Richard Anderson

Interview conducted by

Mark Jones, PhD

July 7, 1997

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Dr. Richard Anderson obtained a Ph.D. in Chemistry from the University of California-Davis in 1979. From 1981-1984 he worked as a scientist at Bayer Diagnostics (Miles Laboratories). In 1984, Dr. Anderson began work with Hybritech in 1984 and then went on to help found Biosite in 1988. From 1998-2001, he served as the Vice President of R&D at Nanogen, then from 2001-2003 as the Vice President of R&D at Genicon Sciences. Dr. Anderson also served as Director of Immunoassay Development at BD Diagnostics

THE SAN DIEGO TECHNOLOGY ARCHIVE

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ANDERSON: I have a PhD in chemistry from the University of California at Davis. I got it in '79, I think.

JONES: So, did you meet your wife there? She's also from Davis?

ANDERSON: Yeah.

JONES: How did you get involved with chemistry initially?

ANDERSON: Oh gosh, in my junior year of high school, I took chemistry and I thought it was pretty cool. I took physics, I guess, the year after, and thought that was pretty cool, too, but decided that the math was too hard, so I took chemistry instead. So, I've been a chemist since a long time ago, now. That would have been '68.

JONES: And when you were a kid, did you always like science?

ANDERSON: Yeah, I've been into science since I was really little, probably as soon as I knew how to read, I was going to be some kind of a scientist, I thought. I was perhaps not very informed as a child.

JONES: This was something that your parents encouraged?

ANDERSON: To be in science? They just encouraged me to think about something. They didn't necessarily encourage science. They are not scientists. My dad is a mechanic, my mom is a housewife.

JONES: Where are you from?

ANDERSON: I was born in San Diego, but my dad was in the service, so we lived all over the place, primarily on the West Coast and in the South Pacific, a little bit on the East Coast, but almost exclusively on the West Coast and the South Pacific.

JONES: That's interesting. Did you get your undergrad degree at Davis, too?

ANDERSON: No, my undergraduate was at Santa Barbara, the University of California, Santa Barbara. I got a bachelor of science there in '73.

JONES: And why did you choose Davis, then?

ANDERSON: Well, Davis ended up being kind of a funny choice because I hadn't actually picked Davis. Santa Barbara, at the time, was a moderate sized UC campus. It's probably still in the middle range. It's not the smallest; it's certainly not the biggest one, and I had thought that I wanted to go to a smaller one for graduate school, which turned out, I didn't want to do that, once I had started a year of graduate school, but I didn't realize that when I started. So, I went to Riverside and I quickly discovered that I didn't like the climactic environment at Riverside, too much smog. And I went to work for a guy who said that I could be his graduate student, but the down side of that was that he was moving to Davis the next year, this was my first year of graduate school. And I said, 'That sounds fine to me. When do we go?' So, that's how I ended up in Davis. It wasn't exactly a conscious choice until it was sort of presented to me, instead of going out and picking it.

JONES: And this person was your advisor all the way through?

ANDERSON: Yeah. August Maki.

JONES: And your wife was working with Claude Meares?

ANDERSON: Yes.

JONES: And you met there?

ANDERSON: Yeah, we were just graduate students, you know, graduate students know all the other graduate students. Chemistry is never a huge department anywhere, although Davis was reasonably substantial. And she and I knew of each other's existence for a couple of years, but we it wasn't like, we didn't go or out or anything until about a year before we got married and then we discovered each other and decided that, you know, we would get married.

JONES: And when you were doing the PhD, did you have in mind sort of a typical academic career path?

ANDERSON: Well, when I started I didn't really know what I would do, but I guess casually I thought it would be in academics. But after I had been in the PhD program for, oh, I don't know, two or three years, mine was six and that was not atypical for how long it took chemists to get done. I had recognized that I didn't want to be an academic, so for the latter part, there was really no question in mind that I wouldn't be searching for an academic position. I thought about, and I ended up taking, a postdoc or two, two, actually, but not with the intention of getting an academic posting just because, actually, when I got, just like when I got my undergraduate degree, there was a recession on in the country, and I sometimes joke that getting a graduate degree was the best job I could get at the time with a bachelor's degree. I think a postdoc was among the best jobs I could get at the time when I got my graduate degree.

JONES: And what year was that, that you got your PhD?

ANDERSON: '79.

JONES: And you did postdocs where?

ANDERSON: I did one postdoc at Davis. My wife was a little behind me, and so that it was a way to kind of delay leaving the area for one year. She had gone to, she had been in the Peace Corps, and so she started the year that I was already a second year student, so that was a way to help her catch up. And that turned out to be not quite enough. She needed a few more months. So, I took the first postdoc at Davis to delay one year, then the next postdoc, we coordinated postdocs. We each got one at the University of Chicago.

JONES: What kind of stuff were you working on at this time?

ANDERSON: As a graduate student or a postdoc?

JONES: As a postdoc, I guess.

ANDERSON: As a postdoc, I did NMR of proteins, and the second postdoc, we were to do electron spin resonance of protein crystals, but we never actually got to that stage of the project. We were trying to make the crystal as opposed to actually doing any ESR on them.

JONES: And then after the second postdoc concludes, then what do you do?

ANDERSON: Well, we both knew that we wanted real jobs, so I, of the two us, was probably the harder one to place, because my academic training is in areas that are kind of esoteric for the average industrial environment, so we were searching around, and I tracked down a job with RCA in Lancaster, Pennsylvania, that was going to entail making color picture tubes for TVs, because of my knowledge of

electronic properties of rare earths, and that job was actually all lined up and we were ready to go, so we were getting to ready to go, we took a quick vacation, took sort of a last vacation before you start your real job, because you know you're not going to have one for a whole year, and just as we left for vacation, there was an ad in the Chicago Tribune for a position as a, I mean not sure how to say it, a chemist, really, with their blood chemistry group, which was a clinical chemistry group in Elkhart, Indiana…

JONES: Oh, Miles? I'm from South Bend.

ANDERSON: Miles, yeah. So, I applied and they offered me an opportunity to come and do an interview, and anyway, to make a long story short, I was successful in the interview. But it was kind of a strange interview because I had a job sitting ready, in fact, they called me up the next day and said, 'Where are you?' And Elkhart, there's not a lot of stuff there, as you know, especially for chemists, but fortunately, my wife had interviewed with them at the beginning of her postdoc at Chicago, and they had turned her down at the time. This isn't what they told us at the time. At the time, they said there wasn't really a position for her, with her skills, and of course, later, we interpreted that as there wasn't any position for me, with my skills, and we weren't going to go for a job in that place with only one job, so when I gave my interview, we twisted their arms a bit, and they found that they still had a position open for her, a year later, so they took us both on, so we went there and told our CA that I just wasn't going to show up. So, that's how we both got started in clinical chemistry.

JONES: So, how long did you live in Elkhart then?

ANDERSON: About two and a half years. I came in the summer of '81, and then we left in the beginning of 1984.

JONES: And 1984 is when you came to Hybritech, came back to San Diego? What were the circumstances surrounding that?

ANDERSON: Well, we're from the Southwest, specifically the San Diego area, and we didn't really care for living in the Midwest, to be honest, so we decided that we wanted to live on the West Coast, so we went looking for jobs on the West Coast, and we had a friend at Hybritech, Lila Rice, who had actually encouraged, and to a certain extent helped my wife get a job there, only helped in the context of functioning as a reference for her. So, we asked her if there were any positions open at Hybritech, and she said that she would look into it, so she helped write our resumes and we interviewed, and we got job offers, so that was where we wanted to go in a location sense, and it was a reasonable set of jobs, so we took them, because it was a way for us to exit from the Midwest back to the West Coast, where we wanted to be in the first place.

JONES: Who did you interview with when you came out here?

ANDERSON: Let's see. I interviewed with Tom Adams, Dennis Carlo, David Kabakoff, there probably was somebody else, but I don't remember any other names.

JONES: Well, this move entails going from Miles, which is a well-established company, to this little start-up. What was your impression of Hybritech?

ANDERSON: Well, it was fun. You know, it was a bit more disorganized than Miles, but that didn't particularly disturb me. I was glad, in a way, that I had started at Miles, because it gave me a little firmer base in the area of clinical diagnostics, but Hybritech was, I got to learn a lot of new stuff because I had no experience whatsoever in immunodiagnostics, and sandwich assays in particular, which is what I learned at Hybritech, but it was a little more free form than Ames was.

JONES: Can you elaborate on that? What exactly was free form about it?

ANDERSON: Well, you know, their processes of doing things were not as, they weren't as established in many respects. You know, Ames had been around for a long time, and I mean, their product lines were fairly well-established. They'd been doing that particular sort of thing for quite some time. Hybritech was, of course, more of a gamut of people from different places trying to mix different policies from different companies together, and not all of it was quite meshed yet, which is reasonable and understandable, I mean, I don't remember quite how old the company was when I came, I guess it must have been five or six years at that point, but it was, you know, still partially getting its feet under it at that point, although it had a lot of its feet under it. But it was, you know, just not as formalized in many respects, as well as it was, you know, Miles at that point was very stable with regard to magnitude of employment, maybe not the specific employees, but the number of employees, and Hybritech was on a wild growth curve in terms of the number of employees and just the activity of integrating that many new employees is itself kind of disrupting to a company. I mean, it's not bad, but it's a destabilizing force in the sense that it has to be controlled by the organization.

JONES: When you came, what did you start doing right away? Who did you report to?

ANDERSON: I reported to Dennis Muriyama, and I worked on repairing an assay. Let's see if I get the name right. It was a visual HCG, it was a so-called bead in a tube assay that was read visually, and there were some manufacturing issues that were plaguing the system at that point, so I was given the task of trying to set those aright. And then the other task that I had at the same time was, Gunars had just recently started the process of putting what was going to become ICON, I guess it was called Sluggo at that point in time, and David Kabakoff, who had worked at Syva, was more familiar with the concept of color density measurements on surfaces as opposed to color intensities in solution, which was really how Hybritech made assays. And there really wasn't anybody other than David who kind of even knew about that.

JONES: They were doing this at Syva?

ANDERSON: Yeah, at Syva they had done some of it, and there was really no one else at Hybritech who knew how to do that, and that's a big thing at Ames, measuring colors on surfaces, because they have dipsticks for a lot of things, and I had learned how to do that sort of measurement while I was there, so once they decided that what was going to be ICON was going to be colors on surfaces, then quantification of that was going to be an important feature of that kind of assay development, and there really wasn't anybody else there to do that, so, as much as anything, that's probably half the reason I got hired, so there would be someone there who could try to bring that technology into Hybritech, which eventually is what I spent a lot of my time doing.

JONES: And your wife came in at the same time, and she was....?

ANDERSON: She was over in the therapeutics group.

JONES: Well, at that time, then, how was it working with manufacturing?

ANDERSON: Well, the manufacturing group, of course, was making products on a fairly routine basis. The particular one that I got assigned had, for reasons I'm not sure I really know, especially now, was not being produced really well. I'm not so sure that it was that manufacturing was doing a poor job. Maybe the original chemistry hadn't been quite what they had wanted, which I think is really more accurate. Because they could make the part that I was particularly working on, but they wanted the beads to be quite white, because they were looking for a low blue color, not a very intense blue color, on a white background, which was going to be this polystyrene bead. And the particular chemistry they had tended to make the bead slightly yellow. It had to do with impurities in one of the compounds, one of the reagents, which was virtually impossible to get rid of, and so I would say that the primary chemistry was a little bit flawed for what they really wanted to do with that product. It had been good chemistry, but not perfect for what they had been trying to accomplish, so, as a consequence, the operations group were trying to meet certain specifications that probably weren't routinely attainable with the chemistry they had been given. So a consequence, my task was to improve that chemistry, which I ended up by doing pretty much by changing it lock, stock, and barrel, the coupling chemistry. And then after that, it went fine. I mean, they really did a perfectly fine job on the particular thing that I was working on that time, when I first started, to be able to manufacture that. But I do think that the manufacturing group as a whole was having some issues with trying to meet demand, and what have you. I think backorders became an issue as time went on.

JONES: And throughout your time, you worked on the ICON, you were basically on the diagnostics side your whole time. Were there any kind of tensions there between diagnostics and therapeutics? You know, diagnostics is bringing in all the money?

ANDERSON: In a sense, diagnostics was bringing in all of the highly visible cash in the sense of, you know, on a monthly basis, somebody sends a check in and you send then reagents. It's probably not fair to say that therapeutics was not bringing in any cash because there were a variety of externally funded research programs, with Hybritech Clinical Partners being a prime example of that, and not everyone may have appreciated that that did represent dollars coming into the organization, and even more so, beyond that, you know, at that point, Hybritech was already a public company, and I wasn't there when it went public, so I quite remember when that date was, I think it was '82 or something like that, it was before we arrived, I know that. And you know, it had a public stock price, and there's no question that in smaller organizations like that, part of the stock price is a recognition of what you're doing today, and in a sense, how well a job you're doing of that, you know, earnings per share and all those sorts of parameters for judging a company. And a component of your stock price is, if you will, futures, it's what you anticipate being able to do at some point in the future, and of the two areas, I think there's no question that the therapeutics was perceived to be the more glamorous of the two, and the higher end return, albeit somewhere in the future at that point, and I would say that whether it contributed to the immediate bottom in terms of dollars coming in versus dollars being spent, there's no question in my mind that it contributed to the overall stock price because it was part of the future of the organization. The fact that it may not have transpired, it's almost neither here nor there at this point, but certainly at that point in time, I think if you were to ask well, was the stock price at least partially supported by what was hoped to occur for the therapeutics, I think you would have to answer that definitively yes.

JONES: When you came in '84, the company is public, and had been for several years, they still had some kind of stock plan, right?

ANDERSON: Oh, yes. And that's kind of funny, because my wife and I had certainly not owned any securities at that point, not very far out of graduate school, and we really didn't understand very much about the stock market, let alone have any money to put into it, but part of the job offer included options to purchase Hybritech shares. I don't remember numbers. There were some shares for each of us. And, at the time, I must admit, I didn't know good, bad, or otherwise. I mean, it seemed like a good thing to have this added on, but that really wasn't a driving force for coming to the company. And probably during the greater share of my tenure at Hybritech, the auctions themselves really didn't represent a large fraction of my perceived value, from my perspective, of working at Hybritech. I will say that now, they have a quite a bit of value. We've managed to retain some of them, now, of course, in the form of Lilly, and to a lesser extent, Guidant shares, and they have significant value relative to the basis price, but I don't think I understood any of that at that point in time.

JONES: How was it working for Dennis Muriyama and David Kabakoff? What was the atmosphere like?

ANDERSON: Well, I was pretty much allowed to try to address the issues as I saw fit. I mean, I was trying to groove myself, if you will, in Hybritech's way of doing things, which was admittedly not perfectly like Ames, so there was always a little bit of conflict, if you will, while you're trying to sort of do it the way that people would like you to do it in the local environment, more in the context of me not understanding in many cases, 'Oh, I was supposed to do this and then I was supposed to do that,' because that's not how we did it at Ames, but I mean, I thought it was pretty open and fairly supportive, if for no other reason than I was able, within a reasonable amount of time, to solve the problems that had been presented to me to be solved. In particular, in the case of the one assay, although it didn't have much of a financial impact on the company, that wasn't my choice, I was told to work on this project. It was other people's job to decide whether that was a good thing or a bad thing to do. I managed to introduce a whole new coupling chemistry to the manufacturing group, which is usually a fairly disruptive kind of thing to do, from an R&D to an operations sense, I mean, they would really rather do what they've done, rather than do something different. But they were quite supportive and the project went on pretty smoothly, and the same thing for what I did on the ICON stuff, at that stage of the game with how to go about doing measurements of colors on surfaces. It was an entirely different technology, they had no experience with it. We had a little bit clutched things up a little bit to provide them with some instrumentation, but they were pretty well willing to accept and try to do, and learn, and use, so it was pretty open, pretty supportive.

JONES: In that respect, what were the main differences between working at Ames and Hybritech?

ANDERSON: It was looser. There were fewer pre-defined paths to follow in accomplishing things, and since I hadn't been at Hybritech for too long at that point, I didn't know very many of the people in some of the other parts, like the operations group, so I probably didn't always start out a task the best way with, you know, the right contact in the other group. I mean, in that respect, there were a lot of things happening, so you didn't always get as much guidance as you might have hoped for from the other people because they had a lot of things to do. And I think that if you asked, you got guidance, but sometimes I forgot to ask, and I would sort of bumble along, and then learn, 'Oh, I guess I shouldn't have done it quite that way, I should actually have done it this way,' but mostly, Ames was very formalized in how it went about things, there was this project, you need to talk to this person and talk to this person, and you did this and did this and….Hybritech had many of the same steps, but it wasn't in nearly as formal a, it wasn't done in nearly as formal a way.

JONES: Well, you developed new chemistry for this HCG kit. Was this something that you patented?

ANDERSON: No, it was out of the literature, essentially. It was new in the sense that Hybritech had not used that chemistry before. I suppose you could say that it

was new from the perspective that the literature had not used it for this particular application, but it wasn't like I came up with a synthetic route, and oh, this was something that I had developed from first principles. It had been suggested to me by some other people, who'd said, 'Well, if you're having troubles, you might try this.'

JONES: People in Hybritech?

ANDERSON: Yeah, my wife, who'd had some experience with this. But actually, I had been told that it had been tried and not been successful, previously, and given what I understood from reading things, and, I mean, it was kind of funny that I did this in a sense, because I'd never considered myself much of an organic chemist, in fact, that's probably one of the weakest areas of chemistry for me, and it fundamentally boiled down to synthetic organic chemistry, although it's not like I was doing hard core research grade organic chemistry. It was kind of, 'Look in the book, and here are the rules, and here's what you're supposed to do,' but, you know, I remember quite clearly, Bob Wang, who was one of the manufacturing folks at that time, when I first presented it to him, his comment was something like, 'I'm glad somebody finally did that here.' And you know, it exemplified the fact that people were open, and that if you could prove that something worked, they were willing to do it. That didn't mean necessarily that they would welcome it with open arms if you hadn't proven it yet, but if you could show that doing it that way was going to work, it wasn't 'We do it this way. We won't do it any other way.' They were willing to accept it. Again, it went into the product and sustained that product for its remaining life, which was about another year or so, I mean, it wasn't a long-lived product at that point, but it allowed it to live out its life in a style that they would have hoped for at that point.

JONES: How did you get involved in ICON?

ANDERSON: Well, I had been working for Dennis, I worked for Dennis for about a year, I think, from when I started to roughly a year later, and I was starting to split my time between Dennis and George Sims, who was in charge of the Toso product.

JONES: I'm not familiar with that. What was that?

ANDERSON: The AIA analyzer, what was called Photon Elite at the time. Toso's the chemical company, I don't think their name was Toso right then. What was their name? I don't remember. Anyway, I'd been approached to make controls for that product, and so I started off doing that and then eventually was transferred from Dennis to George, so I didn't have split reporting responsibilities. And in the meantime, all along, I was helping to support Gunars on ICON, again, on the analytical aspects, in terms of measuring reflectance of colors on surfaces, and Gunars had come up with an idea for a kind of ICON that was eventually called ICON II, multi-spot ICONs where you did color comparisons between a test zone and a reference zone. So, I was helping him with that, and he and I kind of got

together and worked up the theory for how this would work, and how you would structure an assay such that these two were relatable parameters, and the question came up, to George, I guess, really, as much as anyone, is could we do that quantitatively so that we could measure the quantity of HCG, as opposed to simply saying, 'Yes, you're pregnant, or no, you're not pregnant.'

JONES: And that would indicate what?

ANDERSON: Well, it was a way to measure HCG concentration, and in some environments that used to monitor tumor progress, although that's not really an approved indication, but people like to measure HCG quantitatively, even for pregnancy, because they like to look at actual doubling of numbers, although for most practical purposes, the qualitative ones are probably more appropriate and cost less money. So, anyway, the question came, was that doable? And that question came back to me, was it theoretically feasible, and the answer was yes, theoretically, that's feasible project, even though there's lot of things we'd have to do to do such a thing, but theoretically, such a thing is possible. So, that project activity began in, oh, I don't know, probably the latter part of '85 at that point, and Gunars and I were doing those activities in late '85 and early '86. Mostly, I was focusing on the quantitative stuff, and Gunars was focusing on the qualitative, of again, what was to become ICON II. And, I think somewhere in the spring or the summer, I don't remember exactly when, I think it was in the summer, Gunars, I guess, decided that he really didn't like doing development anymore, didn't really want to be doing that too much, so he indicated that he wanted to transition from a development role back into a research role, I think it was in the summertime, something like that. And unfortunately coincident with that, manufacturing of ICON was not going well in operations.

JONES: ICON I or ICON II?

ANDERSON: ICON I, the one dot ICON. There were a lot of field complaints about poor performance, a variety of things, so they were having a great deal of difficulty manufacturing the product for reasons I'm not sure are fully established.

JONES: Did you fix those problems?

ANDERSON: Well, at the end of the summer, Gunars, at that point, had transitioned essentially out of development and they needed someone to pick up this ICON II project, as well as to try and address the ongoing manufacturing issues for ICON, and I got elected to do that, so that was my task in the latter part of '86, to then support a repair function for the ICON in the field, as well as to bring the multi-spot ICONs for HCG, for serum and urine, into being. So that's what I did in the latter part of '86, and I guess, going through '87. Yeah, through probably the summer of '87, and those activities resulted in, first we introduced the micro particle technology where microspheres were placed on top of membranes, which is what rescued ICON

at first, and then that formed the basis of the technology that we did for the multi-spot ICONs, or the HCG ICONs, excuse me, the serum and urine ones, as well as eventually the so-called combo, where you had a serum device that you could run a urine protocol on. And then that was also followed by the development of ICON QSR, the instrument, which was the other project that I had been carrying, really, since towards the beginning of '86. The ICON II product were very well-received and did very well. QSR did not do so well. I think we reached a little further than we could really do, at least with what technology we had available to us at the time. The product pretty much did what we thought it could do, but what it could was really not enough for the marketplace. The HCG product itself, at least, was never really extremely successful. I think the CK-MB product that followed thereafter has been fairly successful, but the HCG version of QSR was not really a great success.

JONES: Well, in '86, did you know about the Lilly sale?

ANDERSON: Before it happened? No. My recollection is that one day, they called us into the lobby of Pines South and said, 'We've been sold.'

JONES: Who said that?

ANDERSON: I believe it was David Kabakoff.

JONES: What was your reaction, then?

ANDERSON: I was surprised. It was just surprise. I mean, it was kind of strange because I had, in a sense, gone away from a big company to go to a little one, and now I was back in a big one again. But not having been through a purchase before, I didn't know what to think, other than that I was just very surprised. It was surprise more from the perspective that when Ted Greene used to have quarterly all-employee meetings when we first came, and I guess, for a while, while he was still with Hybritech thereafter, he had them, and it was a surprise because at each one of those meetings, he had always stood up and said, 'Oh, Hybritech's going to be a so-called fully-integrated pharmaceutical company,' I mean, the irony was that the diagnostics part was always, if you will, the smaller stepchild, or the kid sister to the therapeutics that was essentially the core of the company, and the goal in this integrated therapeutics organization was really to do the whole shebang, from the basic theory to the manufacturing, to the sales, to the, you know, the whole shebang, the whole stuff. And so it was a surprise when that process was to be interrupted or changed by being acquired by Lilly. You know, they did it, so, 'OK, fine. I guess we're owned by Lilly now.' But it was a shock.

JONES: What changed after that?

ANDERSON: Well, immediately, not much, but with time, differing ones of the Lilly management came to Hybritech to fill positions, of course. And I'm sure I don't

remember the dates now, but it wasn't too long after that that I think Ted Greene left. I don't think he even lasted until the end of '86 or early '87. It wasn't too long. And you know, Tim Wollaeger left around the same time, I believe, as Ted. I think it was a little bit after, but not much as I recall. And of course, at that point, they went off, and not too long after that, they started Biovest Partners. And let's see, David Hale, I guess, was there, I'm trying to think. He left in late '87 or early '88, one of the two, somewhere around then. In the roughly two years that I remained, many people, you know, transitioned from Hybritech to other organizations of one form or another. And so, of course, eventually there were Lilly people throughout different pieces of the company. At least while I was there, there were relatively few, in fact, I think there might have been none, in the diagnostics R&D group. There were a few Lilly managers in some of the operations parts that I dealt with, both in technical support as well as formal operations, and of course, there were a few here and there throughout the administrative components. You know, I mean, my impression is that they were trying to rearrange the financials and the administrative aspects of Hybritech to look more like Lilly did, partially for their own reasons, partly because they felt, I guess, more comfortable with them that way. It was a little tense on my end because the project QSR was not going as well as I certainly would have liked it to have seen, and certainly not as well as they would have liked to see, because it was a very difficult project, quite frankly, and we probably had not allocated enough resources in total to try to bring it to fruition. So, it was frustrating for them and it was frustrating for me. And I think, you know, that probably the part that was most frustrating for all was that there was a hope that it would do well in the marketplace and, frankly, it didn't do well in the marketplace. It was an interesting exercise for me, but it's not one of the products that I can look back at and say, 'Well, this one was really a big success.' You know, we had estimations as to what we thought it could do, and I think it performed in the middle of those expectations but not at the bottom end in terms of the best performance that we could have hoped for, and it pretty much needed to have the best performance. From the point in time when the concept occurred until the point in time when the product was available, it needed to hit the bottom end of those precision targets, meaning smallest CVs, in order to be economically viable and competitive, and it didn't do that. It hit more in the middle of the ranges. So, I always felt that it had done more or less as advertised, but from the marketing perspective, it probably didn't perform as well as they had hoped, and as a consequence, didn't do as well as everybody had hoped externally.

JONES: So, Gunars wasn't involved with that. Was Kim Blickenstaff?

ANDERSON: Well, Kim had started off being product manager for ICON, and he and I had worked together quite closely on the ICON II project. He had responsibility for QSR when it initiated, but that transitioned to Julia Brown, oh gosh, probably sometime in '87, I think toward the beginning of the year, I think it was earlier than mid-year, and KIM had transitioned into the field as a regional sales manager, as I recall, was his title, for the San Diego area, and I think he held that title from

sometime in the first half of '87 until our departure in '88, so he really was not overseeing the marketing management component at the conclusion.

JONES: Had you worked with Ken Buechler, too?

ANDERSON: Yeah, Ken was working on the CK-MB project, the CK-MB QSR project, so he kind of had responsibilities for that, so he had pretty close ties with me on QSR, because I had originated the QSR program. We were struggling away with that, which was actually, officially HCG had been completed when we left, and CK-MB, at least we believed, was largely completed at the point in time that we left. Later history showed that it probably wasn't as completed as we thought that it was, or at least it wasn't to the satisfaction of, partly that has to do with the fact that, as time wore on, the hurdles, the requirements, the demonstration points, the bar effectively got raised for projects during the course of '87 as the Lilly folks put the product development process more under a Lilly-like program of where you have to be at what stage in order to be considered successful for a transfer from R&D to operations, and there were a lot of those activities that were ongoing and being formulated in '87, and as a consequence, you know, for instance, what the rules were at the beginning of '87 were not exactly the rules at the end of '87. So, it became hard, in a sense, to tell where you were in the cycle because the rules for what constituted one decision point versus another decision point were fluid during that period.

JONES: Do you think these were aftershocks of the merger?

ANDERSON: Oh yeah, sure. My understanding of Lilly's product development process is that it's very formalized, which is not surprising for a large, established, long-term established and very successful pharmaceutical house. There always was a certain amount of culture clash, if you will, between the diagnostics environment and Lilly's therapeutics environment. I mean, you know, in fairness, you could probably even say that there had been some culture clash within Hybritech between the mindset that needed to be put in place in the therapeutics area versus the mindsets that were allowed, or even appropriate, for the diagnostics half. But if anything, of course, the thinking was a little more grooved and fixed for the Lilly folks because they had, you know, they'd had processes in place for quite some time, and you can hardly argue with their success level. They'd been very successful in the area of pharmaceuticals, and they were grappling with the fact that Hybritech, you know, if you looked at the collection of smaller organizations that they had acquired at that point, and I can't rattle them all off, but the API and Physio-Control and that collection of so-called device companies, well the term device company fit very well for most of them, there were defibrillators and there were infusion pumps. It didn't fit very well for Hybritech because we didn't make devices in the sense of electronic, electro-mechanical devices, to a large extent. There were a few, but that wasn't the core of the company. And so, Hybritech was always sort of off to one side in that collection, and the mechanisms by which one goes about doing diagnostics is not

really quite the mechanism by which one goes about doing electro-mechanical devices in the health care industry, and as a consequence, what fit for those, didn't fit quite as well for Hybritech, and Lilly was having trouble kind of trying to rationalize that. And you know, history later sort of showed that they themselves were having some difficulty grappling with even the device area, and you know, eventually they divested themselves, and that's why there is a Guidant now, and rightly or wrongly, they just decided that that didn't fit with how they went about going about in the world. I mean, I think you can't argue with the success of the Guidant organization. If you've followed their stock price at all, in the last year or two it's gone from the mid-20s to its pushing the low 90s at the moment, so that's certainly, those are hallmarks of successful companies. But, it didn't fit their business plan very well, so they just decided that it was a business area that they weren't really equipped to deal with well. Their expertise was in other areas.

JONES: Well, you had worked with everybody in what's now the Biosite team, and you enjoyed working with these people? Everybody got along?

ANDERSON: Yeah.

JONES: How did Biosite get started?

ANDERSON: Well, this was in '86, it should have been in '86. I was assigned to Ian Wells to do the ICON stuff, QSR as well as ICON II, and I guess in '87, Ian came to me and said that they, the senior folks, I guess, had been thinking about it, and they wanted, they were concerned that someone else might figure out a way to make ICONs, and you know, go around the ICON patent, which was a very valid concern, because obviously if somebody else could figure out a better mousetrap that did the same thing, and take this very lucrative franchise away from Hybritech, that would have been a bad thing corporately to happen, so they wanted to look and think about if there was a way that could be gotten around. And probably the two most informed people in the company that could sort of think about that from a technical perspective were Gunars and myself, Gunars, of course, being the inventor, and me, at that point, having spent a lot of time thinking about ICON. And so, Ian told me that I was supposed to try to get with Gunars and try to figure out how to 'break the ICON patent.' And I thought that that was kind of an interesting concept, kind of funny, actually. I ended up stopping Gunars one day in a hallway, and saying, 'Oh, Ian says that we're supposed to do this,' and I sort of made a half-joke and said, 'Well, if I knew how to do that, I don't think I'd want to do it here.' And Gunars was apparently listening to what I said, so he came back later and asked me whether I was serious, and I said, 'Serious? About what?' And he said, 'Serious about if you knew how to do that, you wouldn't want to do it here?' I said, 'Well, yeah.' I mean, I thought, I make a nice salary, I'm really comfortable with my living, but I'm never going to get rich working for a living, if you will, working at a nine-to-five job. The only way to get wealthy is to invent something, and you have to own it, pretty much, to be able to really benefit from that. Gunars had a pretty funny comment to that, he

said, 'Well, I never thought that you would even ever really consider leaving this place.' And I said, 'Oh, I don't know. If I thought there was something reasonable to do, I would consider it.' So, he and I had a couple of conversations about it. He proposed to me, well, he said that he had been thinking about leaving Hybritech for a while, I don't remember what the time frame was, but for a while, and he wanted to be a private consultant. And my counter was that he really didn't want to be a private consultant because you really only generate value if you make something. It's not enough to generate value from ideas. You have to make the idea and make the thing from the idea, and sell the thing, whatever that thing is. And so, he and I talked a little bit about the concept of, what we used as a model at the time was Centocor, although it's probably a bad model now. Centocor, at the time, was what is frequently referred to as a research boutique. They came up with ideas and developed them to a certain point, and then they would sell the rights to the concept to another organization to really bring it to fruition as a commercial product. My comment was that I thought that had some value, but it didn't build value to the level that, eventually, I think you're going to want, so that, unfortunately, I really didn't see a way to really make a pile of money unless you started a company and made something. So, he and I, and then eventually, Kim and Ken, batted it around, and I suggested, well, why don't we do drugs of abuse? Not that I had any great ideas as to how we would do it, it just seemed like it was in the newspaper a lot. And the four of us concluded that that would be a viable area to work in, and we sort of came to those conclusions, I guess, late summer, early fall of '87, round about then. I don't remember exactly the order of details here, but I think it was Kim who talked with Tim, who was already at that point with Biovest Partners, and he said, you know, 'If,' *if*, 'we were to be available, would there be any money available to start an organization, and I don't know exactly what transpired in those conversations, but the outcome was, the answer was yes, there would be some funds that they'd be willing to try, to risk some venture capital on the four of us, to try to start a company with the idea of working in the area of drugs of abuse, without much knowledge or, frankly, at that point, any available technology that was really ours. So, with that in mind, we put together a business plan at the very end of '87. We had a series of meetings at Biovest where we were kind of kicking the idea around and trying to get a handle on what would a market be like for that, and you know, was there any technology, and what was known about technology, I should say, in that area. And we kind of put everything together and left in the spring.

JONES: Had you really thought about leaving Hybritech before you had this conversation with Gunars?

ANDERSON: Yeah, it was just suddenly, 'Yeah, I guess we could.' And to be perfectly frank, when I first thought about, it was like, I don't think I can do that, and then my wife and I talked about it, and decided that it was a risk, but that it was a risk we could assume, ironically, because she was working for Eli Lilly, which was a very stable company, because she was employed in what had been Hybritech therapeutics, and now was Lilly therapeutics. So, because she had a good, secure,

well-paying job with them, we felt more comfortable about sort of putting our lives on the line with an obviously very risky and probably going to go under function like Biosite.

JONES: You left in the spring. What did you start doing then? Did you have any idea?

ANDERSON: Well, we had consulted with a patent attorney in the fall, to try to understand, before we really got started on thinking….

JONES: Who was that?

ANDERSON: I don't know, I don't remember his name. Gunars would. Somewhere in the deep, dark, danks of Biosite, there's a check that Gunars wrote to some fellow. Someone here in town, but I just don't remember his name. But basically the advice that he gave us was that as long as we were Hybritech employees, we were really not allowed to start inventing. So, OK, we understood the rules, that you're not allowed to invent, we decided that we would conscientiously not invent. None of us were particularly expert in the area of hapten immunoassays. I would say that Gunars and Ken and I, at the time, were fairly well-versed in the area of sandwich immunoassays because that's what we'd been doing, in Gunars' case for, I don't know, six years, I guess, in my case, four, in Ken's case, for a couple. But we would study the area of hapten immunodiagnostics and try to understand how the ones that exist right now worked. And there were two or three different ways that hapten assays were done at different places, not exclusively for drugs of abuse, but for haptens as a whole, and we studied them and understood how they worked, so we would know what had been done, so that when we got to the invention point, we would at least try not to invent something that had already been invented. And again, that carried us through the spring. Well, when we started, we knew what had been invented.

JONES: You were doing that at Hybritech?

ANDERSON: Right, we were doing that at Hybritech. We were doing that on our own, in the evenings, which was all perfectly legitimate because it was all public domain information, it was just a question of digging it out of the literature. And then when we started, then the answer was, 'OK, now we've established that we're going to do drugs of abuse,' which, again, was an open field…

JONES: And why did you decide that this would be good? Had you sort of investigated what kind of markets might be there?

ANDERSON: Well, we had only very lightly investigated what kind of markets, and I think you could probably make a pretty strong case that we hadn't done as much homework as you probably would really hope that someone who's launching off in a business area would do, but that's neither here nor there now. We basically asked the

following question. We asked, 'If you had an ICON-like assay,' and by that, I don't mean an ICON knock-off, what I mean is a rapid assay for drugs of abuse that could do more than one assay, 'would that be perceived in a positive light by the people who do drugs of abuse testing?' And we came to the conclusion that the answer would be yes. We didn't know how we would do that, and in fact, the simplest thing would have been to just make an ICON, but the answer that such a concept would be a viable concept seemed to be reasonable, and it was our interpretation that there was enough drugs of abuse testing being done that, if you could such a thing, that there was enough of a marketplace that we would find a place to do that. Now, I think if you were to back-analyze what had been conceived at the time, the sense was that we would be doing it in a workplace environment and not in a medical environment, but in fact, that is not what transpired. What transpired was doing it in a medical environment, and only later in the workplace environment. But the conclusion was that if you had a rapid panel assay that it would probably be acceptable in the marketplace, that is, assuming that it performed within certain parameters. And then the only question was, 'Well, OK, so how do you do that?'

JONES: Did Tim Wollaeger have any input on that?

ANDERSON: No. Tim's primary input was just the money, money and judgment as to, you know, could people like us actually start a company, which he decided the answer was yes.

JONES: Why do you think he decided that?

ANDERSON: Well, the reason I have been told, and it may only be a partial depiction, was that we had been very successful at Hybritech. I'm sure, you know, you've certainly been told this, or heard it often enough, that there's always the disclaimer, if you pick up a prospectus or something, you know, 'Past performance is no indicator of future returns,' or some story to that effect, but you know as well as I do that, be that as it may, people tend to go with success stories they've had in the past. Of course, occasionally, you get burned, and while you had a success in the past, you don't have a success in the future, but there is a higher correlation of past success with future success than future success with no past success, and the feeling was that we had had to tackle some very difficult projects while at Hybritech, such as ICON or ICON II or ICON QSR. Admittedly, I think you'd have to say that not all of them were extremely successfully pulled off, but there's no question that they were all pulled off. And there's also no question that they were all technically very difficult, and in many cases, had been revolutionary, at least at the point in time that they came out, in terms of those programs versus, say, what may have come out of a competitive organization such as Abbott. So, the sense was that if anybody could do it, we could probably do it, so we were as good a bet as anybody else, and that was the reason I was told that Tim was willing to front the cash, and I eventually got a comment, not from Tim, but from a different venture capitalist, Dick Schneider,

who's currently with Domain, but at the time was with 3i, which was basically along the same lines, although he didn't invest as a 3i associate at the time.

JONES: Had you asked him then, or was this later?

ANDERSON: Oh, yeah. This was in one of the later venture rounds, and he had told us, Dick is a very highly knowledgeable scientist from Syva who had direct experience in making drugs of abuse assays, and he was well-versed in the issues that we were about to face, and his comment at the time was he didn't think it could be done, meaning what eventually became Triage, but that he thought that if anybody could do it, we would be the ones. Now, that was, I think his negative part pretty well came through when he recommended to 3i that they not invest at the time, and you know, I don't think that was necessarily a bad call on his part. I think we were pretty iffy at the time he was taking a look at us, and in fairness to him, later on, he came to us and said, 'Congratulations, I really didn't think you guys could do this, but it's pretty astounding what's transpired.' So, I think it was on the basis of past performance, that we had been pretty successful with some pretty major programs for Hybritech.

JONES: How important do you think it was that it was Tim Wollaeger, who had been at Hybritech, who knew you guys, who knew Kim Blickenstaff for a number of years? You know, without any kind of proprietary position, without any kind of real idea, would you have been able to get some seed funding?

ANDERSON: Yeah, you know, it's probably impossible to answer that question now, I mean, you know, again, in all fairness to other venture capitalists, you might ask them that question now and they might say, 'Oh, sure. We would have put in,' I don't know. I guess not being a venture capitalist, it's hard for me to answer that question. I guess if I had been a venture capitalist, I would have been reluctant to do it, because we didn't have a proprietary position. Most start-ups do have a license or a patent under their belt on the day they go out the door, and we had four sets of hands. That sort of what we had, four walking around brains. If it had not been a Tim Wollaeger, or possibly a Ted Greene, I'm not sure it would have happened.

JONES: How did you go about then, I guess Triage is what come out of this, the first product, how did you go about developing it?

ANDERSON: Well, the idea came that there were some, there was a very important paper by Roger Eakins, who at the time, which is quite some time ago, he had been with Oak Ridge, the Oak Ridge folks, that Atomic Energy Commission at Oak Ridge. And he had written a really nice paper talking about immunoassays, well, specifically hapten assays, and how you analyze the equilibrium expression for that interaction, and we came up with some ideas as to how you might try to structure an assay, and I think the place that we bought it is now gone, but we went down and bought a Leading Edge 80-88, and a copy of Lotus 1-2-3, the DOS version, a long time ago, and

I sat down with that, and once we had some initial concepts as to how we would structure the assay, you know, how much of this would you put in, or which would be the larger component, I sat down and modeled the assay numerically for about six weeks, and at the end of that, we were able to draw some conclusions as to how you would structure what was going to become an ascent multi- immunoassay, and whether or not, in theory, that should function. And our conclusion was that it would work in a certain way, which is basically how it does work, and so once we were convinced, for a theoretical perspective, that it would do certain things, if you pulled it off right, and if you met certain criteria for antibody affinity and the like, we felt comfortable that we had a chance of actually structuring an assay. In conjunction with that, we already pretty much knew that we need to do something that was going to resemble an ICON, and by that, I mean that it was going to be a flow-through assay so that it would be rapid. And there were really two reasons for that. One reason was that, during QSR, we had come to realize that a flow through membrane has one characteristic that's really very, very powerful, and that is, every surface element is, in principle, a different assay. You can't do it quite to the level of a single surface element, but essentially to the level that you can resolve one space on a flat surface from another space. By the way that that works, you can do one assay over here and another assay over here. And since we wanted to do a lot of assays, which was an important feature of life. We were, I guess we were doing the reverse of building an ICON that goes around the ICON patent because we were well aware of what the features of ICON were, and we were determined for a variety of reasons not to step on Hybritech's or Lilly's toes with regard to the ICON patent. So, given that knowledge, we began to think about how you might make an ICON without making it an ICON, but particularly to take advantage of flow-through characteristics and multiple assays, and really a lot of the device development component that led to that success of Triage is another by the name of Mark Nokowski, who is really the design engineer who came up with the solid component, which was this sculptured plastic base that took the place of the absorber that you would have in a normal immunoconcentration assay in which there's basically a sponge underneath the membrane.

JONES: And he's here now?

ANDERSON: No. He's no longer with the company.

JONES: You hired him early on

ANDERSON: Yeah, Mark was hired in the fall of '87.

JONES: One of the first people?

ANDERSON: I think he was number two, might have been the first. He was either the first or the second, it's long enough ago that I don't remember for sure, but he and Susan Moi were nearly simultaneous.

JONES: How did you go about recruiting people? You knew what you had to do, did then target people to come in to work on specific problems?

ANDERSON: Well, some people we had ideas about, people we knew. Mark had been at Hybritech, as an example. He and I worked together on QSR, so he and I knew each other fairly well. Ken knew him. Gunars didn't know him as well, and Kim didn't know him very well, but knew of him. We talked to a few different engineers. Mark was actually not first one on the list, actually, now that I think back on it. There was another guy we talked to, but eventually we settled on Mark, who I was happy with, because he and I worked together really well. I considered him to be quite bright. Susan, for instance, was completely serendipity. She, her husband had recently been hired by my wife at Hybritech, and Susan was looking for a job because they had both recently just come from Davis, cause Mihn had worked with Claude, and she was looking for a job, and Mihn told Leslie and Leslie told me and I told the guys here that, well, here's another person that we could conceivably hire since she's a synthetic organic chemist, and she came in and interviewed and was received very well, so she got in.

JONES: What did she contribute then?

ANDERSON: Oh, she did a lot of synthetic work for the hapten couplings to BSA.

JONES: And what was her last name?

ANDERSON: Nin-Moi. Susan Moi, M-O-I. And at this point, I don't remember. I think Mark was hired a week or two before her, but it was almost simultaneous.

JONES: What were your particular responsibilities at this time? You were starting to put an organization together and none of you had really done this before. How did you go about putting it together and what was your particular role?

ANDERSON: Well, my title was director of, or I was in charge of product development. I don't think we even had titles quite as formal as that at that point in time. I ended up with the responsibilities of trying to take the research components and turn them into a commercial product, I mean, that's what development people do, that and I managed the DEA license, since we have a Drug Enforcement Agency license, we had to get a license to be able to have controlled substances on the premises. That was an example of our innocence. We didn't even think about that until we got started and it was like, 'Oh, you have to get a DEA license to be able to work with DEA controlled substances,' so I had tasks like that. Gunars and Ken were really sort of the ones who led out at the beginning of the chemistry, Ken in particular, because the way you get to the assay is you first have to make what are called immunogens, which are synthetically modified derivatives of the compounds you want to test, and you stick those on a large protein and then you stick those in a mouse, which gives an allergic reaction, and eventually you get antibodies. But the

first step in that process is the chemical modification of the drug, and that was Ken, and the next one in that chain of events is doing the antibodies, which was Gunars' task, and then my task was to integrate some of the outcome of both of those pieces into a commercial product, so I filled in a lot of the holes as we went along. I helped Kim do financial charts at different times, I did the DEA stuff. I did facilities, mail, I did this, that, and the other thing in the beginning, and then eventually I did development of the product.

JONES: And putting this organization together, did you have a philosophy about doing it, or did it just emerge organically as it went along?

ANDERSON: We had a couple of things that guided us. We kind of analyzed the overall process that was going to be required in order to do a hapten immunodiagnostic, and that's where we had a three-pronged version of what was going to be necessary, there was going to be a chemistry function, there was going to be an antibody function, there was going to be a development function, and those tasks got individually assigned to Ken, Gunars, and myself, respectively. In terms of the company, what we did there was sat down and we had a very, we sketched out a design for roughly what had to happen in the sense that there needed to be first, chemistry, then antibodies, then development, assigned some estimated times to each one of those tasks, did what we could to estimate what the expenses would be for each one of those tasks, and then had that for, a thin, but perhaps a backbone for the process as a whole, and that was actually part of the original business plan. So, as a consequence…

JONES: Do you have a copy of that?

ANDERSON: No, from my end, at least, it's lost in antiquity. So, as a consequence, we had an estimation as to what it would cost and how long it would take to do, and the numbers that I recollect were we guesstimated that it would take about ten million dollars and around three years. What I think transpired was we spent about ten and, I think we spent just a little over ten, and it took us just under four years to get from start to finish, so we were pretty much on target.

Dissertation: "Optically detected magnetic resonance studies of heavy atom perturbed triplet states" UC-Davis, 1979.

END INTERVIEW

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The San Diego Technology Archive (SDTA), an initiative of the UC San Diego Library, documents the history, formation, and evolution of the companies that formed the San Diego region's high-tech cluster, beginning in 1965. The SDTA captures the vision, strategic thinking, and recollections of key technology and business founders, entrepreneurs, academics, venture capitalists, early employees, and service providers, many of whom figured prominently in the development of San Diego's dynamic technology cluster. As these individuals articulate and comment on their contributions, innovations, and entrepreneurial trajectories, a rich living history emerges about the extraordinarily synergistic academic and commercial collaborations that distinguish the San Diego technology community.