from Manual Training to Princeton, and that was in 1941.

NB: Wow.

GT: And during 1941, World War II started. I was at Princeton. I had already indicated my intent to go on and be pre-med, planning to go to medical school, and they had a program for the pre-med students. They thought that this was going to be a long war and they would need physicians, so they were allowing people who had intended to go to medical school to continue on. So, I stayed in the Navy. We had a Navy program called the V-12 for people who were continuing their education but in the Navy. We had exercises we performed at Princeton, and we had runs and things like that, and we had, actually, parades. So that was an interesting time.

And at the end of that—well, it was in 1944 that I went to Columbia Medical School in New York, still in the Navy. We were, I think, called ensigns at that time. P&S [Columbia University College of Physicians and Surgeons, currently Columbia University Vagelos College of Physicians and Surgeons] was great. It was a wonderful place to be. Began medical school and continued on, but in 1945 the war ended, and we were discharged from the Navy and continued on in our education.

P&S was a very exciting place at that time. Medical science advanced rather precipitously during World War II in many areas. The NIH was being formed, so it was an exciting time to be in medicine. I went into medicine in part because I had an uncle, who was Thomas Turino; he was a graduate of P&S in 1928.

NB: Wow.

GT: That was the year that the Columbia Presbyterian Medical Center was inaugurated, 1928. He, unfortunately, was killed in World War II. He was in OB/GYN. He was a surgeon and his hospital ship was torpedoed in the Pacific in Rendova. He won the Silver Star, so he was an inspiration for me. I knew him quite well, so I had these stimuli to go into medicine as a family matter.

After graduating from P&S, I had an internship on the Columbia Division at Bellevue [Hospital], and I have to say that was a transforming experience. That was exciting time at Bellevue. We're in the '40's now. Cardiac catheterization had already been done. There were elaborate studies going on in Dr. [André Frédéric] Cournand and Dr. [Dickinson W.] Richard's laboratory at Bellevue. These were landmark studies, and lung function was being defined physiologically in great detail. So being there, you could be part of it. I specifically recall that research meetings took place on a Saturday morning from 9:00 until 12:00, and the room was packed with people. It was that type of excitement at the time. So, it was a wonderful place.

I got introduced to Dr. Cournand and Dr. Richards. I stayed a second year at Bellevue and then went off to Yale [School of Medicine], because my thought was I needed more training in metabolism, and John Peters was the Director of Medicine of ~~Peters and VanSlyke~~ [*Yale School of Medicine, Dr. Turino mis-spoke*]. This was a landmark bit of work that Peters and VanSlyke did on body water and electrolytes. This was really landmark studies. So, I went up to New Haven. I was there then my third year of residency, and had a wonderful time, but while I was there the Korean War broke out.

So, all of us who were trained during World War II immediately had to go into the service. We were drafted.

NB: Mm-hm.

GT: I selected the Air Force to go into, and I had my orders to go to Korea. The embarkation port was San Francisco. I was preparing to go when one of the faculty members in New Haven—his name was Douglas Laurisen, he was a hematologist and kind of a friend, and he asked what I was doing. And I said, "Well, I'm preparing to go to Korea. I had my orders." He said, "You know, we're going down to Washington to work on a crash program, and we'd like you to come with us if you can." I said, "But I have orders." He said, "We'll get your orders changed." And they did. And in 24 hours, I was on my way to Washington DC, working at the National Research Council, which was in the National Academy of Sciences, instead [laughs] of going to Korea.

NB: Oh, lucky.

GT: Well, luck really counts for a lot in one's life. [Laughs] We were working on trying to create a substitute for plasma. They had problems in sterilizing the plasma because it was prone to getting hepatitis virus.

NB: Right.

GT: It was made from human blood.

NB: Right.

GT: And they wanted either to find a way of sterilizing the plasma or create a substitute for plasma.

NB: Right.

GT: So we initiated a program trying to develop synthetic substances which could serve as plasma volume expanders. That is, when you have a casualty and there's blood loss, you have an agent that can fulfill the blood loss. And we did in three years develop a substance called Dextran, which still exists today. That was a very interesting experience. We had really a very interesting time medically with the clinical trials we had to carry out. We had volunteers from the services. And we had to fashion the

Dextran according to a certain molecular weight and branching ratio of the molecule, so it was not antigenic. And that took a lot of time.

So while there, Dickinson Richards was on some advisory committees of the National Research Council. He knew I was coming out of the service, and he said did I want to be chief resident on the first division at Bellevue. And that was ideal, because I hadn't done any clinical work for three years except in this study.

NB: Mm-hm.

GT: And so I said I would, and I went back to Bellevue as the chief resident and that was an interesting year. That was a great division medically, and being chief resident was quite a responsibility but I really enjoyed it. And again, it brought me then closer to the group at Bellevue, who were working in cardiopulmonary disease, still doing research.

When I finished that year, Dr. Richards asked if I would like a fellowship. At that time there was a laboratory, a cardiopulmonary—in those days it was cardiopulmonary laboratories and we were catheterizing hearts, actually, in the cardiopulmonary laboratory, at the same time doing pulmonary function tests and studying lung function. So, there was a laboratory at Presbyterian and a laboratory down at Bellevue, and Dr. Richards made it possible for me to go up to Presbyterian. The director of the lab, who was John West by name, unfortunately got leukemia and died before my arrival.

NB: Oh.

GT: So there was no director, but there were other Fellows, and I had a first year up there. In the second year, Alfred Fishman was appointed director of the laboratory and I was his first Fellow. And we embarked on a whole bunch of studies over the next several years, at least ten years there, working. I had wonderful associates. Edward Bigovsky was a fellow along with me, who went on to be quite a significant figure in pulmonary medicine.

NB: Harry Fritz?

GT: Harry Fritz was there. He was down at Bellevue.

NB: Mm-hm.

GT: But we had a close cooperation between Presbyterian and the Bellevue laboratory. But while there, while there I started out as a fellow, a Fellow of New York—I had a six-year Fellow with the New York Heart Association, which was a very nice fellowship and then I became an investigator of the City of New York. The City of New York had research fellowships available and I was able to have that for support for ten years.

But during those years, I realized that we were being proficient in quantifying lung function, and now, cardiovascular function, but we really didn't know what was causing the diseases. And I didn't think we were going to bring insight into disease mechanisms at a tissue level, at a basic level, physiologically, so I decided to embark on some studies on the lung tissue structure. I was able to work with Karl Meyer, [MD, PhD] who was there, who was a biochemist, a glycosaminoglycan biochemist, who actually discovered hyaluronan. And so I spent a year working with him, and that was an insight for me into a whole new area of medicine, medical science.

NB: So that's how you sort of got into the chronic obstructive lung disease model?

GT: That's right.

NB: Yeah.

GT: So while there, I also collaborated and was fortunate to get to know Ines Mandl, [PhD], who was also a biochemist at P&S. She was in the department of OB/GYN but her special interest was the elastic tissue of the body.

NB: Mm-hm.

GT: She had her early beginnings in Vienna, actually, and had come here in the United States at the end of the war. And we began to talk about the possibilities of the kind of studies we might be able to do, and we came up with the idea of a program project from the National Institutes of Health, which had the approach of investigating mechanisms of lung injury. We got the program project. Ines Mandl was a very important part of that. Karl Meyer was also a consultant.

We began studies in models of emphysema, which we could produce with enzymes. In 1963 a disease was discovered in Sweden, which was called "alpha-1 antitrypsin deficiency," and that is a genetic disease where there is a low concentration of a protein in the blood that has a specific function. And that function is to inhibit an enzyme in the

body, a normal enzyme in the body, which is in our white blood cells. It's an elastase; it's an enzyme that actually breaks down elastic tissue. And people who have alpha-1 antitrypsin deficiency develop emphysema at a young age, even if they don't smoke, because the elastic tissue is being degraded by this uninhibited enzyme.

Well, that was an important insight, because for the first time we had a potential etiology, or etiological mechanisms, which could cause lung damage, leading to pathologically, which was emphysema. So it was a pathway to look at models of emphysema in animals. If you inject an elastase into a hamster, or a dog, or even a mouse, you can produce pulmonary emphysema. So one of my close associates, Jerome Cantor, who is an experimental pathologist, embarked on a number of studies of these models of emphysema in animals. And out of that came two important directions for our work. We realized that elastin was the target, vulnerable target of the lung, because elastic tissue lines alveoli. It's present in bronchi. It's present in the circulation also. But when you degrade it in the lung, particularly in the alveoli, you get emphysema. So we began to—well, one direction involved the development of an agent, which might prevent destruction of the lung.

NB: Mm.

GT: Dr. Cantor and I were doing these studies, and we were studying enzymes which could make the emphysema worse in the animal. And we tried a number of enzymes, like trypsin, even tried hyoxygen. Well, we finally picked on an enzyme called hyaluronidase. Now hyaluronidase is a very specific enzyme that degrades hyaluronic acid. And when we did that and then gave an elastase to the animal, the emphysema was much worse.

NB: Mm.

GT: So we reasoned that this was an enzyme that was degrading this glycosaminoglycan hyaluronan, so maybe if we gave the hyaluronan before we gave the elastase, it might prevent the severity of the emphysema. And that's what happened.

NB: That was an incredible insight.

GT: It was luck, as it were. We just came on this and followed it up. So what followed then were a number of studies to determine what giving hyaluronic acid to animals might do.

So we could show that giving hyaluronic acid prevented severity of the emphysema in the animals that we were injecting the elastases in. That was one thing.

NB: Mm-hm.

GT: We then created a matrix of elastin, which you can do. Endothelial cells will grow elastic tissue. We labeled the elastic tissue with C-14, so that if you degraded the elastic tissue, the C-14 would leak out and would give you a numeral index of severity. And there, too, hyaluronan protected that matrix against breakdown. We then went on to exposing mice to tobacco smoke, and we would carry the exposure into months, as long as eight and nine months, and there, too, the hyaluronan animals, as opposed to the animals that didn't get hyaluronan, were protected against the severity of the emphysema.

So, all of this has led up to further development of hyaluronan as a potential therapy. We did have one small study—oh, and let me go back, because at this time we were also developing our biomarker.

NB: Mm-hm.

GT: And we knew chemically that elastic tissue has two amino acids in it. In the mature elastic tissue fiber there are two amino acids. One is called desmosine and the other isodesmosine. They are what are called cross-links. When you are going to synthesize elastin in the body, it starts out in a soluble form—I'm getting too technical, perhaps. Tropoelastin is the soluble form. When these two amino acids, which are called cross-links, get on the tropoelastin, it becomes insoluble and becomes a fiber.

So the important thing about desmosine and isodesmosine is they only occur in elastic tissue. So if you can measure them in the body's fluids, you can detect how much elastin is being degraded in the body. This was known for some time, and the methods, which were developed to detect desmosine and isodesmosine were based upon radioimmunoassays or elizes, which depended upon antibodies to the desmosine and isodesmosine. Unfortunately, the antibodies, depending upon which laboratory developed the antibody, varied, because the specificity of the antibody was not that great. So there were variable results in various laboratory, which reduced the credence of the biomarker.

NB: Mm.

GT: I knew that, and I thought, gee, if only we had a method that we knew was reliable and sensitive that could measure small concentrations. Well, by this time I was no longer director of medicine. I guess I was finished about 1992, but I stayed on. We had research going on. I was able to develop a lung center down at St. Luke's-Roosevelt called the James P. Mara Center [James P. Mara Center for Lung Disease], which was supported by funds from the Carson Family Foundation. I was fortunate in their support of me. They gave me $2 million and that $2 million paid for renovation of the space at Roosevelt [now Mount Sinai West] for the Mara Center.

NB: Mm-hm.

GT: I should say that it was called the James P. Mara Center because he was the brother of Mrs. Carson and he had alpha-1 antitrypsin deficiency [and died from it], and she wanted to commemorate his memory. So that's why we named it the James P. Mara Center. We had $2 million to start with. We did renovate the space for about $300,000, and then I had some funds for research going on.

NB: Is that what's continuing your support, your current work?

GT: It has, yes. It continues my support to the present time into the near future. How far into the distance we don't—

NB: So, it's very exciting that you've done this research [which] has been pyramidal in terms of building and building and building.

GT: Yes.

NB: And a lot of hard work.

GT: Yeah, yeah.

NB: It's a lot of hard work, too, with patients, and evolving, and so on. But in the middle of all this you took on a huge administrative role, becoming the first James Keating Professor of Medicine here at St. Luke's. [John H. Keating Professor of Medicine].

GT: Yes.

NB: How did you make that decision that you would do that, because it would obviously curtail some of the time you had to do the research that was very exciting?

GT: Well, I was fortunate in that I had my group from the program project at Columbia Presbyterian, and I brought them down to St. Luke's-Roosevelt when I assumed the chairmanship of the department. So, they were functioning while I was Chairman of Medicine. They were carrying the major load. I had the responsibility of the department, which was a lot of responsibility. I knew that.

NB: That was in 1983?

GT: In '83, when I came as chairman of medicine, and then brought my group down through the '80s and '90s. We had the program project for fifteen years, so we were able to carry on the work. We got renewals. So I guess I just had to depend upon the people I was working with to carry on and keep me informed.

NB: Mm-hm.

GT: And that's how we went forward, actually.

NB: So, how did you then develop the department? Did you look at avenues you could strengthen, facilitate research, etcetera? And the training—obviously, the training program.

GT: Yes. Oh, yes, I was very much aware—well, my vision was that St. Luke's-Roosevelt could be the Peter Bent Brigham of New York. And what was being recognized in those years was medical discovery, and if you showed that you were on the—on the top tier of medical science, that was important in an institution in creating confidence in the institution. So, I did try to recruit people who could add to the research in the institution. I was fortunate being able to recruit Jahar Bhattacharya [MD, DPhil], who stayed with us for eighteen years. He is now a leading investigator in pulmonary medicine. He was recruited by Columbia Presbyterian away from us, but he's still there, still doing it. Alan Rozanski, MD… I felt cardiology had to be built. He was an outstanding figure in visualization of the cardiovascular system.

NB: Mm-hm.

GT: And I was able to recruit him away from the west coast, which is where he was. So, we brought on—you know in the eighties, there was the AIDS epidemic.

NB: Yes.

GT: And we brought on David Volsky [David J. Volsky, PhD], who was an outstanding investigator in AIDS and HIV. He's got a model of HIV in animals. He's still here. So, those were some of my recruits I can be proud of. And I think it added and still is adding to the institution—this institution and others.

NB: Right.

GT: But I would go back to just to show where we went with the biomarker, if I may, because it's important in still where we are. So, as I indicated, we did have these two amino acids, which were indicators of elastin degradation. And you must realize that when alpha-1 antitrypsin deficiency was discovered, and the disease was caused by a deficiency of an inhibitor of an elastase, that brought focus on elastic tissue in the lung, the significance of elastic tissue in maintaining its structure to maintain the lung matrix.

So that was a good insight going forward, and we thought if we could develop this biomarker a little more reliably it would be an important biomarker for studies going forward in emphysema. The way it came about, I had the support from the James P. Mara Fund, and I had an associate here, Seymour Lieberman, who headed the Health Science Institute of St. Luke's-Roosevelt. Seymour was a wonderful biochemist. He was a wonderful director, and had his own work in measuring female hormone—female hormone effects physiologically, their levels and all that, and he was using mass spectrometry as a measuring device for his hormones.

And I realized that, gosh, these were in low concentration. I wonder if mass spectrometers could be used to measure desmosine and isodesmosine. So I asked Seymour, could I work with some of his biochemists, and he said, "Sure. Go ahead." So I approached Yong Y. Lin, [PhD], who was working with Seymour, who was an expert in mass spectrometry and liquid chromatography, and I said, "Do you think you could measure these two amino acids? They're not hormones, they are peptides." And he said, "Sure." And [laughs] in a matter of weeks, using his mass spectrometer, he was able to develop a method. But I needed a mass spectrometer for our studies.

So, I went to Russell Carson and I said, "I need $300,000 for new mass spectrometers, the most up-to-date they have." He said, "I'll give you a check tomorrow." So I had the money immediately. We bought the mass spectrometers and developed the method, which is still in existence and is the most accurate and sensitive method, which has given credence to desmosine and isodesmosine as biomarkers in COPD.

NB: Well, I can see how success in doing this kind of work, and persistence in following it through led to the next step, which created confidence for funding. So that's really critical for it to go forth.

GT: Yes.

NB: Do you think this kind of process, this kind of career that you have, how it impacted on all our trainees? Some of them, obviously, were interested in research track, others were not, but I think it has a lasting impact on what I call the level of academic proficiency and quality that we also teach. So I wondered how you saw that, as a carry-over to your other big-hat role of being chief of medicine.

GT: Yes, well, you'd always hope that people in training in medicine would go into research, but it doesn't always work that way. We didn't have as many individuals I would have liked to get into our program. And it may have been kind of rather isolated in terms of the methodology, mass spectrometry being in liquid chromatography, but I think that possibility still exists. We are going forward with our studies, and I'm very much hoping that I can interest some of our fellows to continue on the work in our laboratory going forward. It's most important.

NB: Right. And at the time you were there, too, there were two separate training programs, St. Luke's and Roosevelt. How did you see that merge, and then later on with Continuum [Continuum Health Partners, INC.]?

GT: Well, it was a likely outcome that instead of having two separate house staff training programs, they could be, could be combined. Administratively, that would have been important. And also, most important was the training was strengthened by having each of these hospitals with their own environments.

NB: Mm-hm.

GT: They served different parts of the city. They vary in the severity of disease in them, and this was, I think, a useful exposure. So I think that was a successful outcome, combining the two training programs.

NB: I remember during the AIDS epidemic there were many people who didn't want to train in New York because they "would only see AIDS."

GT: [Laughs]

NB: I remember being very upset about that, because in fact, it was like, well, if you learn AIDS, you learn medicine.

GT: Yes.

NB: Because of the impact on every system, organ system in the patients.

GT: Yes.

NB: So I was wondering, did you see that as an impact at all in the quality of training, things of that type? We had superb people here.

GT: Oh, yes. The AIDS patients in those years, in the '80s and early '90s were very sick. Most of them ended up in the intensive care unit. Almost all of them had to have a bronchoscopy because pulmonary complications were so common. So, it was an intense time for the Fellows to care for these patients and to carry out these bronchoscopies, so in a way it intensified the quality of the training they had. So, it was an interesting time.

NB: How did you marry all this work and your lovely wife, who is also a physician. Did you meet her at P&S?

GT: Well, to go back to New Haven.

NB: Oh.

GT: [Laughs] Dorothy was two years behind me in medical school. I was class of 1948. She was in the class of 1950. I met her briefly in her fourth year of the medical school. She was a student at Bellevue, taking the Bellevue rotation, and I saw her on the wards at

Bellevue looking for a patient. She had to make a presentation to the professor. So I pointed out where the patient was and told her all about the patient, and we got at least introduced to each other at that time. But, then, I went up to New Haven that next year, and she was there as an intern.

NB: Ah!

GT: So [laughs] I was her senior resident, actually, through a good part of that year. When I got drafted into the service in the Korean War, we were seeing each other rather regularly, and we became engaged. And when I had the opportunity to go to Washington—

NB: Instead.

GT: —instead of going to Korea, we got married.

NB: Uh-huh. Wonderful.

GT: And we've had three sons. We have a wonderful family. Dorothy went on with her training in rheumatology, and became really an outstanding rheumatologist at Columbia Presbyterian. She was also an associate dean for alumni affairs. She ran the Committee on Affirmative Action. There was a committee formed so that there would be a—how shall I say? Fair processes in recruiting. And she carried that on for years, a very difficult task, believe me, because most chairmen of departments didn't want to know about Affirmative Action at that time.

NB: Mm-hm.

GT: So she had a wonderful career until four years ago when she became somewhat a victim of age, I would say. But we had a wonderful marriage and we have a wonderful family, that you asked about.

NB: Well, I remember her fondly because she was also one of my preceptors.

GT: [Laughs]

NB: And so she was my teacher. And you were my teacher, so I was like, it's all the family, right?

GT: She was a great—she loved teaching and she loved taking care of patients, and in rheumatology, you really have to take care of your patients. [Laughs]

NB: Exactly. Exactly

GT: The doctor-patient relationship with the rheumatology drugs depends so much on trial and error, and she was very good at it, and patient. Yeah.

NB: Oh, boy. She also always had such a very warm, cheerful demeanor—

GT: Yeah.

NB: —so that the patients felt a lot of confidence and trust. I think that's very much a part of my training, to see that kind of role model.

GT: Yeah.

NB: The interactions with the physicians and patients, and the amount of respect that was accorded that created that wonderful doctor-patient relationship.

GT: Yeah.

NB: She was a wonderful model.

GT: She was a wonderful—a wonderful physician and a wonderful wife.

NB: Right.

GT: Yeah. We had a good marriage.

NB: Did your sons pursue a medical career after all this—?

GT: No. I had three sons, and here they had mother and father in medicine, and I think they wanted to seek their own [laughs]—their own challenges. And they're all different. They all do different things, all the way from real estate, to architecture, to up-stock development financially. They all have different careers. We're still close and see each other. A very close family.

NB: Are you a grandpa?

GT: I'm a grandpa four times.

NB: Oh, my!

GT: [Laughs]

NB: That's called life's bounty in my mind. Well, you've seen the changes over a period of time, over 30 years now. What do you think about the direction we're going? We seem to get bigger. What do you see our future?

GT: You mean in medicine?

NB: Yeah, and St. Luke's-Roosevelt, et cetera, within the Mount Sinai family.

GT: Yeah. Well, the change I've seen is [pause]—is a more prescribed control of what the commitment is to people in training in medicine, the residencies.

NB: Mm-hm.

GT: And I think part of that came from indicating that there were time slots where people would serve, and then they would be free. There's much more administrative control of the training program, it seems to me. That's partially, I suppose, financial concerns. But I think what the—I call it the "shift mentality"—has produced is a focus on the job to be done and not much more.

NB: Mm.

GT: And, when we were in training, we were in certain training areas, of course, we were expected to extend ourselves beyond the clinical realm, become interested in something that we could grow on. And that is important in training because you spend your life, and if you can focus on something early on, you grow with it as you go forward. And that is an important part of medicine. Young people are not doing that these days. They are fulfilling their obligations, clinical obligations, and they don't seem to feel the need or the desire or the stimulus to explore beyond.

NB: Well, "There's no time," right?

GT: Yes. There's no time, but there was no time for us, either, but we did it, and what that also probably depends upon is collaboration.

NB: Yes.

GT: So you've got to create an environment where the opportunity for collaboration between people in science at the basic level, or even the clinical level, and people in training, that collaboration can happen.

NB: Exactly.

GT: And that was the environment that we had during my training up at Columbia Presbyterian, even New Haven, that was there. It was easy. Everybody was accessible.

NB: Right.

GT: Institutions maybe structurally have gotten big, bigger, bigger, and they've been architecturally depending upon financial and real estate concerns instead of how you bring people together, which is still important.

NB: Critical. Well, you were President of the American Thoracic Society, too.

GT: Yes.

NB: So, that's an international society of like-minded people interested in thoracic disorders. So I wondered from that experience, you were connecting around the world now as a leader, and also within the administrative components of the ATS, how you saw how that would either facilitate, or did it hinder what you were trying to do?

GT: Well, the American Thoracic Society had a very significant history in pulmonary medicine, and being involved with them was an opportunity to advance research in lung disease. The American Thoracic at that time was affiliated with the American Lung Association.

NB: Right.

GT: And we were raising about $10 million a year for research. But we wanted—we needed much more. Lung diseases were a very important part of the pathology of disease in the world, really. I mean, like today, for example, COPD is the third—the third increased cause of death in the world. We estimate that about 300 million people have COPD. We in the United States, we have about 25 million, and we don't have a treatment for that.

NB: Right. We treat symptoms.

GT: We treat symptoms. So, I was aware of this. And while I was president of the ATS I was affiliated with the American Lung, and I thought we should decide how would they spend their money?

NB: And that was money from the stamps, right? Christmas stamps.

GT: That's right. Christmas stamps, yeah, and donations. But I assembled a group of people when I was president, well, I guess maybe before I was president, then I became president. So for a whole year we considered what disease should the American Lung Association devote itself to at that time. At the end of the year, everybody came up with asthma.

Asthma was being recognized as a disease affecting a lot of people. It had a mortality. It had a mortality, often unexpected mortalities, and we really knew very little about how to treat it. I convinced the American Thoracic Society and the American Lung Association to raise $25 million, which we did over the years, to cause—to develop centers of research in asthma. And that became their asthma program, with nineteen centers around the country, which still exist.

So, that shows what can be done if you really push it. I feel the same way now about COPD. It's not getting the attention it deserves, and I've made this known in some of the committees I'm on at the ATS. [Laughs] But, can I go back? I want to finish the story—

NB: Oh, yes, please.

GT: —about the biomarker, because it's quite interesting. When I was able to, with the help of Yong Y. Lin, and now, his associate Shuren Ma, [PhD], develop mass spectrometry and liquid chromatography as a method to measure the desmosine and isodesmosine. As it

turns out, we could measure it in plasma, urine, and sputum, and that was important because the biomarker was always criticized, because you didn't know where the biomarker was coming from, but with sputum it's only coming from the lung. And with bronchoalveolar lavage fluid, it's only coming from the lung.

So with that method, which has gotten, I think, accepted we have been able to publish the results with the biomarker in ordinary COPD, where it's elevated. It's even higher in alpha-1 antitrypsin COPD. We've shown it is lowered by tiotropium, which is used in COPD as a bronchodilator, and has some anti-inflammatory affects, which is how it lowers the biomarker. We were the first to show that augmentation therapy, which is the therapy for alpha-1 antitrypsin deficiency, where they are replacing the missing protein on weekly infusions. Everybody gets a weekly infusion for life, really.

NB: Mm-hm.

GT: It had never been shown that it actually, that treatment reduced elastin degradation, which is what it was supposed to do. It was supposed to block the elastase. Previous attempts using the biomarker were not successful, but we did. We published two papers now, one a short-term exposure to the augmentation therapy, and the latest study, which is a four-year study with augmentation therapy, using computer tomography, which CT, computer tomography, is an x-ray technique that actually can measure tissue density of the lung. And they could show that over four years, those patients who got augmentation preserved their lung density—that is, prevented the severity of emphysema. We did the biomarker, and the biomarker went down in three months on with the augmentation therapy.

So this latest study is showing a link between a visual evidence of a therapy and a chemical evidence. But what that's telling us is that if we have an agent other than augmentation therapy that could preserve elastic tissue, we might preserve the lung. And what that tells us: If we had a therapy that could be given at the very outset of the disease of emphysema, when first detected, we might prevent this progression. And we're working on that, and that's where this hyaluronic, hyaluronan, hyaluronic acid study comes in.

NB: Right.

GT: And we are embarking at the present time on a clinical trial with the hyaluronan. It's in alpha-1 antitrypsin patients. We're studying 40 patients. Twenty will get the

hyaluronan and twenty will get placebo. These are alpha-1 patients, not on augmentation, and we're going to use the biomarker as an endpoint. The study will go 28 days, and we'll see what the outcome is. We'll hope the outcome is positive. If it's positive, hopefully that will lead to further financial investment in the develop this as a therapy. I'm happy to say that the Alpha-1 Foundation is supporting us for this trial with $500,000, so that's fortunate, and we have the money to hopefully complete the trial. So, we'll see what happens.

NB: Well, that's the oil for the machine, for it to work, and that's really exciting.

GT: [Laughs] Yeah, yeah.

NB: Very, very exciting.

GT: So, if this works, it is a potential therapy. The interesting thing about hyaluronan—other than augmentation therapy, augmentation therapy blocks that single enzyme. The way hyaluronan works as a barrier against elastase degradation, hyaluronan is actually embedded into the elastic tissue structurally, normally. An important fact, which we discovered in one case, hyaluronan is deficient in the lungs of people with COPD and alpha-1 COPD. It's half normal. So it's missing.

NB: That may explain why not everybody gets the disease when there's the same toxin to their system.

GT: Yes. Right.

NB: So that would make sense, and why it can be familial.

GT: In a way we're replacing something that has this function that is deficient, which gives another, I guess, reason for it maybe to be used.

NB: Yes. Or to be hopeful that this will come forth.

GT: Yeah.

NB: Did you see a functional as well as a structural and a biochemical change in the patients?

GT: Well, let me say, we did one small trial. We had recruiting problems a few years ago. We did, however, recruit eleven patients for a study with hyaluronan.

NB: Mm-hm.

GT: Three of them got placebo. Eight got hyaluronan, but it was only a two-week exposure.

NB: Oh, yes, sure.

GT: We didn't expect any results. It's too short a time to see any functional result.

NB: Right.

GT: And I didn't think we would see any effect on the biomarker, but we were surprised that the biomarker went down in plasma, urine, and sputum in two weeks.

NB: Mm. That's great!

GT: So that was encouraging, which is why we went onto this larger study that I've just described.

NB: Mm-hm.

GT: So I think that offers a possibility for a therapy. Let's hope, see what comes out, and hopefully the FDA will allow us to go forward with a larger, even a larger study. The ultimate target is COPD. This drug should have a role in COPD because elastin degradation is the mechanism in ordinary COPD, as well as probably other mechanisms.

NB: Right.

GT: But it probably is playing a role in the development. So that's kind of where we are at the moment.

NB: Well, it suggests that the work will go on forever. [Laughs]

GT: Well, it's going to go on. I think it has to go on, and I'm hoping that there will be succession from me to carry it on. The Alpha-1 Foundation seems interested in it. I've engaged some of my associates to be prepared to carry the work forward if I can't.

NB: Are they here?

GT: Well, one is here, definitely. Jerome Cantor, who has been working with me for almost—over twenty years. Yes, he's an associate. We have formed a corporation, actually, called Matrix Therapeutics, which was created because we had to license the intellectual property for the biomarker and for the therapy from Columbia and Mount Sinai, and we have licensed that from the institutions, Mount Sinai and St. Luke's. And now the license is maintained by Matrix.

NB: Mm.

GT: And hopefully, that's where funding will come in for further development, and that's where the alpha-1 funding will be put with Matrix. So we have a structure to go forward, I think. Put it that way.

NB: So it's won't die because of technical reasons.

GT: It won't.

NB: That's important.

GT: That's important.

NB: So what do you do for fun?

GT: [Laughs]

NB: [Laughs]

GT: Well, I used to play a lot of tennis. I love tennis, and I would play as much as I could. In fact, we had a group when I was at Columbia, and even when I was at St. Luke's I would play with Dick Pierson [Richard Pierson, MD], who was an avid tennis player. We would play in the Columbia courts up at Baker Field, and we had a whole group that played once a week up there. But then I haven't played tennis in the last couple of years. My legs are not as steady as they were. But I go to the theater and I travel. Travel in work and apart from work. And I have good friends. I have a summer house in East Hampton, which I do like, and I've had that for 45 years. So I still maintain that house.

NB: Your escape.

GT: My escape. So in spite of the loss of my wife, which I do miss, I do have friends, and I try to keep up with the world. [Laughs]

NB: Well, judging from what you've said, and having met James Keating's grandson, and knowing what his vision was. His vision was to develop a department of medicine that would have a research focus and a research life, and developing divisions so that each subspecialty would develop expertise and excellence, with Dr. [Theodore B.] VanItallie carrying it forward. I think you've certainly picked up the banner and carried it forward even further.

GT: Well, I would hope so. Yes. I was inspired when I came in [*and saw*] what Ted VanItallie had built. I mean, their nutrition or obesity center was really a remarkable accomplishment—

NB: Yes.

GT: —at a time when there was nothing like that.

NB: Right.

GT: We had it here at St. Luke's-Roosevelt.

NB: Right.

GT: And the research that was going on was at a basic level, a clinical level. It was a remarkable accomplishment. So that was an inspiration, actually, to continue that tradition in this institution of doing research along with clinical excellence, and we thought the two were really important together. [Laughs]

NB: Vital to the excellence that has been now part of the history.

GT: Yeah.

NB: I know that Dr. [Arthur J.] Antenucci was the Chief of Medicine at Roosevelt, and he was also recipient of funding that developed the Antenucci Research Building.

GT: Yes, yes.

NB: Which was very helpful to support the research effort that would go forth.

GT: Yes. It was actually, he was acutely aware that the strength of a hospital had to be not only clinical, but it would have to be conceptual from a basic level. And that's why he built the Antenucci Building, and that was how institutions could grow. I think it was a wonderful building. I mean, the research space there was excellent. And it led to some very interesting work that went on, yeah.

NB: In more than one department.

GT: More than one department, yeah. It was for the whole institution.

NB: Right.

GT: Yeah. Well, they had what was called the Medical Science Institute. And that's how Seymour Lieberman was brought down from Columbia Presbyterian, to head the Institute, and he enjoyed that role. That was important at that time in our development and growth, no question about it.

NB: But you have to have the support at that level in order to get the work done.

GT: Yeah. Yes.

NB: There's no question. You need the space, you need to have the money, you need to have technology.

GT: Yeah.

NB: And you have to have vision. All those things are part of what make it happen. Your career has been outstanding, and people have recognized that, more recently with another award from your alma mater.

GT: [Laughs] Yes.

NB: Just awarded, what, two weeks ago or a week ago?

GT: Well, about two weeks ago now.

NB: About two weeks ago. So he got the Outstanding Physician Award, which is very exciting, because I'm just rubbing a little off on you. [Laughs]

GT: [Laughs]

NB: But it is an exciting history, and one of the reasons I wanted to capture this, because we have such a rich—incredible people here at our institution. And so, this oral history project got started with the idea that we have such an opportunity to capture the spirit, the enthusiasm, the intensity—

GT: Yeah.

NB: —and the passion, really, for this kind of work. And I'd like to see this carried on, even if it's by rubbing shoulders and not direct. But I think we need to continue to encourage this very, very much.

GT: Oh, I couldn't agree—I couldn't agree with you more. Medicine is exciting, and I'll tell you, discovery is exciting. And if you get interested in something just from the earliest thread, but pursue it, it can mean so much in your professional life.

NB: Right. You grow.

GT: And grow. You grow with the thing you're trying to understand. [Laughs] And you're often helped—I told you-luck takes a hand very often, more often than not. And, if you're fortunate—

NB: And they say, luck favors a prepared mind, right?

GT: [Laughs] That's right!

NB: So, it goes together. It goes together, no question about it.

GT: Yeah, yeah, yeah.

NB: You have to see that there's luck there to have it happen.

GT: Yeah.

NB: Otherwise it's a [unclear]. Well, is there anything else you'd like to add? Because it's been wonderful hearing your story.

GT: No. I guess what I would add from my own personal standpoint, who you're able to work with, I mean your associates, means so much. In my own case, there's no question that my exposure to the environment at Bellevue, knowing Dickinson Richards, Andre Cournand, people who came to that laboratory, that was an extraordinary environment. And being able to reach out to people I worked with, like Ines Mandl, Carl Meyer, those were opportunities which were unusually productive in the end. Productive in the end.

NB: Right. They were open to it.

GT: They were open to that, yeah.

NB: That climate.

GT: Yes, that climate was just—it was exciting. And we have to create those climates. And medicine is exciting if you can make it possible for people to expend their curiosities into medical science. Yeah.

NB: Charlie Reagan asked me to do a project, and this was in the, what, late '60s, I guess. *[Charlies Reagan, MD was Chair of Medicine at Bellevue Hospital at that time and Dr. Braun completed her Intern and Resident years under him there.]*

GT: Mm-hm.

NB: He asked me to figure out, try to create a directory of all the people who were trained in the Cardiopulmonary Lab, and where they went.

GT: Yeah. Mm-hm.

NB: So, in the late '60s, 75 percent of people who were heads of pulmonary across the United States had trained with Dickinson Richards and Andre Cournand. Seventy-five percent!

GT: Yes, that's true.

NB: And Tom Petty was one of them. *[Thomas L. Petty, MD was a Pulmonologist in Denver, Colorado, a pioneer in Pulmonary Medicine.]*

GT: Yeah, yeah.

NB: He could talk endlessly about the experience that he had here.

GT: Well, that was a major laboratory, there's no question. Yeah.

NB: A major laboratory. Tremendous work was done.

GT: Yeah.

NB: And, you're right, nobody ever missed those conferences. And an hour just seemed like ridiculous; people would spend half a day.

GT: Yeah.

NB: But nowadays we don't work on Saturdays. They don't have classes on Saturdays anymore, either. So it's a change.

GT: Yeah.

NB: I don't know if it's good or bad, but I know whatever it is, it's a change in how we live with it. Well, thank you so much! I can't tell you how much I enjoyed it.

GT: Well, thank you so much. You were very kind to ask me to do this.

NB: I'm thrilled to do it.

GT: I'm still optimistic about the future, and we'll see how we do. I'm Gerard Turino. I am a professor of medicine at the Mount Sinai Icahn School of Medicine. I am founding director of the James P. Mara Center for Lung Disease at Mount Sinai West and Mount Sinai Saint Luke's.

[End of Interview]