Walter Desmond

Interview conducted by

Mark Jones, PhD

July 30, 1997

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After receiving his PhD in biochemistry from UCLA in 1979, Dr. Walter Desmond went to work for Hybritech for over twenty years, where he contributed to the development of TANDEM and ICON technologies and other important developments. He went on to work in the San Diego educational field with Lincoln High School and the Science/School-to-Career program, and as a board member with the San Diego Science Alliance.

THE SAN DIEGO TECHNOLOGY ARCHIVE

INTERVIEWEE: **Walter Desmond**

INTERVIEWER: **Mark Jones, PhD**

DATE: **July 30, 1997**

LOCATION: **San Diego, California**

JONES: How did you get to UCSD? What were you doing there?

DESMOND: I was a research assistant in the Biology Department and also at Scripps in Marine Biology.

JONES: Who were you working with?

DESMOND: I was working with Gordon Sato in the Biology Department and Dr. Volcani at Scripps.

JONES: What kind of projects?

DESMOND: Cell biology. We were studying growth regulation in cells, particularly hormone effects and other growth factor effects on cells.

JONES: How did you first hear about Hybritech?

DESMOND: I first heard about it from a friend in the local scientific community. That was Gary David. He had started working for them. I can't remember specifically, but I know that he called me up and said that I should take a look at this new company that they were starting. So I came over and checked it out.

JONES: Do you remember how he described it, how he represented to you what was going on there?

DESMOND: No, I don't. In fact, I will say that I didn't know about that specific technology of monoclonal antibodies. I don't recall, but he described it as something like a new company that he's involved in and I should take a look.

JONES: Where had you met Gary, at Scripps?

DESMOND: Yes, while he was at Scripps. I guess that I just had met him just in scientific circles.

JONES: So you went over to Hybritech. What happened there? Who did you talk to?

DESMOND: Well, at that time, I talked to the President, Ted Greene and that's the only thing I remember. I will say it was a real flyer. I wasn't really intending to do it, or wasn't really looking or anything.

JONES: You were happy with what you were doing?

DESMOND: Yeah. He told me about it. I remember that I went on vacation right after that so I just thought I was going to go and hear about it. I guess I thought about it over vacation, and somehow, I can't remember specifically, but it was quite a move at that time.

JONES: Did you think that it was a risky move to go to this little start-up?

DESMOND: Yeah, yeah. Well, not because it was a start-up. I really didn't know about that. But it was considered risky just to leave academia. In biology, it's quite a bit different now. At least I think it is, but at that time it was irreversible. Since then, there's become a lot more interplay and interaction, and less distinction.

JONES: Did you go to Notre Dame?

DESMOND: Yeah.

JONES: I'm from South Bend.

DESMOND: Oh, you are. For goodness sakes.

JONES: Are you from California originally?

DESMOND: Yes.

JONES: From San Diego?

DESMOND: Yes.

JONES: After Notre Dame, what did you do?

DESMOND: I went to UCLA for graduate school and got my PhD in biochemistry, and then came to UCSD as a postdoc.

JONES: So you were thinking about an academic career at that point? Is that why you may have been a little reluctant?

DESMOND: Yeah.

JONES: People have told me that Ted Greene is very persuasive, he's good at generating excitement about this stuff. Did you find that to be so?

DESMOND: Yeah, he must have been. I think he was, yeah. He was a good sales person. I mean, he was very good because he had some sense of the science and could represent that to business people. Then he had a sense of the business, which he could then represent to people like me. So, yes.

JONES: And this was early '79, or the middle of '79?

DESMOND: Let's see. Yes. It was September 1979.

JONES: So you decided to start. What did you do when you first arrived? They had started the cell biology group, right?

DESMOND: Well, we were making antibodies to some specific antigens that they wanted to measure. I think the idea at that time was that they were starting to expand a little bit, differentiate a little bit, into biology and chemistry departments. And so they were hiring a fair number of people in biology. They had hired Joanne Martinis. Then me shortly after - I guess a month or so after. The idea was to essentially double in size and split the research into chemistry and biology.

JONES: How many were in the group at the time, do you recall?

DESMOND: Rachel Hernandez, she started the same day I did. This guy named Gary Jones. I think there were eighteen people at that time.

JONES: Do you remember your badge number?

DESMOND: Yes, thirty-one.

JONES: What was your impression of the labs and the research compared to UCSD or Scripps? Did that have anything to do with your decision?

DESMOND: No.

JONES: What really motivated you then?

DESMOND: Well, it was…I can't really say. It wasn't financial. I think one thing maybe was just the challenge or the assignment of getting this organization set up, and organizing, making kind of a systematic manufacturing function. Although I have to say that I didn't know anything about manufacturing. I guess it was a challenge, but it was also something that was very clear. I'm not saying that I went out to do the unknown, so I guess that's why I went. I was probably looking for something new, but not really very vigorously.

JONES: Did you believe that the technology would work?

DESMOND: Yes, well, it was sort of faith in the actual business and medical application. I was more interested in the science. Another reason was just to learn that. It wasn't obvious that that was going to be a new up-and-coming technology, but I was aware of it. I just wasn't really aware of the exact science, so I think that that was another prime reason - learning a new area. So, sure, I believed. I mean, it was already in practice. I knew that.

JONES: So what kind of work were you doing? Cell fusions and experimenting with different cell lines

DESMOND: At Hybritech early on?

JONES: Yeah, at Hybritech.

DESMOND: We were really using an established technique, and we had some ideas about kind of refining the procedures to do. I remember very well that once you got into seeing this thing, you could come up with lots of ideas about technological things we could do in the lab or applications. It was a lot of fun sitting around dreaming up potential applications once you had some idea about the power of these things.

JONES: Can you recall some of these things that you thought of that you either pursued or didn't pursue?

DESMOND: Yeah, I have to think a minute. We had lots of ideas, idea notebooks. Come back to that, I'll think about it.

JONES: OK, what was the atmosphere like? How was it similar to or different than working in an academic setting? Because it wasn't like real industrial research...

DESMOND: Not at all. I would say, for the most part it was a very similar atmosphere. I mean, all of the people were just from academic labs. And, you know, there wasn't even really any tremendous urgency of production of a product. There wasn't any manufacturing timeline or anything. But I think there was a kind of urgency of realizing this thing and just getting it going. It was a pretty amazing situation. There was no budget, no particular timeline - well, I shouldn't say we didn't have a timeline. We certainly had products that we had in mind. There were plans, five and ten-year plans, things like that. Maybe I should say that we didn't really sense that, you know, 'We have to have this by December, or March,' or something.' But the atmosphere was very exciting. Everybody was working hard. I remember very well, people routinely came in Saturdays. I remember that because we had TGIFs on Friday, and it was traditional to stash a bunch of beer so you'd have some beer on Saturday. Ah, the innocent old days. And I think the other thing was that we realized there was a lot to do, so it was exciting in the sense that we wanted to get stuff done, and also we were hiring a lot of people. You know, there were constantly new people.

JONES: Were you involved in any of that? Did you bring in people that you knew?

DESMOND: Oh yes. I was involved in all the interviews. We had kind of team interviews. A hundred lunches at Torrey Pines Inn over at the golf course which is the only eating establishment in the area. That was it, that's where you went to eat. And we all were thinking of people that we knew around town to recruit, so that was a real big effort.

JONES: So, a lot of the people did come from UCSD and Scripps?

DESMOND: Oh yeah, I think at one time a third of the people were from Scripps or people from UCSD. These were various people that we had collaborated or worked with in the past.

JONES: Do you remember the Friday morning technical strategy meetings that Ivor Royston would take the minutes for?

DESMOND: And bring donuts.

JONES: He would bring donuts?

DESMOND: Yes.

JONES: So, you attended those? Do you remember what kind of discussions those were?

DESMOND: Oh yes. They were essentially the strategic planning meetings, and that was something that was really organized by Ted Greene. I mean, I don't want to give the impression at all that there was no product-oriented direction. It was just that we sort of left it to him. We'd show up and be asked, 'How are all these projects going?' and then go through all the antibody projects. We were, I distinctly remember, introduced to words like milestones.

JONES: How involved was Ivor Royston? He would come over once a week?

DESMOND: Yes, he wasn't really technically involved at that time at all.

JONES: Ted Greene, I guess he was working with Gary David a lot at the chemistry end. Did he get involved with the cell biology group?

DESMOND: No, he really didn't do chemistry, either. I mean, he wasn't a scientist.

JONES: Yes, but he's on the patent. I don't know what his contribution was actually, but Gary told me that it was significant…

DESMOND: Yes, as far as concept and discussing the applications and stuff like that, for sure. But in the actual lab, no. He was involved in cell biology in that sense.

JONES: He knew what was going on technically?

DESMOND: Right. I remember he designed an experiment once, I remember.

JONES: Did it work?

DESMOND: Well, I'm not sure we did it. Howard Birndorf was much more involved in day to day operations because he was sort of the operations manager. So he did purchasing and licensing.

JONES: These guys were around, and there was a lot of interaction with the people doing the management stuff?

DESMOND: Oh, yes. All the time. It was really small in number and also physically, so yes, they were just around all the time.

JONES: When did you start getting the research antibodies out?

DESMOND: Hepatitis.

JONES: That was toward the end of '79?

DESMOND: December of '79.

JONES: People have told me about filling the vials and capping the vials, did you do all of that? Were you involved in the whole manufacturing process?

DESMOND: Yeah, actually, I think Gary David probably did most of that.

JONES: People have also told me that things started to change when Tom Adams came in. Would you second that?

DESMOND: Well, he added a little bit of industrial or business rigor to the way we operated. He introduced lab notebooks. We had to think about things like patents, you know, things that are really obvious from a manufacturing standpoint such as standard operating procedures. We had a little bit more formal research meetings where we talked about the science. Not that we didn't have those before, but it was a little bit more formal. I guess just having him there made it a little different. The place was getting bigger. One major difference was that, obviously, there's a sort of organizational hierarchy, and it wasn't so necessary to get together with everybody like it had been earlier. So we didn't see, say, Ted Greene, as much.

JONES: Do you recall when you moved out of La Jolla Cancer?

DESMOND: It was in probably '82?

JONES: That late? You were there that long?

DESMOND: Yeah, because before we moved, we expanded into trailers, so I would say it was '81 or '82.

JONES: So during that period did you keep acquiring more lab space?

DESMOND: Yeah.

JONES: Did the process change when you started shifting the focus from making research antibodies to diagnostic kits? Did it matter for cell biology at all?

DESMOND: Not substantially, I don't think.

JONES: So you were still basically involved in producing antibodies?

DESMOND: Yes.

JONES: It was more basic research than product development?

DESMOND: Well, no. I just think that the application of the product or the way it was sold didn't make too much difference. I mean, it really wasn't basic research. It was still churning out antibodies. There was a little bit of basic research as far as antigens and potential product to see if we could get good antibodies. I think the goals would be the same regardless of what the application was as afar as cell biology went. And even chemistry to a large extent. I mean, there were some practical questions that we started thinking about such as manufacturing and a large-scale manufacturing process.

JONES: During this period can you think of any episodes or any events that really changed the atmosphere, changed the company? Was moving out from La Jolla Cancer a big thing, or was it just the growth of the company.

DESMOND: I think it was mainly just growth. We clearly needed more space. It just instantly had a more corporate feel, which the science people didn't necessarily appreciate, but obviously was essential. The appearance, and the address, and sort of the amenities, and so forth, are what you have to have. But I'm sure the main reason was just to get more space.

JONES: Was going public a big event? Did that make a big impact?

DESMOND: On me, personally, no. I'll always remember that Tom Adams called me in and said, 'Well, we're issuing stock and here are your stock options.' And I said, 'Oh, OK.'

JONES: Did you perceive any value in the stock that you held? Was that important?

DESMOND: No.

JONES: Did it become important later, when it was really worth something?

DESMOND: Sure. The original stock was a fifth of a cent, and it probably ended up being, well, you probably have the calculations somewhere, I think they were twenty-seven dollars, from a fifth of a cent. But I'll say that probably 90% of the people had no previous experience with that. I always think about that now, because I do a lot of advising of students that I work with in a biotechnology class at City College. I'm not sure that anybody goes to work for Company X because they think it's really going to pay off big in the long run. That was certainly the case then. But people like Ted Greene, and people who had been in these things before had a different feel. Even if we thought that it was going to be successful, we didn't really see it as some major payoff.

JONES: When the company goes public and the officer salaries become public knowledge, was there talk about that?

DESMOND: Probably, I suppose. I don't remember that. I do remember you could just look it up. There were probably discussions about who was worth their pay, I don't know.

JONES: But going public didn't disrupt the atmosphere?

DESMOND: Not at all, and I think that was another important thing, and it was a real milestone. I mean, there's no question that we were really excited and proud of it and everything. But again, that was just kind of a business function, and we were just doing what we were doing anyway.

JONES: As time went on, you were in very early, so I assume that you were being pushed toward management and administration rather than working in the lab? How did that happen for you?

DESMOND: It was very gradual. It was mainly a function of just huge numbers of people that we hired, so it was gradual. The entries in the notebook got sparser and sparser and there was some point when I just gave up the notebook. But it was gradual, and we were never really strapped for technical people. There were plenty of technical people there who were really good. So both Joanne and I, and the other scientists, we did spend a lot of time in the lab and we would do all of the various technical things sometimes.

JONES: Were you happy with that kind of change?

DESMOND: Yes, I was.

JONES: You enjoyed doing that? Managing the lab, managing the research?

DESMOND: Yes.

JONES: Did you develop any kind of philosophy for doing that?

DESMOND: No.

JONES: Did others?

DESMOND: I don't think so. Again, we're talking about the science people. It was pretty much seat of the pants. There was certainly no formal training in any kind of management at all.

JONES: Was that true up until the time that Lilly bought the company?

DESMOND: Yes. I mean, we just got stuck right into the middle of Lilly management training.

JONES: But until even up until the sale everything just sort of happened?

DESMOND: I will say there were people that came in that were experienced managers. Russ Saunders, he's a good example. He was a scientist who had a lot of management experience. We learned a lot from him, but it was all pretty much learning by doing. It's kind of an interesting school of management because, first of all, the whole situation was pretty much ideal. Really good employees, really motivated, an exciting business, expansion. There were essentially no personnel or management problems, so all that was a good way to learn. I think Joanne and I - I

remember when we went to Lilly later on and started getting the TQM stuff in '89, we had done a pretty good job of learning. Nothing was particularly new. I will say, the other thing is that management is common sense dealing with people. So if you have people with common sense and a reasonable situation to deal with, and the crises come very slowly so you can figure them out, it's a pretty good situation.

JONES: Do you remember any scientific milestones that were particularly significant in the '82-'86 period?

DESMOND: Well, yes, I mean, the obvious one is the TANDEM concept which was around for a long time. But in actually putting it into practice, and I discovered that it was more complicated than just getting two antibodies that worked. There were various other technical aspects which meant that you had to a lot more selection than just grabbing two that worked. That included mostly chemistry, but also some cell biology.

JONES: So, there was a lot back and forth between the different groups working together?

DESMOND: Yes and I think we made a lot of effort to know what each other was doing, even as the thing expanded. And then other assay technologies like the ICON and other immobilization methods like that, again, those were mostly chemistry and product development. But there some concerns for the cell biology department.

JONES: So you would select the right antibodies, the best antibodies to use for these things?

DESMOND: Right, and ultimately we came up with the idea that the final test configuration is really critical, and that you should do as much selection as you can as early as possible to ensure that the antibodies are going to work in that configuration. Again, another big thing that was starting at that time was instrumentation, and that was not too much our concern in cell biology. We were always working on other methods of production, like human antibodies and in vitro production, rather than growing in mice. You know all about this technical stuff?

JONES: I know some.

DESMOND: There are two aspects that are done in animals, and they're still done in animals. One is actual immunization to create the antibody producing cells in the

first place. The other is the production, which is done both ways, but still a lot of it is done in mice. And even early on, there were lots of reasons to want to get both of those processes under the more controllable in vitro situation, so I don't think these are breakthroughs, but these are research and development refinements. And the other one was to have human antibodies, using human lymphocytes.

JONES: Could you say a little bit more to describe the production processes? For the immunizations in the vivarium, you had a lot of mice, right? How big was the vivarium?

DESMOND: We had hundreds for the immunizations, because we probably had twenty to thirty different analytes, or things that we wanted to make antibodies against. And we were always trying to refine and improve the immunization process to get better antibodies, so all immunizations were experiments. You'd have fifty or a hundred animals. There are also biological variations among these animals, which are supposedly identical, so you have to have some duplication to take care of that. That's a process that takes six months, maybe, three months to a year or two, to get animals producing antibodies. That's sort of one branch of the production of the cells that are going to be the parents of the hybridomas.

JONES: And then you take those and…?

DESMOND: The generation of the hybridoma cell lines, and that's another thing that takes, we'll just say six months of work, essentially all of it in culture. And eventually, when you select cells that look like they're going to be product cells, you expand those and grow a lot of them. They either grow in a whole lot of mice, or they grow in various kinds of culture apparatus.

JONES: And initially it was done in mice, and you were developing new techniques. Did you develop some originally at Hybritech, or were you sort of cognizant of what going on elsewhere and trying those things?

DESMOND: For the production procedures?

JONES: Yes.

DESMOND: Mainly using technology that was around in other places. I mean, there were lots of reports of people doing it in various ways, and there were companies that

were commercializing a number of processes. There were probably like five or ten pretty different processes.

JONES: Which did you settle on?

DESMOND: Well, actually, we settled on kind of the simplest, the most straightforward, which is what they call fermenter culture - big stirred pots of cells that are used universally for production of microbial products, bacterial and fungus, things like antibiotics and vitamins, and stuff like that. Those processes were adapted to mammalian cell cultures and hybridomas specifically. We did some of that adaptation, but typically it wasn't…there was a lot of that stuff going on, so we just kept dragging that stuff in.

JONES: So you were more involved in setting up a pilot plant for those, and then later when you get a product, it would be an operations task to scale it up, to get a really big fermenter?

DESMOND: Right, in fact, in all the time I was in cell biology, I mean, I actually started a little pilot in vitro antibody layout, and we had a little one going doing that. Then, I moved out of that area - it was later –and it kind of expanded as we planned with a production pilot, and then a production area. We finally went to Lilly where they have huge production facilities.

JONES: Was cell biology always located up on Torrey Pines?

DESMOND: Yes.

JONES: Did you move it to the white building on Torrey Pines?

DESMOND: There's a story about the white building. One of the great things is that building is right up on the edge of the sagebrush. In fact, it encroaches on Torrey Pines State Reserve, where I'm a volunteer docent there. But anyway, when they built the building, I remember, this is really common knowledge. It was gray, and one of the things that Ted Greene wanted to do was to get that thing white as soon as possible. I'll always remember the architect, who I actually later knew, saying that they picked this gray, a specific gray, you know, sagebrush, to blend in with the environment. All of a sudden it's given this sort of Taj Mahal white that sort of jumps out at you from the freeway, which is probably two points of view on whether you want the thing to blend in or stand out, but yeah, it was in the white building.

JONES: And it stayed there?

DESMOND: Yeah, in fact, it stayed there until last year.

JONES: And the vivarium was there too?

DESMOND: Yeah, I mean there was another vivarium over on Carroll Road, for manufacturing and for production.

JONES: And that was a much bigger operation, a lot more animals?

DESMOND: Yeah.

JONES: So things sort of proceeded on course until the Lilly sale?

DESMOND: Yes.

JONES: Did you know anything about that beforehand? Were there any rumors floating around?

DESMOND: No, the management, our level of management, was in on it ahead of time, but not very much. It was a real business deal. It was kind of surprising.

JONES: This reminds me - someone told me a story about sometime in '79, there was a point where the company had trouble making payroll. Do you remember that?

DESMOND: Yes, I do.

JONES: What was that like? Was it a tense period? Did you think that, well, maybe this isn't working?

DESMOND: No, I don't think so. I do remember that. It was like we were just about to run out of money. It was kind of dramatic, but there was no feeling like, 'Well, we've got to go out and start working labs to keep the place going.' I'm sure the feeling was that we were trying to get money in various places, and that we were going to get it. I can't remember the exact circumstances, what we were waiting for, what the timing was. Essentially, we'd run out of the first batch of money, but there was no feeling of real panic or anything. I'm sure of that. I don't know if you've heard differently, but it was kind of dramatic and it made us realize, I mean it's kind of a funny situation, because there's this huge pot of money and you just burned it. I

mean somebody, maybe it was Tom Adams, or maybe after he came, but at some point, we had to have a budget, and people said, 'Oh, a budget? You mean we have to plan what we're going to spend?' It was a real different situation.

JONES: With the Lilly sale, what was your reaction to that, when you learned that this was going to happen?

DESMOND: There were some people who thought, well, 'We were going to do it on our own,' and this was kind of a disappointment. Obviously, the sort of party line explanation was that in order to expand and do all this stuff, particularly the therapeutics, people were going to need huge amounts of money. I will say that I didn't think about that too much. I mean, it's actually obvious now, we just didn't - I didn't - think that much about the business requirements. I guess I said, 'Well, hell. We're making antibodies, why don't we just keep on making antibodies.' I guess it always just sort of a business decision that you have to make. It's amazing how often that happens. I mean, you're successful and then you have to expand. If you talk to people, even in like restaurants, or something, 'I want to only keep this restaurant. I do not want to expand,' but the pressure is on to expand. So, you have to just make this conscious, sort of rebellious effort to just say no. I think obviously there, they want the business to really boom, so I think for most people, it didn't matter. There may have been a few people - I don't know what Gary David thought - but there were a few people that were disappointed. For most people, including me, that wasn't the case. I don't even think that we thought, well, there's more stability here, or whatnot. There was some concern over how much interference there would be. It's kind of interesting because, from a Lilly standpoint, the scientists, we found out afterwards, were also concerned. They thought that we were going to interfere because we were really monoclonal antibody experts, and they weren't. They were doing some monoclonal work, and part of the idea was that we would, you know, complement them, so there were monoclonal people saying, 'Well, what's going to happen to me?' As far we were concerned, it had almost no effect, either. The research and stuff was pretty autonomous, certainly autonomous in terms of day to day and month to month. I think there were long-range strategic influences from Lilly, but....

JONES: Do you think that that was more true for cell biology than for some other groups, maybe?

DESMOND: Yes, right. Cell biology, just by nature, is further back down the product development line, so, you know, as you get closer to product, obviously there's more influence and probably more concern.

JONES: And when Lilly came in, pretty quickly, at the top level of management, there were a lot of changes. Those people went out and Lilly people came in...

DESMOND: Not very many Lilly people came in.

JONES: No? Ted Greene left, Tom Adams had gone long before that, but...

DESMOND: Well, it was kind of gradual. Well, I never thought of it that way, let's put it that way.

JONES: It didn't make a big impact on day to day operations?

DESMOND: No.

JONES: And your impression of Lilly, when they came in -- A good company to work for? Good people to work with?

DESMOND: Yeah, I mean, it was a good impression, but it wasn't that important, just because there wasn't that much effect. I mean, we went back and certainly we were really impressed with their relatively large operation in all ways, and it was all real impressive. I don't think we thought too much about what the company was like to work for, because we really didn't work for them, and they didn't really change much. Personnel policies were not really changed substantially, or if they were, it was kind of gradual. The bigger thing was the retirement and the stock sharing and stuff like that. One of the things always emphasized was that as soon as you start making money, we'll talk about it. I'll always remember that. It was always an employee question when Lilly executives would come, 'When are we going to get the retirement?' So that's one side, and the other side was that, as far as, I think, employees were concerned, Hybritech's personnel policies were quite autonomous, and they proceeded as they had.

JONES: Did you actually go back to Indianapolis and visit?

DESMOND: Yes.

JONES: Did a lot of people do that?

DESMOND: Not a lot, but they had management training, so probably a hundred people went back for that. Lilly people would come out every now and then. And we had some scientific interactions, little scientific meetings about specific applications or specific product ideas or production ideas.

JONES: I haven't heard much about that. Did they ever develop monoclonal products of their own?

DESMOND: You know, they had some that they were using for research, and it's a little hazy, but essentially, we never produced or sold any of their antibodies. There was one, a cancer antibody, that there had been some thought about doing. Mainly the technical things that I'm thinking of are either manufacturing, overall manufacturing process things. Specifically, the fermenter technology, and things like processing, purification and probably pharmaceutical production sorts of things. That was the main kind of technical thing. And then the other thing was more research oriented, and that was the cancer research stuff.

JONES: Yeah, how did that project unfold? This is where you were working on human antibodies, or humanizing the antibodies, right?

DESMOND: Well, the fundamental idea was just to make antibodies that were used, essentially, in people, in vivo. The humanizing is one thing that's needed, or you have to think about that in order to make it practical. As long as those projects went, we didn't have real humanized antibodies that we were using. So, again, the main idea was, we'll just say injectable antibodies.

JONES: There was a molecular biology group working on this though, right?

DESMOND: Oh, yes, right. And there were lots of ideas and lots of generations of a number of the products, and that was certainly the long range plan. Anyhow, since from 1979 on, the idea was you would make antibodies that would be used in therapy.

JONES: So, what kinds of problems did you face then, when you wanted to produce antibodies that could be used in vivo? What kinds of things did you have to do to develop antibodies that would work for that application? What characteristics did the antibodies have to have?

DESMOND: Well, let's see. They just have to have the characteristics that monoclonals just sort of inherently have, and the more specific they are, the better. I

mean, whatever the target is, you want them to really recognize that target. They're supposed to be as sensitive as possible, so you can use as small an amount as possible. Those were the two really critical things. Now, in addition to that, there are requirements about their ability to survive and act in an in vivo environment. Antibodies are just amazing things, you know. It really is an incredible mechanism, but the major one is the host or patient response to them as foreign. I'm sure you know all that stuff, so the other major characteristic is, as I say, that ideally, they wouldn't look foreign, so you wouldn't have a reaction to them.

JONES: So how do you go about producing such antibodies? I mean, you're still using mouse-based antibodies, right?

DESMOND: Right, well, one way is to make fragments. The antibody is a great big molecule, and there's a much smaller part that's the actual active antigen-recognition part. So, one approach is to chop off as much of the rest of it as possible, so that there's less that's different. So, that's one major approach, making fragments that are still functional, but aren't as…

JONES: So, this involves a lot of basic research, finding out what happens when you do that, how does the antibody behave, and so on?

DESMOND: Right, and then, the other thing was this humanizing thing. One approach is just to make human antibodies using human cells in culture, and the other thing is to make mouse antibodies look like human antibodies by doing genetic manipulations. A lot of that stuff is going on, too. I'm sure you've heard of that. So, that was a big effort and a big ultimate requirement, for sure.

JONES: Were a lot of your efforts and resources directed towards that once the diagnostic kits started going out the door?

DESMOND: Yeah, it was a big focus, but not the only one. It was clear that you were going to have a lot of research and development that was going to have to go into that, including what you just suggested, to answer these basic questions, will they work as well? Will the same antibodies that work in this form work as well in the required new form? So, there was a lot of effort going into making a first generation product, which would use the more conventionally produced kind of antibodies, and that's a lot of effort to do that.

JONES: And did you always have the resources to do what you had to do? To get the people, the materials?

DESMOND: Certainly, I would say yes, for the most part. You could always come up with ideas of how you could use more people, but it was very well-staffed.

JONES: Did you have the feeling that you could do things there that you couldn't do in an academic environment, or not as easily?

DESMOND: No. I think the one thing was that, typically, there was more money and more equipment and stuff. I think the way that the Hybritech atmosphere was that if you had something that you really wanted to do, you could do it. It helped if it had some kind of product orientation, but, as a matter of fact, most people in labs at Scripps or UCSD have some kind of application in mind, right? So, it's not very different, I think, and it's getting more and more similar.

JONES: Well, in all your time at Hybritech, did you maintain ties with academic researchers? Did you know what was going on?

DESMOND: Yes, sort of. Later on, it was much less. I mean, we were much more concentrating on specific products, specific product improvements, manufacturing and processes and regulatory things, and stuff like that, that aren't so much a concern of research areas. But I do remember, myself and a lot of other people would have liked to have had more time to keep up better on what was going on. We made a lot of efforts. We had journal clubs and stuff like that. There was no discouragement of contacts. It was just a matter of time, and sort of focus.

JONES: Was there a policy for publishing, you know, if you had stuff that wouldn't be classified as a trade secret?

DESMOND: Oh yes, I would say it was encouraged.

JONES: Even after Lilly?

DESMOND: Yeah, in fact, I will say that I was frustrated in not publishing. I mean I had a lot of goals of finishing stuff and publishing it. Those were recognized goals by the company that we didn't get done just because we were off doing other things. That's the kind of thing where it would probably have been a little better to have a little more collaboration with people outside, so you could let them do the

publishing. But no, that was encouraged. I think patents became more and more encouraged, but publication wasn't a problem.

END OF 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.