



Nobel Voices Video History Project, 2000-2001

Interviewee: Gunther Blobel

Interviewer: Neil Hollander

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BLOBEL:

I'm still napping. [Laughs]

HOLLANDER:

We have to crank you up and get you going here. Doctor, let's start with the easy stuff. Please introduce yourself and tell us what it is you do.

BLOBEL:

I'm Gunther Blobel and I'm working at Rockefeller University in New York.

HOLLANDER:

And what is it that you do?

BLOBEL:

I'm doing research in cell biology, which is an area that was really founded there in the middle of the last century when the electron microscope was first used to look at the cell. Before that, people had stared through the light microscope and all they saw is a cell wall or a cell membrane and the nucleus in it. Sometimes when they used stains they saw certain organisms. Suddenly, this electron microscope, they saw many, many more things, and that started the whole field of cell biology.

Then once people had seen that there are many more things in the cell, they wanted to know what are these things doing. So they cranked open the cells, they isolated all of these structures, and they tried to find out what they do. And this is how it was found out that mitochondria produce power and that other organelles do other things and so that there is a division of labor and that each organelle does a job in the cell.

HOLLANDER:

The Nobel Prize. Why did you win the Nobel Prize?

BLOBEL:

I won it for the finding of how the billion molecules of proteins that each cell has, how they're sent to their address, to their correct address. Because only if they're sent to their correct address can they function properly. Some of these protein molecules only live for a few minutes, others live for days, others live for weeks, others live for a month or more. So there is constantly renewal of these proteins, because they cannot be repaired once they have suffered damage. DNA can be repaired, but proteins can't be repaired. So they're just degraded. They're little machines, which look like dragons, they eat them, and spit out the building blocks and then they build new proteins.

But for them to function properly, you have to send them to various addresses in the cell. And what we discovered is that there is really a zip code attached to each protein, and the zip code tells the protein where to go. Of course, if you put a zip code on a letter, it doesn't go automatically to Chicago, but you need the machinery which recognizes the zip code, takes the letter and puts them to Chicago. We not only discovered the zip codes, but we also discovered the machineries which decode the zip code and which take the protein and get it to the right address.

HOLLANDER:

[unclear]

BLOBEL:

Well, very practical is, for instance, the production of proteins by bacteria. As you know, insulin, which you all have heard of, or growth hormone, or many proteins that are used as growth factors, are produced now in bacteria or in yeast. People are no longer going to the slaughterhouse and extract the insulin from animals and then inject it into man. It may still be done, I don't know, but it is mostly done by making the insulin from recombinant DNA.

So what one does is, one has a little zip code on there in the beginning of the insulin, which gets the insulin molecule out of the cell, out of the bacterial cell. Therefore, one can purify it much easier. One does this with all the so-called secreted proteins. They all have this little zip code to get them out of the cell, and you can purify them. This is a market of several billion dollars a year, the production of these proteins. So just a billion dollars a year probably means a little something. Then, you know, the other thing, of course, is that it will be very important, many diseases, when the protein doesn't go to the proper spot in the cell, it cannot function properly and then people end up getting sick.

HOLLANDER:

[unclear].

BLOBEL:

I can hear, but you have to speak up a little bit.

HOLLANDER:

Okay. I'll speak up a little bit. We're getting your voice all right.

BLOBEL:

Yes. Yes.

HOLLANDER:

Doctor, why did you become a researcher? What got you started? Was there a moment in time when you decided, "I'm going to be a researcher"? Was it a book you read, someone you talked to? What was the spark? Where did it come from?

BLOBEL:

I was always very curious. I always wanted to know things from a child on. I studied medicine, and when I was finished with medicine, I realized that many things aren't known and people were treated symptomatically. But very often the cause of the disease was not treated, but just the symptoms. And I wanted to find out more about why do we get sick and what is it. So that's the reason why I started to become interested.

But there are many setbacks that you can suffer when you enter research. There may be a year or two that you don't find anything or your ideas were wrong. But you must not be bothered by that, because it is a great deal of fun to just find out new things and to find something which nobody else has seen before. And that is a reward that is the greatest reward. There is no reward greater than that.

HOLLANDER:

But when you were a kid, somewhere along the way you decided, "I'm going to be a scientist. I'm not going to be a farmer."

BLOBEL:

Well, I mean, I decided that I would like to do medicine and that I wanted to study medicine, but I hadn't really decided yet whether I would go into research. That came only later. I had heard about research. My father was a veterinarian, and he had never done any research. I grew up in a very small village and there was no research institute. I was not exposed to research when I was a young kid, even when I was in high school.

But when I went to medical school, I for the first time was confronted with lectures of professors who said, "Well, we don't know exactly why it is this way, but maybe you would like to find out."

And many, many professors would say this in their lectures. And I said, "Yes, I would like to find out." This was one of the reasons that I then decided to go into research. It was my teachers, it was the environment, it was many, many things.

HOLLANDER:

Was there any single book that influenced you?

BLOBEL:

I cannot really say that, no. No, there wasn't a single book that influenced me. I mean, I read all the medical textbooks, and again, I realized that a lot of things we don't know.

HOLLANDER:

You mentioned just a minute ago that it was fun, research is fun.

BLOBEL:

Yes.

HOLLANDER:

Is this an attitude you've continued to have?

BLOBEL:

Oh, absolutely. Absolutely. It's wonderful to be able to go into your lab at a time when you want. You don't work eight hours a day, you work twelve hours a day, because it's fun. [Laughs] You are your own master. You can think what you want. You find interesting things. You can have new ideas and then test them. So I consider it a great privilege to be able to do that.

HOLLANDER:

Do you think you probably share this [unclear]?

BLOBEL:

Many do. Many do. I have many friends who have exactly the same attitude. Of course, there are some people that are in research and perhaps shouldn't be. You have to give yourself some time to test whether this is the right thing for you. You have to be able to take some setbacks and to go after something with a certain determination. The amount of fun that you have with it, if you find that you have fun with it, then you should go for it.

HOLLANDER:

Is there any specific example of having a good time or having fun that you can point out, or when you had the most fun?

BLOBEL:

Well, if you have bets with your colleagues, or if you made a hypothesis and then people say it can't be like that, and it can be sometimes quite serious, that people even say, "Well, this is nonsense. I'm not going to support this research." And then the fun is in the vindication, is that when you were right. Of course, you know, sometimes you are wrong, too. But it's a wonderful vindication to find that your ideas were not too far off the mark, or even correct.

HOLLANDER:

Can you give us some specific examples?

BLOBEL:

Well, a specific example is, for instance, we had postulated very early on that proteins crossing a membrane must go across the membrane by using a channel. They're not going just through the lipid bi-layer, but there is a channel that is specifically constructed for proteins to go across in an unfolded configuration. People thought that this was just a real terrible idea—you wouldn't need this thing; protein is channeled; protein could just fold into the lipid bi-layer and you wouldn't need this channel.

It was very difficult for us to show the existence of the channel. It went fifteen years and we had no evidence that such a channel existed. We had postulated all sorts of other characteristics for this channel. And then finally after fifteen years we succeeded in showing the existence of this channel by some really very, very beautiful experiments which a fellow did in my lab, called Sandy Simon. He really has to be given a lot of credit for it. He did these experiments. We had so much fun, it was like going on a wagon trip to the wild west and discovering new mountain ranges and everything. Nobody had ever done experiments of that sort, and it was two years of great excitement.

HOLLANDER:

Have you ever gone on wagon train through the west?

BLOBEL:

Not through the west, but through Germany. When we were refugees from the east, right after the war and before the war ended, we were on one of these wagon trips with horses going from place to place because we were driven out from the eastern part of Germany. So I know the feeling. In our case, it was under somewhat sad conditions, but it is a wonderful feeling to be on a wagon and

going by horse and going through the land and stopping at various places.

HOLLANDER:

When you take a vacation, is this what you do sometimes?

BLOBEL:

No, I don't do it anymore. Now I don't take vacation that often. I just go to a quiet place where I can be quiet for a few days and where I can think about things and just relax a little bit. I don't do any wagon trips anymore. [Laughs]

HOLLANDER:

Any adventure at all?

BLOBEL:

No, no adventures. No. No. In travel, no.

HOLLANDER:

Doctor, I think you gave part of your prize to rebuild a church.

BLOBEL:

I gave all of my prize to the city of Dresden to rebuild a church and a synagogue both. The synagogue was destroyed during Fascism in 1938. It was burned down by the fascists and the church was destroyed during the bombing in 1945. The church, it was a magnificent baroque building, probably one of the most important baroque buildings north of the Alps. It's being restored over a period of ten years. It had a giant cupola in the form of a bell and this was very unique about it. It will restore Dresden as one of the most beautiful cities. Have you been there?

HOLLANDER:

[unclear].

BLOBEL:

Well, I'm sure that you will go one of these days. Because they have now also decided to restore the old City Center, which will take twenty or thirty years. Part of the old City Center around the church, all the streets leading to it, and the square around it, and about 300 baroque houses and palaces, which will be restored. So it's wonderful.

HOLLANDER:

What other things are you involved in outside of science?

BLOBEL:

Well, architecture is one of my principal hobbies. And since I have done that in Dresden, I had already started before the Nobel Prize, I had already started an organization in the United States called Friends of Dresden, a charitable organization. We are tax-exempt. I had already collected \$2 million to help in the reconstruction of this church. We have recently, just recently, gotten permission from the IRS also to collect funds for the synagogue. So these are our two projects. We will eventually also help in other projects in the city, because it was one of the most beautiful cities and there are a lot of initiatives by the citizens of Dresden to rebuild certain sections of the city. These citizen initiatives then take on such momentum that the city government and the state respect these movements and they start to rebuild in the old way rather than just building some nondescript modern buildings like you see in all other cities. So it's really very nice. And I have been interested in this for a long time, in architecture, and now I'm interested in many other cities to help them to regain their identity.

I'm also interested, in the United States, in conservation. But I haven't really done any project there. I don't know whether you remember the old Pennsylvania Station. That was a real railway station.

HOLLANDER:

That's gone.

BLOBEL:

That's gone. You see, if people would have fought more. People like Isaac Stern fought for Carnegie Hall and that's why we still have it; otherwise, it would be under the hammer, too. So it's very important for young people to get interested in the arts. Not only in science, but also in the arts. Because the aesthetic surroundings of your environment are very important. I lived in a small medieval city near Dresden that was not bombed, and my school way led every morning along the city wall, with the towers and it was a very medieval city. It was beautiful old houses, beautiful churches. And that inspired me. It was a beautiful thing just to walk through it. It's nice to grow up in a beautiful, physically beautiful environment. Not everybody can, but I was fortunate enough to.

HOLLANDER:

Doctor, if someone comes to you, an adolescent, and says, "Doctor, what should I do? What direction of science do you think I should go for? What should I do?" what would you tell them?

BLOBEL:

Well, there are a number of very excellent books. It depends whether you want to go into the biological sciences. There are excellent books that you can read. Some of them are not so strict, you can read them at home. Then I would tell them, try to work in the laboratory during the summer first and find out whether you like this sort of work.

Then you should spend two or three years working in a laboratory and doing research to find out whether you are suited for it. And if you enjoy it, you should do it.

HOLLANDER:

Do you have any special science jokes that you like?

BLOBEL:

Science jokes.

HOLLANDER:

Or put it in another way. Could you tell us a humorous situation that's happened to you? Maybe an embarrassing one.

BLOBEL:

Well, there are many, many humorous situations, but they are so personal that it would be difficult to get other people interested without making a very long story. I'm sorry. [Laughs]

HOLLANDER:

Go ahead.

BLOBEL:

No, they're too long a story. I mean, there are many, many jokes. Many. But not a very short decisive one. I would have to think about it. Sorry. It doesn't mean that I'm humorless. I mean, I just don't think of anything now which would be short enough to really formulate it in a very crisp way.

HOLLANDER:

One last question. Where do you think the frontiers in science are now?

BLOBEL:

Well, the frontiers are, really, and have been for a while, in combining various approaches. For

instance, now, of course, we generate a tremendous amount of data in genetics. The Human Genome Project has been done. We have some three billion or so letters in the human genome. We know them all and we know potentially what they code for.

But there are tremendous problems that remain to be solved, because the messenger RNA, as it is made, as it is transcribed from these genes, as you know, is cut into bits and pieces, and then bits and pieces are put together, and then after that process called splicing, then a protein is made. And we don't know from the human genome sequence exactly how many such splice variants exist and how many protein variants exist. We know that in some cases there may be quite a few proteins which have only certain blocks of a sequence, which they share with this protein of the same. But either they have additional blocks or less building blocks, and it depends of how you splice the messenger from that particular gene. And we don't know much about this. We don't know much about their properties. We don't know much about how proteins talk to each other.

Sidney Brenner [phonetic] said recently, when the genome project was finished, "Well, this is the end of the beginning."

HOLLANDER:

One last question. How has the Nobel Prize changed your life?

BLOBEL:

Well, I have more interviews. [Laughs] I didn't have as many interviews before that. People suddenly want to talk to me. But what is a bit—I have to watch out, that means people now ask you for opinions about all sorts of things about which I don't know much, and being a scientist, I would like to be precise, and so very often I find myself saying, "Well, I don't have all the data to really give a meaningful answer to your question." People now think I'm suddenly endowed with wisdom, and ask me to make comments on all sorts of problems that I don't really have the data for. And so that's a temptation that you have to really resist.

HOLLANDER:

Thank you very much.

BLOBEL:

You're most welcome.

[End of interview]