

The Endocrine Society Oral History Collection
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MARCUS A. ROTHSCHILD, MD

Interview conducted by
Adolph Friedman, MD
July 3, 2000

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FAMILY BACKGROUND

Dr. Friedman: Marc, I understand that you were born in New York on the second of June in 1924.

Dr. Rothschild: Yes, in 1924.

Dr. Friedman: Where were your parents from?

Dr. Rothschild: My mother was born in Atlanta, Georgia, and my father was born in a little town called Woodville, Mississippi. They came from the English branch--my father did--the Rothschild family in England--the Nathan branch--and they settled over here in the early 1800s. Exactly when, I don't know. Dad moved from Woodville, Mississippi, to New York. He and mother were married, and Dad spent most of World War I in Europe. He went to New York--then went overseas during World War I, and later he worked with Sir Thomas Lewis. He worked with Lillie Wolffe, also. This is a picture of my father with one of the first EKGs.

Dr. Friedman: Where did your father go to medical school?

Dr. Rothschild: Columbia P&S.

Dr. Friedman: That's interesting. And did he practice in New York?

Dr. Rothschild: Oh, yes. He had one of the first EKG machines in the City of New York. His office was on 82nd and Park Avenue--on the east side of Park Avenue--and I visited there many, many, many times. My father died when I was 11 years old, in 1936.

Dr. Friedman: Did you have any siblings?

Dr. Rothschild: I have an older sister who lives in England, and I had a brother who died in "crib death."

Dr. Friedman: What does your sister do--a housewife?

Dr. Rothschild: She married a British man, and she drove an ambulance in the blitz in England. She came back to live in this country for a few years--then went back and spent the rest of her life in England.

EARLY EDUCATION

Dr. Friedman: Coming back to your education--where did you go to grammar school, where did you go to high school?

Dr. Rothschild: I went to grammar school at a place called Horace Mann in New York.

Dr. Friedman: I've heard of it.

Dr. Rothschild: The original school for youngsters was at 120th street off of Amsterdam and Broadway, and then the senior school was up in the Yonkers, Riverdale. After my father died, my mother shipped me to Andover. I flunked all my entrance exams, so they sent me to summer school at Exeter. I loved summer school at Exeter. Then I took the exams again, and I passed them this time; but they didn't think I would at Andover, so they put me as a sophomore in a freshman dorm. I had no friends; I hated every "cotton picking" brick in it. I guess my most respected classmate was George "Poppy" Bush, the former president. Then when the war broke out, we all started at Yale University, early.

MEDICAL TRAINING: YALE UNIVERSITY; MILITARY SERVICE; POLIO

Dr. Friedman: When you went to Yale, were [you] in the Army?

Dr. Rothschild: No. We went to Yale about April of 1942--give or take a little--and a whole group of us--must have been five or six months later--decided we would enlist, so we all enlisted into the Army. Then early in 1943, I went to Fort Devens and spent a little time in a specialized training unit; then we were shipped to New York to await orders, and I was in Governor's Island. I didn't feel well for a couple of days, and the sergeants weren't going to do anything with me, and the next morning I woke up with polio. I spent about two years in a hospital bed. They said I'd never walk again, I'd never get out of bed. I was lucky--thank God! The best part of whole story, however, is while in medical school I had written NYU a letter--while I was in Fort Devens as a private--and they said they would take me in any class I could make. So in 1945 when I had gotten out of the Army--I had trouble reading--so I went back to Yale to learn how to read again and started medical school in September.

Dr. Friedman: Of what year?

Dr. Rothschild: Nineteen forty-five. The dean called me in one day and told me I couldn't graduate without a college degree. I said, "I can't get a college degree; I was at Yale for five months." I went back to Yale, saw the dean at SHEFF, which is a scientific school [Sheffield Scientific School] at Yale, and he asked me, "You have a class at 45W?" I said, "Yes, sir." "And you were going for a BS degree?" "I said, "Yes, sir." He said, "Go home, I'll send you one." So I had a BS degree from Yale after five months.

Dr. Friedman: That's fabulous. Well, from what I've read about your future, there is no question that you did well without it. After medical school, you had several house-officer assignments.

Dr. Rothschild: Right.

Dr. Friedman: Was there anything significant with associations used? Did you work with any famous people? Did you do any research?

Dr. Rothschild: No, not really, I worked with Lewey Wolf, cardiologist, in Boston.

Dr. Friedman: I don't remember that name.

Beth Israel Hospital

Dr. Rothschild: He was a big cardiologist at the Beth Israel Hospital and the other Boston hospitals, and he had worked with my father with Sir Thomas Lewis--when Dad had worked with him--when that picture was taken with Dad and his feet in the buckets with the EKG. But not really--I didn't do any work. I wrote one paper, "Electrocardiographic Changes after Quinidine [in Supraventricular Tachycardia]"--came out of Beth Israel Hospital in New York. When I was chief resident, I took care of a guy who was in "flutter," and we gave him quinidine, and the EKG turned to look like an acute myocardial infarction. I was going to go into practice.

BERSON AND YALOW

Sidney Schreiber provides an introduction

Dr. Friedman: I have a note of that. Now, the real research work that you did was when you got involved with Berson and Yalow.

Dr. Rothschild: Right.

Dr. Friedman: How did you meet them? How did you get into the lab? Because I know from talking to others--and I'm doing a big project on Berson and Yalow and the people surrounding them--that they only took two people a year, and that wasn't every year. So one year it was you and Arthur and then a couple of years later Glick and Jesse Roth.

Dr. Rothschild: Well, I had another friend who ultimately worked with me down at the VA in Manhattan named Sidney Schreiber.

Dr. Friedman: Yes, I noticed how frequently you worked with him.

Dr. Rothschild: So I started to work with a Dr. Halpern in New York and covered him and everybody else, went to hotels, and was in practice after I graduated from my last residency. But Sidney and I had gone to medical school together and became very good friends, and he called me one day, and he said, "You know I'm taking a fellowship up here in the Bronx VA Hospital with Dr. Solomon Berson, would you like to see if I could get him to see you?" I thought for a bit and said, "Sure Sid, I think that would be good, but I'm really not fascinated with what I'm doing." I drove up to the Bronx VA Hospital one day, met Sol and met Roz [Yalow], and Sol asked me what I would like to do, and I said, "I'd like to study the blood volume in heart failure--heart disease." Roz said, "That's not a very good idea." So Sol took the preliminary work that I had written, looked at it, found a reference which he hadn't read, went down to the library--we looked

it up. And a radiologist who was in charge of nuclear medicine said he didn't want another one, but Sol said that he was going to take me anyway. That's how I got in with Sol.

Early work on blood volume with Sol Berson; studying thyroid disease with radioactive material; early work on albumin with Arthur Bauman; origin of the idea to label insulin; labeling insulin and proteins; experimental treatments with radioactive insulin; moving to the Manhattan VA Hospital; work with Andrea Cournand studying the exchange of salts across the pulmonary membrane using radioactive potassium and radioactive sodium

I began working on blood volume, and then we got interested in albumin, and Arthur and I worked together. We worked with all the new radioactive material from Brookhaven in studying thyroid disease, and there was a chemist by the name of Kitty Newerly, and she would label the proteins and the insulin that we used and all the other stuff, and we started studying blood volume. We got interested in albumin. Arthur came to me one day and he said, "Why don't we study some insulin?" Years later, when they had kind of a celebration for Roz at the Plaza--along with a lot of famous people--Arthur got up and said, "I just want to tell everybody the idea to label insulin was Marc Rothschild's." I got up and said, "No, Arthur; it was yours." Then there was dead silence because Roz was there and Sol had died and, of course, she had won the Nobel Prize. So I always said it was Arthur's idea, and he always said it was my idea. But anyway, we labeled some insulin; we gave it to patients--there was no real way to get anyone to approve what we had done. We went up and spoke to the patients, and I remember I would tell them, "No, we don't think this is going to hurt you." We were going to give them a small amount of radioactive material, and we were going to draw some blood and study what happened to the material that we gave them. A lot of people said yes. Sol came in one day and he said, "What are you boys doing?" We showed him, and he went around a mental corner, which I never followed. Then we would spend the night there with him. He would play chess or the violin, and we would be trying to isolate the radioactive material from the plasma--went to the grocery store to get starch to build a starch block--and we built our own scintillation counters. And then he came in one day, and he dropped this paper on the desk and said, "Boys, I hope you don't mind, I put my name first." We looked at each other, we read the paper, and I said, "You mean that's what we've been doing?" We "giggled" together, and he was wonderful. He was just the greatest man, greatest friend. He asked me once if I would stay and continue to work with him. I drove home, drove back the next day--having cried a bit during the night--and I went up to him and I said, "Sol, I'm so thrilled, but I can't do this. If I was to work with you or for you, I'd always be doing the things that you wanted done because I can't outthink you, I can't compete with you, and I would never know whether I can ever do anything on my own." That's how I moved from the Bronx to the VA Hospital in Manhattan. Sol got me the job. He was a wonderful, wonderful man and a good friend. I was lucky when I was down there--I worked with people--I worked with Andrea Cournand, the Nobel Prize winner, and others that were at NYU, and I worked in his laboratory studying the exchange of salts across the pulmonary membrane using radioactive potassium and radioactive sodium.

Dr. Friedman: What year was it that you left Berson?

Dr. Rothschild: Nineteen fifty-five or nineteen fifty-six, I think.

Berson and Yalow's working relationship

Dr. Friedman: What did you think of his relationship with Yalow?

Dr. Rothschild: Well, they had an office, and they were always in the office together. The door was closed much of the time. I didn't see much of Roz; she was much more of a "loner" I found than he was, but they had their laboratory, and they had their office, and that door was closed. Many days Arthur and I didn't see them at all. We used to see Sol sometimes, because we would discuss the clinical cases that we saw--the thyroid patients primarily--or those we did blood volumes on, or those we treated with radioactive phosphorous or polycyolemia. We would see him much more frequently.

SIDNEY SCHREIBER

Dr. Friedman: What ever happed to Dr. Schreiber?

Dr. Rothschild: Oh Sid? He was always working on the heart. He had a little bit of isolated profused guinea pig heart. He left--maybe a year before I did--and started out in practice. He had his own practice, and then when I got settled at the VA at NYU in 1957, I called him and asked him if he would like to come back and work in a laboratory and continue his work. So he came down. And by that time, I was head of a Radioisotope Service at the VA and got him an office. And he had a laboratory and began studying the heart. Sid worked with me for many, many years.

MURRAY ORATZ

Dr. Friedman: Who was Oratz?

Dr. Rothschild: Murray Oratz was a biochemist--who worked with Levy--and head of biochemistry at NYU--and Murray was working for him. Dr. Levy was one of the individuals, like Andrea Cournand, who supervised the Nuclear Medicine or the Radioisotope Laboratory. They would come over and find out what we were doing in the laboratory. He suggested to Murray that he come over and work in our laboratory. Murray came over--I met him in the lobby, I remember--and we talked for a little bit, and Murray was my partner and best friend and associate for all those years that I worked at the VA--co-author or senior author of half or a third of the manuscripts that we worked on together. He lived out on the Island, married Roz [Rosalyn Oratz], had children--a fine man, wonderful person.

Dr. Friedman: You never told me if you ever got married during this period of time.

ROTHSCHILD'S MARRIAGE AND FAMILY

Dr. Rothschild: I got married in Boston in the early fifties, and that marriage didn't do too well. We had two children, Lisa, who lives in New York, and she has three children, so I have three grandchildren. The son that I had is an active schizophrenic, unfortunately. He lives in New York, alone. His mother lives in New York, and we're going up to see him in a month, and he always--a very good friend--but I've had him at doctors since he was four years old, and he's a very troubled and sick little fellow.

Dr. Friedman: That's sad.

MORE ON BERSON AND YALOW

I started to ask you before about Berson and Yalow. Was there anything about their relationship in their work that impressed you--as to how they did this, or how they did that? Or did one sort of guide the other, or was one the domineering force?

Dr. Rothschild: I always felt that the ideas of whatever they were doing--or that we were doing--were Berson's, but I can't prove that. As I said, they were very quiet, working along together in that office. Roz was a biophysicist with a background, I guess, from Indiana. I think that's where she came from. She suddenly knew all about the use of radioactivity. I think she was more of the "let's do this." And she helped figure out how to do it and made sure that it got done in the best way possible. I think they were a very good pair. They were there when I got there in the morning, and they were there when I left in the early evening to drive back to Manhattan. Everything I would hear them discuss--we didn't go into their office very much. They kept that to themselves. Their laboratory was to themselves. Our laboratory was in a different part of the whole Nuclear Medicine-Radioisotope Service Area. But Sol would consult with us about the patients, and Roz would consult and tell us about the doses of radioactivity, and I think she probably often knew it better than I did. She probably did more of the "how we do what we are planning to do."

STUDYING GAMMA GLOBULIN METABOLISM WITH DOTTIE AND ED FRANKLIN

Dr. Friedman: I noted from your bibliography that you wrote a paper with Dottie Franklin in 1960 on haptoglobin and hemoglobin metabolism. How did that come about?

Dr. Rothschild: Well, I was very friendly with her husband, and we had done some work on gamma globulin metabolism and rabbits during the anamnestic response. I worked with Ed Franklin, so I got to know Dottie very well. They lived off of Lexington Avenue between Lexington and Park.

Dr. Friedman: She still lives there.

Dr. Rothschild: She still lives there? Oh, my goodness. Very, very nice woman. She had a background that read like Frank's in Germany.

Dr. Friedman: I know. We've become friendly with her through Caroline.

Dr. Rothschild: They were very close.

Dr. Friedman: Yes, they're still very close.

Dr. Rothschild: So that's how I got to do work with her--because I know Edward well and appreciated his work, and we did work on gamma globulin with a Greek who came from Greece, but we had a wonderful time with him, and we were always close friends. I didn't see them socially very often, but I knew them well, and I thought he was one of the nicest, finest men that I've ever met. Arthur always spoke well of him.

WORK ON ALBUMIN, BLOOD PROTEINS, AND CIRCULATION

Dr. Friedman: You also spent much time working on the blood proteins and circulation. Is this a continuation of the work you told me about earlier, or did it change?

Dr. Rothschild: Well, I became primarily interested in albumin, and I studied how albumin was made, and how it was distributed throughout the body, and what happened to it in disease, and how it got from the liver to the blood stream, and how it got into ascitic fluid. That's primarily--what I worked on was serum albumin, and then we started investigating the influence of specific amino acids on albumin production and found that tryptophan was an interesting one to work with because it appeared to stimulate albumin production--arginine did, too. We studied a group of amino acids, and we profused them into the isolated profused rabbit liver. Then I had a friend, Irwin Mossback, who worked across the street, and he came over one day and wanted to know if he could use our profused liver to study bile acid and cholesterol metabolism, and it was he that came up with the equivalent of medical--

Dr. Friedman: That was great.

Dr. Rothschild: Studying it--it was his idea. I had nothing to do with it, except that he used the isolated profused livers that we had. We studied ascites and how albumin was manufactured, and then--in the last X numbers of years--I became interested in alcohol.

EARLY INTEREST IN HEPATIC METABOLISM

Dr. Friedman: Excuse me. Before you became interested in alcohol, I was going to ask you about you getting involved with hepatic metabolism. Was that related to alcohol, or related to albumin?

Dr. Rothschild: You mean how I became involved in the Liver Association?

Dr. Friedman: Yes, liver and gastroenterology.

Dr. Rothschild: The president of the Liver Association was a man who worked in North Carolina. I'll have to go look it up because I can't think of his name now. He called me one day.

Dr. Friedman: President of what?

Dr. Rothschild: Of the American Association for the Study of Liver Disease (AASLD). I had gone to their early meetings, and I had met Hans Popper.

Dr. Friedman: I know who he was.

Dr. Rothschild: I used to visit with Hans--go up after dinner. I'd get a call from Hans, "Marc, Lina wants you for dinner." Then Hans would hang up. So I'd call his wife Lina. I said, "Hans called me?" "Oh yes, we'd like you to come to dinner. Can you come this Thursday or Friday, whatever works for you?" I said, "Sure." I got to know them very well, and whenever I go back to New York, we see Lina. Hans died many years ago--a wonderful man. So this guy--it will come to me--the name--I'll look it up. He was from North Carolina, and I get this telephone call from him. He said, "Marc, would you like to be secretary of the Liver Association?" [From 1978-79 Harold Fallon was president of the Liver Association when he invited Dr. Rothschild to become secretary.] I said, "What?" Then I stopped. I said, "Oh, what a thrill, why me?" We did all this work on albumin--and it was made by the liver--so I accepted it, and I became secretary of the American Association for the Study of Liver Disease when there was really no office. [We] collected the money--I had bank accounts, no real office to speak of--but working with the Liver Association at that point and studying liver disease, and going to all these meetings, and meeting all these experts taught me. So I never considered myself an outstanding authority in liver disease, but I knew a lot about it. That's how I got started. Then I got interested in alcohol.

Then at that time, if you were secretary, five or six years later you became president, so it was a steady progression. So I knew it would happen.

Dr. Friedman: I want to ask you if you know a very good friend of mine, Hyman Zimmerman?

Dr. Rothschild: Hy! Was! Did he die?

Dr. Friedman: Yes, he died about a year or so ago. It was unfortunate. He died of cancer of the mouth from his pipe smoking.

Dr. Rothschild: Terrible.

Dr. Friedman: It was a sad death.

RESEARCH ON ALCOHOL, NUTRITION, AND LIVER DISEASE

Dr. Rothschild: Hy was wonderful to me, and we were friends. We spoke well about each other. I knew him well when I worked in Washington. I came down to Washington once many years ago at the invitation of a Dr. Rita Hays, who was in charge of the research.

Dr. Friedman: She's an endocrinologist out in California.

Dr. Rothschild: She's out in California!

Dr. Friedman: Correct.

Dr. Rothschild: She was head of the VA Research Program. She asked me to come down to organize a VA research on alcohol, and I got some friends to work with me, and we sent out a little notice. I got it written in a day. We had them send out a notice, and we got lots of applicants. We said that their suggestions to us should be limited to five pages and no more than two thousand words, and the VA would pay for their training. And one of the past presidents of RSA was one of the people.

Dr. Friedman: What is RSA?

Dr. Rothschild: Research Society on Alcohol--that was when I got started with the journal, which I just quit this year, but I was editor for nineteen years.

Dr. Friedman: Maybe we'd better go back a little. Did you become involved with the alcohol because of the liver disease, or did you get involved with the alcohol because of the protein relationship, or what?

Dr. Rothschild: Well, we did some work on ascites, and we showed how albumin got into acidic fluid directly--not through the blood stream. Then I became interested in ascites and that form of complication of significant liver disease. Until we started, we used carbon tetrachloride (II) and we started profusing the liver with alcohol. We found it inhibited the secretion and the transport of albumin and the synthesis and the metabolism of other agents, and then we found that high nutrition--specific amino acids--interfered in the toxic effect of alcohol on the liver.

Dr. Friedman: Was the same true of the carbon tetrachloride? Did the nutrition help to deter that?

Dr. Rothschild: Not as much as with the alcohol, but it did--and it was specific amino acids. I'd have to look it up to make sure. At one of the meetings in the late seventies or eighties--Paul Burke and I were good friends and he--

Dr. Friedman: Paul Burke! Not Jack Burke?

Dr. Rothschild: No! Paul Burke.

Dr. Friedman: J. Edward Burke was also a gastroenterologist-hepatologist.

LATER RESEARCH: PREVENTING ALCOHOL FROM INTERFERING WITH LIVER PRODUCTION OF PROTEIN

Dr. Rothschild: No, Paul was at Mount Sinai, and he was going to be the new president of the Liver Association, but the board said that he couldn't be editor of the *Seminars in Liver Disease* at the same time. Why? I don't know. When we were on the same plane flying back from Chicago to New York, I turned to him and said, "Paul, if you'd like me to be editor of the *Seminars in Liver Disease*, I would be glad to do it until you want to take over again." He said, "Oh, Marc, that would be wonderful." So I didn't get any money--or a lot of money or anything--but I did him a favor, and it was a wonderful way to learn about liver disease because you always had a guest editor. This one was Charlie Lieber, and Burke was the founding editor. Whatever the subject was on liver disease, I could always get someone who was highly skilled in that aspect, whether it was hepatitis, cirrhosis, or alcohol. And I learned a lot by getting involved with Paul Burke from a clinical standpoint. So I had fun doing that. The major work at the end of my career was on not so much ascites, but "how to prevent alcohol from interfering with the liver production of protein."

Dr. Friedman: How did you get to work on guinea pigs with this? I got a kick out of getting guinea pigs to drink alcohol.

ALCOHOL AND THE HEART

Dr. Rothschild: Sid was interested in the heart. When he came to me and said, "Marc, you know the heart has problems with alcohol, too." I said, "Why don't we combine our aim, and you see what alcohol does to the heart, while we work on the liver." He said, "What do you mean?" I said, "You're using the isolated perfused guinea pig heart; you don't use blood as we do in the liver, so it would be easier for you to get more concentration of alcohol." So he did that, and we began working on acetaldehyde, and acetaldehyde was a lot more toxic to the heart muscle protein production than was alcohol--or worse. Sid didn't do it that way. He perfused the heart with small doses of acetaldehyde. The heart would function for a couple of hours, and he would take the perfused aid(??) periodically during that period of time, study it, and then he would study the heart muscle thereafter. He made slides of it, looked at it, and other things of that nature. So that was his work, and we just did these things together.

Dr. Friedman: What does alcohol do to the heart?

Dr. Rothschild: It decreases the ability of the heart to contract, and to a large degree that's the acetaldehyde ____ on proteins. The heart then gets bigger and suffers from alcohol-induced cardiomegaly. You have to drink a lot to get the cardio disease from alcohol alone. Of course, with an isolated guinea pig, you can perfuse the heart with

anything. But it's a disease that affects some people, but not many. And many chronic severe patients who consume large quantities of alcohol suffer; it takes some time. You don't see it in binge drinking. Some of these kids who are involved in binge drinking drink seventy to ninety drinks a week, which to me is unbelievable. But you don't see the kind of cardiac damage that you see in adults, and maybe that's because you need another type of cardiovascular insult plus the alcohol to promote the kind of cardiomyopathy--these hearts really don't work very well. Our studies never used____, and we really didn't feed guinea pigs alcohol. We just profused the hearts.

EDITORSHIP ON HEPATOLOGY JOURNALS

Dr. Friedman: Well, it seems from your bibliography that you became more and more involved in hepatology. You were editor of *Hepatology*, editor of *Seminars in Liver Disease*, and the editor of the *Journal of Alcoholism*. Then you wrote the chapter in Popper's book.

Dr. Rothschild: Right.

Dr. Friedman: What about your contacts in your positions as counselor of the International Association for the Study of the Liver?

Dr. Rothschild: Well, it was from the effects of duties that I had when I was working with the AASLD (The American Association for the Study of Liver Disease), and they asked me to consult with them. But I really wasn't deeply involved in any of the functions of that association. I didn't organize the meetings; I acted sometimes as a reviewer of articles, and I became acquainted with a very interesting Swedish man whom I met once many years ago--I can't think of his name at the moment--who became interested in liver disease, and I became a part of their group.

STILL MORE ON BERSON AND YALOW

Origin of the insulin tag

Dr. Friedman: Since the main purpose of my wanting to get together with you is in relation to the background that I'm working with on Berson and Yalow, is there anything else that you can think of that would be of interest for me to know about them? For example, Arthur told me the same story you did about working on insulin. Shimon Glick accredited it to the guy from Cleveland, Ohio, Mirsky. He said that [I. Arthur] Mirsky was the one who stimulated Berson to tag insulin with radioactive IV.

Dr. Rothschild: Well, I can't tell you whether it was an idea out of the blue-- _____, but I remember sitting with Arthur, and we were talking about tagging insulin, and I don't know whether it was he or I who said, "Aren't we doing enough with albumin, and haven't we tagged gamma globulin? Why do we need to tag insulin?" Then we began talking about it being a smaller protein and probably having a short half-life. We went and spoke to Sol, and that's when Sol got us to use salting out methods to separate globulins and other serum proteins. We'd go to the grocery store and buy starch, or

starch block. We worked in the basement and built those things, and we studied insulin and other proteins on 3-MM Wockman paper--it bound where you put it even though you used the paper___mechanism, free insulin never moved. I would think that it was Arthur's discussions with Berson and Yalow. After we had begun these studies and he had come in and seen what we had done, that got them interested in it. I think it started with Berson's ideas, and he had things in mind when he told us to do these things to separate blood proteins and to look for denatured insulin, for example, on a very high specific activity insulin, which meant that basically they had to get the laboratory on the Island to make us "carrier-free" I-131, and that was very hard to do.

Dr. Friedman: I was going to ask you, was this possible?

Dr. Rothschild: Well, I remember sitting and listening to Sol and Roz discuss this and, therefore, they could make tagged insulin, which was really just tagged insulin, and it wasn't contaminated with I-127, and this is really what permitted them to use this to isolate globulin-bound radioactivity as an index of "free insulin" ratios. You get the free insulin easily from the 3-MM Wockman paper, but you needed special techniques to get the globulin-bound insulin. This is how the radioimmunoassay came to be developed. It was their idea.

Dr. Friedman: I know that part was their idea.

Dr. Rothschild: I always thought that they became interested in it because Arthur and I were working on it.

Dr. Friedman: Well, according to Arthur, he said that he had asked Sol several times, "Why don't we tag insulin?" Sol said that he had enough trouble and enough work to do without that. Finally, after three or four times, he got tired of Arthur asking about this, so he turned to the technician, Kitty Newerly, and said, "Kitty, tag some insulin for him."

LARGE DOSES OF DESSICATED THYROID AND THE DISTRIBUTION OF I-131 LABELED ALBUMIN

Dr. Rothschild: And that's the way it happened. I remember Arthur and I discussing it for a long time, and then we stopped to work on albumin and blood volume and other things such as globulins, and we began studying insulin and gave it to lots of patients. We studied various hormones and their effects, and we gave patients--God forbid nothing happened--but we gave them five and six times the normal amount of thyroid.

Dr. Friedman: I wanted to ask you about that article, "The Effect of Large Doses of Desiccated Thyroid on the Distribution of I-131 Labeled Albumin." You said the article was written in 1956.

Dr. Rothschild: No, they took it very well. The one reason it worked is that the first person who said that he would do it--and we explained to them what we were going to do--had one of the worse cases of psoriasis that I had ever seen. We started the thyroid.

We'd given him a shot of radioactive albumin and began the thyroid, and within a week his psoriasis was gone. His skin was clean. We looked it up and found that people many years before had tried it, but this man went around the hospital, and he said, "These two doctors are going to come and ask you if they can do a study that can possibly do you some harm, but isn't going to do you any good." He said, "They're full of baloney. They're brilliant. They're going to cure you." This guy went around and got us the patients. So we did that in 1956.

Dr. Friedman: When you were working on radioactive iodine in those days, did you ever get to meet Sam Seidlin?

Dr. Rothschild: I may have. I don't remember.

Dr. Friedman: He was the first one who supposedly cured metastatic thyroid carcinoma to the skull with radioactive iodine.

Dr. Rothschild: I could well have met him, but it doesn't ring a bell.

Dr. Friedman: He was a great guy.

Dr. Rothschild: I'm sure.

Dr. Friedman: Well, there's nothing more for us to talk about. I enjoyed this and appreciated it very much, but if there is anything else you can think of about Roz and Sol, I'd love to know about it.

Dr. Rothschild: I have a picture of Roz that I can show you.

Dr. Friedman: Roz I met. I interviewed her. I've got several pictures in my files at the Endocrine Society, young and old. You know she had a stroke.

Dr. Rothschild: Yes, I know that. Arthur and I use to talk about that quite frequently, and when I visited Arthur and Caroline at home one day, Roz came by. That was in White Plains where they lived.

Dr. Friedman: That was before their present home.

Dr. Rothschild: Where do they live now?

Dr. Friedman: Rye, New York.

STUDYING THE RELATIONSHIP OF CHEST PRESSURE TO THE CONTROL OF BLOOD VOLUME

Dr. Rothschild: He would have me come over, and he said, "Gentlemen, I would like you to meet one of our boys." Then he introduced me, and I would meet all of the "big

wheels.” Sol made the effort. He put his hand out. He was such a friend. Roz was quieter and more distant, but they worked solidly together all of the time. Arthur and I once tried to figure out if there was a pressure-related factor in the chest to control blood volume, and we used urinary output. We got a great big old gas tank, washed it out, ___ it with a negative pressure, and then we would breathe against this and see if it would do anything to our urinary output. Arthur got tired of doing it because I couldn’t void unless I had a really good bladder, and he was tired of being the subject, so he quit looking for these atrial maturetic factors. That’s something else that we became interested in. It was fun. It was a part of my life that was exciting. Not that the rest of my life wasn’t, but this was a wonderful way to start it, and it was a great experience, and Arthur was a “super friend.” There wasn’t a day that we didn’t meet, sit and have lunch, or talk about things that we didn’t have a good time together.

FRIEDMAN DISCUSSES HIS INTERVIEW WITH ROSALYN YALOW FOLLOWING HER STROKE

Dr. Friedman: The only one left at the moment that I have to get together with is Jesse Roth. At one point around Easter, Glick came to the States. Now, he’s in Israel. He had to do something at Columbia, apparently--they paid his expenses--so he flew in to Columbia, and I went up to New York. I got on the train early in the morning, got there at noon time, spent the afternoon interviewing Glick, got on the train, and was home for a late dinner with Florence. And I interviewed Roz, and I interviewed Arthur. Arthur was originally going to be my test case with the interviews, but I got more and more involved in this. So it was you, Glick, Arthur. I went up to interview Yalow, and Billy Bauman came with me. She was supposed to come to the office that day--she didn’t feel well, so she said, “You can come out to the house.” Billy, Florence, and I went out to the house, and I began to interview her. She gave me voluminous material to take home with me. But in addition, she would forget or falter because of her stroke. Billy would say to her, “Roz, didn’t you mean to tell Dr. Friedman about this?” Then she would start over again. At another point, she would forget something, and Billy would say, “Roz, maybe Dr. Friedman would be interested in this.” It was a wonderful interview considering that she had had a stroke.

Dr. Rothschild: Wonderful, wonderful.

Dr. Friedman: I’ve really been fascinated with the job that I’m doing.

End of Interview

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