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Oral History: Patrick Baeuerle / 2019/7/19

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Key

AFL: = Interviewer, Anne-Flore Laloë

PB: = Participant, Patrick Baeuerle

[??? at XX:XX] = Inaudible word or section at this time

AFL: So we're here today, it's the 29th of May[1] 2019. We're at EMBL Heidelberg in Germany, and this interview is part of the oral histories programme of the EMBL Archive. My name is Anne-Flore Laloë and I'm the archivist at the European Molecular Biology Laboratory. Please would you introduce yourself?

PB: Hello, my name is Patrick Alexander Baeuerle, I'm currently employed with MPM Capital in Boston and stayed at EMBL 1987 to '88.

AFL: OK, super. So before we start talking about your time at EMBL can you just give me a bit of background, who you are, where you come from?

PB: I'm obviously German, born on Lake of Konstanz, studied biology in Konstanz then did Master of science and a PhD in the group of Wieland Huttner at the Max Planck Institute of Psychiatry and I moved then with Wieland to the EMBL, met my future postdoc advisor, David Baltimore, here at EMBL, did then a two year postdoc at the MIT. Shall I run through my entire CV?

AFL: No, no this is great. So you're a biologist by training.

PB: I am a biologist by training, yes.

AFL: And what is it that attracted you to biology in the first place, do you remember?

PB: Actually, I first wanted to become a geologist and it was more because I'm fascinated by volcanoes and about minerals and gemstones and this kind of thing. And then I wanted to become an artist so I pretty much focussed in high school on the art section and not so much on the science section, actually I dulled of biology, I didn't continue and instead did more art and chemistry. And then I became a conscientious objector, so I refused to do military service in Germany, instead they put me in a hospital for about two years, a long time. And there I got

[1] July is correct!

in contact with nuclear medicine, radiology, surgery, pathology, microscopy, you name it and I found that all quite fascinating and that made me reconsider and study biology. I was just fascinated by all the science that is associated with, let's say, nuclear medicine, doing radioimmunoassays and pathology, examining tissues, healthy and deceased ones, etc.

So quite a journey from geology over art to biology. And I should also say my dad always supported me in every interest I had, so I went to all these Cosmos experimental kits as a kid, you know I had telescopes, microscopes, chemistry labs, whatever. I also had a little chemistry lab in the garage focussing on explosives and teaching my fellow… my folks in school, and to help the girls particularly understanding chemistry, and had a lot of fun if things went up and so forth. So I had a real good feel for chemistry to begin with, not so much for biology.

AFL: OK, so would you describe yourself first as a chemist and then a biologist?

PB: Yeah, I come really from the chemistry angle. I'm really good with atoms and molecules.

AFL: Oh great.

PB: And actually part of my history you'll find in a book that just came out, it's called *The Cure Within* and it features all the people who pioneered immune oncology and I got a chapter in there and it talks about all the explosives I developed <laughs>.

AFL: Oh fantastic, excellent. So you met Wieland Huttner at the…?

PB: Actually, that was a nice story. Obviously I didn't wanna continue at University of Konstanz studying biology and I wanted to follow my wife to Munich so I needed a place to do my Master and my PhD thesis. So I just walked straight into Max Planck Institute because it's a good name, right?

AFL: Yeah <chuckles>.

PB: And then there was the sign neurochemistry.

AFL: Neurochemistry.

PB: Chemistry right, attracted me quite a bit. I just went in there, walked down the aisle, stepped into a lab and met Wieland Huttner, and after two hours I became his first student ever. He just came back, he was just 29 years old from Yale University, did great work on protein kinases back then, tyrosine phosphorylation. <5:00> And we just got along from the first second, you know, it wasn't the time

where you would email people or submit a CV or come up with credentials, references etc. you just went in, you talk and I became his first student. And I stayed with Wieland for four years and that also brought me then ultimately to the EMBL.

AFL: OK. So what was the lab looking at, at the beginning?

PB: It was me and Wieland <laughs>.

AFL: Oh right, so just… yeah, of course, yeah.

PB: And a technician I remember. And then his lab quickly filled, he had one of these junior group leaders at Max Planck that went for about five years and after that you're supposed to move on. And so we had a very good time and since I was his only and first student I essentially learnt everything from him first hand, how to write papers, how to do experiments, the whole thing, I just soaked up like a dry sponge and really enjoyed a very, very hands on education from him. I would say in hindsight it was the most important part of my education was just the time I spent with Wieland.

AFL: Those four years at the MPI?

PB: Not the university, it's nothing. So I did both a Master of Science with him for about one-and-a-half years, and then continued for the next two-and-a-half years/three years with a PhD.

AFL: So all in…?

PB: All in Wieland's lab, first at the Max Planck then at the EMBL.

AFL: So you moved with him to EMBL, you got an EMBL PhD.

PB: Yeah, it was a pre-doc.

AFL: Yeah, a pre-doc as we call them here.

PB: I remember the tax-free salary <laughs>… or low-tax salary.

AFL: So then you stayed here as a postdoc?

PB: Pre-doc. For the postdoc I met here, was back then on your SAB here, David Baltimore. I interviewed with him here at EMBL over in the cafeteria and ended up as a postdoc in his lab. I had a EMBO stipend and a DFG stipend, decided then

for the DFG one because it was a little bit more money. And ended up in his lab at the, back then, Whitehead Institute which was part of the MIT.

AFL: OK. So you didn't spend a very long time at EMBO?

PB: It's about a year. It was an important year and I wish I could have stayed *much* longer because it was a fantastic environment, all the kinds of people you meet. But having been together with Wieland for so long time it was just about time to do something new.

AFL: Yeah, to spread your wings.

PB: Also changed topic quite a bit, you know Wieland was in the cell biology department which was, back then, headed by Kai Simons, we did studies on tyrosine sulfation, post-translational protein modification, happening in the late Golgi apparatus. But my heart was really beating more for signal transduction, transcription factors etc. and that brought me ultimately to David Baltimore's lab. But I took all my cell biology experience along and that helped me a great deal in David's lab.

AFL: OK. So what was EMBO like when you arrived, I mean as far as a finishing PhD student?

PB: It was a fun place; it was so exceptional in everything. I mean I never was really in university, right, it was either Max Planck then EMBL and what I should say I've experienced all along is there's nothing that limits you, you could not say, 'I don't have enough money to do this and that experiment', because the only limitation were always yourself, the time you put in; you could never blame anyone for not being successful and not putting in the best of what you had. And that is really characteristic of EMBL and that was obviously characteristic of the Max Planck Institute. I'm sure it's all different at the university where you have 15 other students and you have to ask for each and every pipe-head tip and buffer and reagent. That really marks EMBL, plus you know the environment, all the young people here, we had a lot of fun also in our free time.

AFL: Yeah, what did you do in your free time?

PB: Oh, hang out together. Fend off all the nice invitations from free-radical girls.

<Laughter>

I was married back then so we had to separate for the entire time; my wife stayed in Munich, I came here, moved into a *Wohngemeinschaft* with other EMBL people here. <10:00>

AFL: OK. We hear the phrase a lot the 'EMBL spirit', I think there's going to be a discussion about this later. Have you heard it before?

PB: The EMBL spirit?

AFL: The EMBL spirit, yeah.

PB: I didn't hear about it but I can well imagine what that is about <chuckles>.

AFL: So how would you describe it, how do you understand it?

PB: Oh it's so different, you don't feel to be in Germany here, you feel more to be in Europe. As I said, there are no limits to what you can do, no limits to who you can talk to and which expertise you can tap into. And of course I will show it today, my lecture with great colleagues here, very vibrant atmosphere. And all along you felt to be really at the cutting edge of science and research, you never would think about any 'me too' approach or something like that. You always think pretty much ahead of everyone else. Then I mentioned all the great luminaries that passed through here giving lectures all the time, the whole work essentially came through here and you would, sooner or later, meet everyone back then.

AFL: That then becomes a…

PB: That is the EMBL spirit, plus the great canteen.

<Laughter>

AFL: Still to this day.

PB: Wine for lunch, where else would you…

AFL: As a pre-doc.

<Laughter>

People comment on how the physical isolation of the laboratory up here helps, it means when you're up here you can only do science.

PB: It's a kind of ivory tower, right? In the midst of the Boxberg.

AFL: But that's why we need a good canteen.

PB: Yes, absolutely to keep people here so they don't go out and have a beer someplace else.

<Laughter>

AFL: Yes, to fuel us.

PB: Yeah.

AFL: So your pre-doc here started with Wieland Huttner and then you said you changed the subject a bit.

PB: Totally.

AFL: Can you expand on that a bit?

PB: Yeah, in with Wieland we started tyrosine sulfation and that ultimately brought us into the secretory compartment, so it turned out it's a modification of only secretory proteins and that takes us away pretty much from cell regulation in some form, where all the excitement back then was, which was in oncogenes and in signal transduction and so forth. So that's where I wanted to go back into and so I had to change topics, and what I then did in David Baltimore's lab is worked on a just discovered transcription factor called NF-kappaB. I jumped fully onto that and there wasn't back then a lot of cell biology of protein chemistry, biochemistry experience in David's lab, these were all geneticists cloning stuff and so forth. And me, with my unique experience and background from EMBL and from Wieland's lab, I could approach things from a very different angle and then was first to characterise and figure out how NF-kappaB is activated, identified proteins in the pathway, which is actually still true. I mean <chuckles> it's the canonical pathway now and I got amazing numbers of citations for the papers I had in David Baltimore's lab and then subsequently because I took along the topic. I don't know whether you know I have more than 240 papers, 17,000 citations and more than half are on NF-kappaB and the second half is then on what I did later in the industry and bispecific antibodies etc.

AFL: Sorry, could you expand on what you did in the industry then?

PB: Yeah, in the industry I again had a total 180 degree change of perspective, I went into essentially developing antibodies that can engage T cells, which I was awarded for now here, which I will elaborate on today in my talk. But that brings you into therapeutics essentially, therapeutics to treat cancer from studying the intracellular signalling path that's involved in cancer which I did in David's lab. But the work on NF-kappaB then continued in my own lab and then all the way into my university position in Freiburg, so for about ten years I worked on NF-kappaB altogether before I did the radical change into industry and into, again, a completely new topic.

AFL: What motivated your change into industry? <15:00>

PB: Actually I got, after my time at David Baltimore's lab which was only two years, I moved back to Germany and had my own research group, junior group at the Gene Centre, continued working on NF-kappaB and about four years later or so I got a call as a German Professor at the Freiburg University Medical School. I was only 34-years-old at that point in time – can you imagine a 34-year-old thinking about the next 30 years being locked in at a medical faculty with all the self-administration and grant writing and… it just didn't suit me. It was scaring. And so only two years later I gave up my chair, my civil servant position, the pensions, everything –

AFL: So you took the job in Freiburg?

PB: Oh of course, I took the job in Freiburg, moved my lab from Munich to Freiburg, had four people doing *Habilitation* with me, building on groups all in one big lab space, which was quite a challenge, and then essentially I said, 'OK, guys that was it and see for yourself.' In the meantime everyone is a professor or a chairman themselves, all the people I had because they published a lot with me. And I ended up then in San Francisco, the small biotech company. Now, imagine having a huge office and secretaries and associates, assistant professors and a huge chair in Freiburg and the next day sitting in a tiny cubical, no lights, no natural light, having a boss and working on a topic I had absolutely no clue of.

AFL: So how did you get into this biotech company?

<Laughter>

PB: It went extremely fast, it was October 1992 I believe or '93 that I was invited to speak at the International Conference of Immunology in San Francisco. First time ever in California and I remember sitting in an open convertible riding over Golden Gate Bridge looking up to the red beams and cables, the fog cleared, sun came through, I was just thrilled with California, the smell and the light. And on the occasion of this conference I gave a talk at the biotech start-up called Tularik, founded by luminaries like Steve McKnight, Bob Tjian, Dave Goeddel, chairman of the board was Bob Swanson, the founder of Genentech. There was this tiny Tularik, just 60 people back then, and after I gave my talk, the same one I gave at the conference, I walked out with a verbal offer. 'You wanna join us, you can head up our drug discovery, here are the terms', which I got in writing a couple of days later. And I said, talking of course to my family, I said, 'Yes, but first my wife needs to come and look around and get comfortable with the situation.' She came, we saw a great house, the company said, 'Oh well, we make a huge down payment that we forgive after four years', and got shares in the company and got this unique position, and I knew I had absolutely no clue about that, but they just thought he's a good scientist, he understands transcription factors, which was the focus of Tularik. And so after that meeting it took only five months that I had located with my entire family to California and given up the chair, which of course

caused a big explosion in Freiburg. I mean in all of Germany, you know I had news coverage from the *Neue Züricher Zeitung*, everyone talked about it that there is a young professor that just jumps ship and goes to California into a biotech company.

AFL: What was the discussion around, I mean the surprise or the –

PB: Total surprise, of course most people thought I'm totally nuts, you know, having reached that kind of a position you want to keep it for the rest of your life obviously. And no one had a good understanding what I was doing there, including myself <chuckles>. But it was a challenge, I was 34 years old, what could I lose, right? <20:00>.

And if things fail I'm sure I could go back into German academia, I could even get a chair someplace else, which actually happened during my time in Tularik. I was invited back to places in Germany and to new chairs and, 'Don't you wanna do this and that?' So I was right in that angle, but I stayed in biotech. It was a hard learning experience, I remember the first meetings we had just strategy meetings in the industry, I didn't understand a word, it was like they were speaking Chinese, you know all the expressions, all the thinking was so alien to me.

AFL: Was it jargon?

PB: It was just strategy, you know how do you build a biotech company, what's important, where do you get money from – all that was so new to me, I was just a pure scientist. Nevertheless ending up running the most important piece which is the drug discovery piece, with halls stuffed with robots that do automated assays all day long, producing millions of data points every year, so already big data was a point back then, we had to setup assays. Ultimately what you tried to find is small molecules that eventually can become drugs that treat HIV, that treat allergies, asthma, what have you not. And so you setup assays, either be cell based or biochemical, then you run large chemical libraries over these assays trying to find hits which then the chemists are modifying etc. and understand how they work etc. That was my job for three years. I found it quite exciting and of course I found there people who can build the robots, run the robots, develop the assays. It was more my job to bring the biology back into that business and not keep it so separate from the rest of the company. But that, I believe, was successful and I probably would have stayed there… I could have stayed there, I had a green card etc. but then I was lured back to Germany to run Micromet as the Chief Scientific Officer.

AFL: OK. So how long did you stay in California?

PB: About three years.

AFL: And so moved back to Germany, so now?

PB: Moved the whole family back, I mean we bought a beautiful house, we had [??? at 22:16] etc. and we had a lot of guests from Germany and parents came and so forth, but there was the new challenge. It was a huge step up also to become the Chief Scientific Officer, a C-level person in a German start-up for a change. And it was the time when a lot of capital did flow into Germany, as we have seen in the Bay Area, and it was an exciting start-up that wanted to go into the clinic rather quickly with antibodies, antibody therapies. So that lured me really over there, it was headlines that the company was called Micromet, that Micromet would move into the clinic with therapeutic antibodies to treat cancer. That was the attraction for me.

AFL: So what year was this roughly?

PB: That was 1998. That is really a sweet story, so they had these headlines, they had actually a CEO of an American company called Center Core on their board, which was also super attractive for me, the kind of validation, and they were supposed to in-licence two antibodies from Center Core into Micromet to move into the clinic. And it was only a few weeks after I was with the company in Germany that Center Core got bought by Johnson & Johnson, the CEO left the board and the licensing agreement for the two antibodies never came into existence. So the very reason I joined Micromet went away in an instant. And I was sitting there, no pipeline, nothing to develop – it was a good reason essentially to say, 'Let's go back to California', I mean there's no reason to stay there any longer. So resilient as I am <chuckles> I went to the Founders Lab at the University of Munich and spotted a very interesting molecule there, just sitting on the –

AFL: Sorry, which lab?

PB: The Founders Lab, Gert Riethmüller at the Institute of Immunology at Munich University. There they had a very interesting molecule that they'd just published on in PNS and it is a molecule that can bind with one arm to our immune cells, to T cells and can bind with the other arm to cancer cells and connect the two. And by doing that connection the T cell starts killing the cancer cell, would come right off and do that over, and over, and over again. And that very molecule I was seeing there sitting on the bench, on the lab bench…<25:00> later became a drug, without any modification. It's now on the market in the US since 2014, and that is what I did for the rest of the time at Micromet. I developed that molecule, alongside many others. None made it to the market except for this one. And this molecule then also became the basis for the acquisition of Micromet by Amgen, the world's largest biotech company, if you wish, for 1.2 billion was the price tag. And that brought me then to Amgen, I was the only C-level person they retained and wanted to run then the site in Munich, which became then an Amgen site, obviously, and then see through the further development of the drug to the market. After that was accomplished four years ago I was then engaged by MPM Capital as an executive partner or entrepreneur in residence, as they call it, and ever since I feel in a candy store of opportunities and have ever since started six companies with MPM.

AFL: So from 1998 to 2014, is that how long it usually takes for a drug to get to market?

PB: It's usually long, that has to do with the fact that this was a completely novel drug, no one has ever used that target, used that format and developed a drug that could do this very function, namely engaging the T cells to directly kill cancer cells in a fashion that is independent of normal T cell recognition. So all that to be first in class, and only in class, took a long, long time to work out. Also on the way we did a lot of publications showing that we tried to understand how the drug works, mode of action studies, in vivo models, we had to develop, pharmacokinetics and dynamics we had to establish etc. and really made us, I don't know, 60/70 publications on the way, which also was very attractive then for industry, for folks like Amgen to engage. They knew this is a very solid company that tries to understand what they do.

AFL: How big was the team you were working in with that?

PB: At the end we had like 250 people.

AFL: 250 people working on this one molecule?

PB: No, also on other molecules of that class and there are… now, many of these other molecules we worked on Amgen is not taking into clinical trials. They have now 16 molecules in this class moving forward in the clinic. So it was a platform we created essentially and the first molecule of this class made it to the market.

AFL: So I mean now you're working on something, yet again different, so would you describe yourself as a biologist, as a chemist, how would you describe yourself?

PB: See, I'm collecting functions, I'm not exchanging one for the other, I always stay what I was before, I'm still a biologist, I'm still a researcher, I'm still now a cancer researcher, I'm now a drug developer, I'm an antibody engineer and now I'm a venture capitalist and I'm all of that at the same time. So I haven't given up, for instance, publishing. I, just a few weeks ago, had a first author publication in *Nature Communications* on one of the technologies I invented from one of the companies. In the meantime I have 240 publications probably which have come from industry, from all my industry positions. So I never gave up on that, I continue doing that and so I will continue writing papers in all the companies I'm now involved in. At the same time I learn more and more about investing in companies, and everything I did in my life is just adding up expertise and it's also very interesting to see how I can connect everything I did so far with what I do now. So just last night meeting all these people here immediately had so many places where we could connect.

AFL: You talk a lot about connections, what do you think is the relationship between research and industry… I mean you've been on both sides, should we think about it as two sides –

PB: Still on both sides.

AFL: - should we think of it… how would you like the relationship to be?

PB: I mean everything has a basis in basic research, right, needs the discovery of some kind in basic research. <30:00> And then there are people who do research more in the translational aspect, asking the question, 'How can I now use that knowledge to eventually come up with a new diagnostic, medicine, medical device', and what have you not, and use that knowledge to the benefit of patients. I think I see people more and more thinking about also the translational aspect of what they do; just a few talks I had this morning it was very clear that they just don't do research in a totally independent way, you know? But I must confess, I mean we wouldn't have learned a lot about telomeres without doing research in ciliates, right? Or about development without doing research in *drosophila* and zebrafish, or having wonderful technologies such as PCR, doing research in thermophilic bacteria, right? It's so important to do that research to finally get technologies that you can use for something else. Another example is green fluorescent protein coming from jellyfish. I mean it's so important to do that basic research and it's all intertwined and one can't live without the other. But we definitely need also people who then grab the idea and bring it to another level. And ultimately I think mankind, humans do research ultimately to live better lives, that is the ultimate motivation for doing research, to better understand where you live in. And I just this morning learnt we have people here at the EMBL thinking about how to change the microbiome of a cow to not release that much methane – I mean this is wonderful! This is what we have to have to solve the problems of the planet, in a tiny lab at EMBL. Can you imagine they eventually come up with a microbiome that reduces the methane production by cows – then I would probably go back and eat steaks again.

<Laughter>

It's these tiny, tiny little things, discovering telomeres in ciliates that changes the world. All of a sudden you have companies popping up looking for telomeres anywhere else, right, trying to make us live longer or fight cancer and it's all so connected.

AFL: All connected from that. So where do you see yourself going over the next few years?

PB: I have no clue. I have no clue. I mean looking back I never would have thought to ever become an investor, to become a cancer researcher, to become a drug developer. I mean what I've stayed all the way through is a researcher, right, to understand science in the best possible… but things come on top. Probably I

never get to full-fledged investor or just think about numbers, I let other people do that that have longer experience. I'm fascinated really by starting new companies.

AFL: By starting new companies?

PB: Yeah, that is my passion right now.

AFL: What drives you on that?

PB: First of all you develop drugs that may help patients having cancer; secondly, you build workplaces, you employ lots of people, you give them great jobs, fantastic jobs; thirdly, you help the economy because you can create huge value in these companies, you invest 40/50 million and you then sell the company for a billion, right? That creates a lot of value for people and for society and it's this combination of all of that that you find realised in forming a new company. And the nice thing is at MPM the capital is there, there's a billion waiting to be invested in oncology drugs and it's just about investing it, finding the opportunities and doing the right investment decisions. And so we more and more, probably in 50/60% of cases go and start the companies ourselves, we don't wait until a company knocks on the door and says, 'Here's what we have', but hey, we have our own ideas, we even create IP within MPM, which ends up in the company so that there is no dependency on academia any longer for many of the companies we start, but we incubate them and we form them inside our walls, if you wish. That is also something very exciting. You don't have to negotiate with anyone, you just do it yourself. <35:00>

AFL: Just do it and then you feed it back into society.

PB: And that is also how MPM evolved over the last couple of years, there were more and more executives hired with deep oncology experience who developed oncology drugs and they know exactly how to do it. So we have now like, I don't know, eight, ten colleagues with deep oncology experience and each one comes up with new ideas and we all the time start new companies based on their ideas. That's a great place to be, and I can even do it remotely, I mean I'm spending 150 days in the US, but most of the time travelling or being at home and it works, it works extremely well. And I have time to sit here today with you and chat instead of being in Boston and looking after my companies. I mean sooner or later really we hire great people to run the companies, and for that reason you better start the companies in an environment where you find these good people, and these days it's either the Boston area or it's the Bay area. Sorry, it's not here and it's just these two places where you find the best people to run your companies; serial entrepreneurs, people who have done it before, people who have created a lot of value by creating companies, selling companies, running companies.

AFL: It's fascinating to think of science from the side of companies and all the choices to make to –

PB: But I should say there are very few places that operate this way, maybe a handful of venture capital fronts that have this kind of a model, so I had to go essentially to Boston to find the candy store.

AFL: The candy store <chuckles>, that sounds good.

PB: And obviously also, you know, if there are hundreds of companies coming in every year presenting to MPM we get a lot of inspiration, we see a lot of ideas floating around and often we are not happy with what we see but we are illuminated, we see great concepts and eventually it inspires us to start a new company venture and a reiteration of what we have seen or something that we call the next level of it etc. So that helps also a great deal seeing all these companies, seeing all these people with fantastic ideas.

AFL: The ideas influx.

PB: Yeah, exactly ideas influx. Of course people knock on the door because they wish us to invest in their companies but there's always something that we don't like with the team, with the IP position, be it the experiments they did etc. there's rarely something we would love from the beginning. So we end up, from the 500 companies we see, investing in only 5, 6, 7, 8 and often we then decide also to go with companies that are super, super early where essentially there is just a IP file, this proof of concept in some animal model, and we can build the company from there, as an alternative to building it just within our walls.

AFL: We're coming to the end but there's one question that I like asking everyone that I speak with, is what piece of advice would you give to a young scientist starting out today in science, to the new pre-docs?

PB: I love talking to young people and coaching their careers and so I'm doing all the time when I have an opportunity. What I see is if people get very good grades when they come out of high school or *Gymnasium* in Germany, they think their career is like a cruise, on that day they are here, a few weeks later they are there, then they go there, then they go there. So they ask me already, 'Which postdoc lab should I go to?' Although they haven't really started studying yet, right? So they wanna plan like a year and then go straight to a professorship or goes to a position in a biotech company etc. And I always tell them, you know, 'It doesn't work like that, go for the next level, show that you can do it, show that you can publish and then look at your opportunities, what's there right after you have taken the next level? And then also let your gut feel tell you or your interest where you go next. Don't think you can plan it like a cruise. You will not get there, it's impossible.' <40:00> Look at my CV. I never planned to be a professor with 34, I never planned to be a drug developer, never planned to be this or that or this or that, it was always an opportunity I saw in front of me which I grabbed, I could have likewise walked away. It's always like opportunities you don't grab you regret, the ones you take you never regret. That's exactly true for my case. I mean there were moments where I gave up my chair and was sitting in this little

cubicle in San Francisco thought, ummm, was that the right thing to do? <Laughs> but you're having all of a sudden a boss, you know, that comes <claps> 'Hey, results, deliver, did you do this, did you do that?' I mean that was a new world for me. And there were moments where I thought hmm, should I regret it? But after three years I think it worked out successful and could take the next level. So my advice would be don't plan so far ahead, just go one level by level and each time give your best. If you're postdoc try to really come up with at least two good first author papers. If you don't have them, no reason to think about the next level; you have to have them, right? Or you go and… eventually biotech where you don't have a pressure on publishing. But if you want to pursue an academic career, want to become a professor or run the EMBL, you better publish extremely well. That is my key advice I guess, and it's not always a rational decision you take, you know, you just feel this is right, these are the right people, these are the people I want to work with, this is the kind of topic you are excited with. It may not be super rational. Super rational would be, OK, I publish now well in this area, better stay in that area, because you have no expertise, try to build a small group, publish more. This is more a rational path but to do something completely different is more irrational.

AFL: Because if I counted correctly you turned in your career four times?

PB: Yes, many times.

AFL: A minimum of four times.

PB: I don't feel it to be a turn in any form, I still think it's very rational for me, it's very straight line for me it feels like, and as I told you, I never give up anything I know and it…

AFL: You've added.

PB: Yeah, I want to stack it up.

AFL: Added new layers.

PB: Yeah, exactly I want to put layer on layer.

AFL: It sounds like it's been very fun in all events and very enriching.

PB: Yeah. For some reason when I was jetlagged last night I was also really thinking about all the failures on the path, which I'm never aware of, but they were failures, right? I didn't have an A level MSc degree for instance, but then when I did a PhD I had a summa cum laude.

AFL: It balanced out.

PB: Yeah <chuckles> totally balanced out, I never talk about my Master degree. And then of course I also did mistakes, I here and there behaved not the right way. I was a nuisance probably for my competitors and <laughs> so forth. But I'm always oriented to the future, I'm an optimist, I'm having a good deal of resilience on the way is very helpful, and only in rare moments think about all the failures <chuckles>.

AFL: Such as when you're jetlagged.

PB: Which exist, which I can admit.

AFL: That's great. This has been a really interesting talk, thank you so much for taking the time today.

PB: Most welcome.

AFL: Thank you.

<End of interview>