Intro 00:00:01

Inventors and their inventions. Welcome to Radio Cade, a podcast from the Cade Museum for Creativity and Invention in Gainesville, Florida. The museum is named after James Robert Cade, who invented Gatorade in 1965. My name is Richard Miles. We'll introduce you to inventors and the things that motivate them. We'll learn about their personal stories, how their inventions work and how their ideas get from the laboratory to the marketplace.

Richard Miles 00:00:39

An effective antiviral treatment for COVID-19 has been around since 1973. Tell me more. Welcome to Radio Cade. I'm your host Richard Miles, and my guest today is Jean-Francois Rossignol, chief scientific officer at Romark Laboratories and a professor at the University of Florida, and also a 2020 inductee of the Florida Inventors Hall of Fame. Congratulations, welcome to the show Dr. Rossignol.

Jean-Francois Rossignol 00:01:00

Thank you very much.

Richard Miles 00:01:05

I had the privilege of actually talking to you or recording this a few hours before you're being presented with your award, which was delayed by COVID. So, is this an exciting evening for you, particularly since you've had to wait a little bit to get it?

Jean-Francois Rossignol 00:01:11

Yeah, of course it is. It is a great honor and my specialty has been in a kind of world, which is not always celebrated. Okay. Because I began to invent and develop drugs for the third world, because I was under the direction of the director of WHO Dr. Halfdan Mahler would have been elected three terms, 15 years, to WHO, he was a Danish guy, and his assistant Andrew Davis was British. And these two men directed my entire life. They are all gone today, you know, most all dead, but Dr. Mahler was a man, for those of you who remembered, who created the Alma ATA declaration. The Alma ATA declaration was a WHO United Nation meeting in the USSR. And where he said, we're going to bring health for the world into Soule. And of course, it did not happen.

Jean-Francois Rossignol 00:02:07

But anyway, that's another story. So, I was a tropical physician at the time where I met Dr. Mahler and through Dr. Davis, they were number one or number two in the organization. And these two guys were interested in the fact that I was a synthetic organic chemist and a physician, a young physician training in tropical diseases. So, Dr. Mahler said to me, well, we don't have the drug we need for treating the Third World. You're going to see that very easily. And could you please put your brain working on inventing drugs for specifically the developing country? And that's what happened in my life. And I spent my life between Africa, first, because I was trained as a tropical physician in Africa and Southeast Asia a lot, a bit in Latin America. So that's my background. If you want, I was talking about my background.

Jean-Francois Rossignol 00:02:58

So, I spent my life there. Oh yeah. Africa, Asia, South America. Yeah. I did the work in parasitology. The parasitic agents where in the 1980s, essentially early infection of the developing world. We estimated for instance, that about 2 billion people, which was at that point in time, one third of the world population was infected by worm, intestinal worm, including schistosomiasis, which I later eradicated in China. At that point in time, it was very widespread. Malaria was the killer. It is still, it is still, no change much. Which is telling you that we have not done very much for the Third World. So, I started to work on giving the world a single dose drug, very cheap for the treatment of intestinal parasite. And I had to really call ties to the pharmaceutical industry to get them to help me. And I was successful, with most of them, I have to say.

Jean-Francois Rossignol 00:04:00

GlaxoSmithKline gave me a drug which was used for veterinarian medicine, very, very widespread, Albendazole. And I went to see them, and I said, well, can I develop your drug for human use? And the answer was immediately, oh yes oh yes, absolutely. Actually, we were thinking about doing it without you coming to tell us. So, I said, yes, I will do that. I'm a tropical physician in Africa at that time, I can do a clinical trial, I can do everything. So, we developed Albendazole, which was the single dose inexpensive, and very very safe. Davis was a tropical physician. Dr. Mahler was not as much as Davis and myself, the field doctor, you know, the tropical doctors, as we said in UK, but Mahler has been directing the WHO tuberculosis program in India for most of his time. Davis was saying to me, well, you know, the guy is on the courtyard.

Jean-Francois Rossignol 00:04:52

You know, the village, you're leading an entire population, and you give them a pill for treating their problems and you cannot have any side effects, any toxicity, or any kind of things like that. You have to have a safe drug. And that's what we did. The second thing is we cannot repeat the treatment. The people will not take more than one dose. So, we developed the concept with WHO, the single dose treatment of parasitic diseases. And we were successful for most of the disease, malaria, schistosomiasis, and *(inaudible)* and so on. So that was a great idea of the World Health Organization, where we had instead of a diplomatic problem, like some opposition, at that point in time, Mahler was a Dan, the Scandinavian are very nice people and really, he was a man of conciliation. He was a diplomat, good with the Chinese and good with the Russian. At that time, it was the Russian communist…

Richard Miles 00:05:47

We're talking about the seventies and the eighties?

Jean-Francois Rossignol 00:05:49

1980 to 1990. He left WHO in 1988. So, this is the year where I was put, as Mahler said to me, you know you chemist position, so now the best thing you can do in your life, is really to invent drug. And we were, I have to say at that point in time, absolutely convinced that we would be saving the world. This is something which the people don't understand. I believe that in 1980, 1990, before the onset of aids and HIV, we believed that everything would be under control. And we were close to being. People will tell you then that malaria, *(inaudible)*, schistosomiasis, and so on and so forth because we had the pharmaceutical industry collaborating with us. So, by air, for instance, beat German company by air,

worked on giving us the single dose on time *(inaudible)*, or schistosomiasis, later on *(inaudible)*. Now you have to understand that schistosomiasis, Mayo...

Jean-Francois Rossignol 00:06:46

When I went to China, for WHO to direct the eradication program, that wasn't a red book. Okay. Mayo said, if we're not going to eradicate the schistosomiasis in China. So, they had put together the program with praziquantel, which is the discovery of Mahler. And that was very interesting. I could be able to talk hours about my first China, because the guys knew very well who I was and they said, but you're a chemist. So, we're going to show you the chemical plant, which was making this German drug. SmithKline had given us a single dose, *(inaudible)* for intestinal worms. That's probably the most used drug today in the world because I'm still receiving the letter from different people. And they say that given today 3 billion does of Albendazole in the year. Okay. Malaria was a lot more difficult, but we make some significant advances with the U.S. army, the Walter Reed Army Institute of Research in this country.

Jean-Francois Rossignol 00:07:42

That was the *(inaudible)* of the Vietnam war. It has been disbanded since that. Ok. The military were sent home. At that time, they were really working very hard. They was screening molecules and I worked with them for one molecule. And finally, you have *(inaudible)*. That was the hardest discussion I had with *(inaudible).* When I went to a railway in New Jersey. And I said, well, we want to develop your drug for *(inaudible)*, which is *(inaudible)*. And at the beginning, *(inaudible)* was very, very upset by that because they said it's not a safe drug and we don't want to have any problems. And I remember the second meeting Andrew Davis came with me, was this big authority. And he said, don't worry about that. Russian *(inaudible)* has made only single dose drug, he wouldn't make a single dose drug *(inaudible)* and they said, okay. And we did it. So, it was an extraordinary life. I say, you and extraordinary opportunities. And I have a lot of respect for the people I worked with.

Richard Miles 00:08:41

But I just wondering if you could tell me, you had this unique position of being able to see drug development from all sorts of different angles and then different countries, different regions, France, Africa, the United States, and in your opinion is drug development working as good as it should, or are there things systematically that governments should be doing differently, or pharmaceutical companies should be doing differently? Let's compare it to the eighties and nineties. Is the process better now or is it worse than it was 30 years ago?

Jean-Francois Rossignol 00:09:07

It’s a lot more complicated, the regulatory process came on board, which was not existing in the 1980s. Your question is very easy to answer with SmithKline. SmithKline asked me as an organic chemist coming out from the Pastor Institute and University of Paris with my PhD and a physician when finished, you know, my training. And we're doing the clinical specialization in tropical diseases. At that point in time, people said, do you know how to develop the drug? Well, the answer was no, no, I had absolutely no experience, but I was so excited about being in charge of developing Albendazole on a worldwide basis with the support of this wonderful company in Philadelphia. It was wonderful people. I remembered when the night where they gave me my contract, there was everybody, the board of directors was there

and the chairman and everybody else. So, I could not believe that the little guy like me, you know, was celebrated by these people.

Jean-Francois Rossignol 00:10:03

And they supported me for eight years. Okay. They support everything I was doing; I was going to Philadelphia about once a month. And I was getting my results, was highly successful for the company, of course. Today it's a lot more complicated, but it doesn't proceed by the same way in the past, we would take, for instance, people were doing complicated diseases. So, the famous university professors. So, I had people everywhere, tropical physicians, and I'm still friends with a lot of them around the world. So that was who I could be with in Japan. They were tropical physician, professor of clinical parasitology. So, they knew what they have to do. And we were able, with WHO, to unify the protocol. So that was the great thing, WHO. And that was something WHO doesn't do anymore, because Mahler, I've said, in order to get to the Alma ATA declaration, *(inaudible)* for everybody in 2000, we're going to have to work with the pharmaceutical industry and they all know the enemy to destroy.

Jean-Francois Rossignol 00:10:58

No. And that was the part where, WHO helped me considerably because when I was going there, I really knew that they can say no and push me out of the door. And people did not do that. Never, ever. They were very, very nice. So that's where I invented three drugs. Okay. And the last one was the *(inaudible). A*nd *(inaudible)* been incredibly important because that was the bridge between the old world and the old world of Mahler, WHO, you know, the third world, essentially the poor people to the new world, having some diseases of the third world, which is aids. Okay. So, we had a problem with cryptosporidiosis, which there's an opportunistic infection in aids, which was killing people. NIH could not find a drug. And I give them that one day in Washington, DC, and to Alexandra Fairfield, was working *(inaudible)* NIH, and she called me, and she said, oh, she's listening to that. She will be, if she stumped *(inaudible)* she's alive. She was a young, beautiful girl. And two weeks later, she said to me, Rossignol, we have the drug, it works. Okay. They tested in animals and that was done in Boston by a veterinarian. So that was a great adventure. And then we've got the treatment and today, uh, it is nitazoxanide. It is still the only drug approved by FDA for treating of opportunistic infection in aids. Okay. So, uh, that's the bridge to viral disease.

Richard Miles 00:12:19

I see. Okay. Let's talk about that a little bit more. That's one of the things you're being recognized for, for tonight is the invention of nitazoxanide. How did that start? What was the process leading up to that discovery? Because there's quite a while ago in 1973, right?

Jean-Francois Rossignol 00:12:32

Oh yeah, I finished my PhD, a doctorate degree in organic chemistry. At *(inaudible)* in Paris in 1971. And then I discovered that I was not going to stay in chemistry. So, I went to medical school and that was very obvious, anyway. I was *(inaudible)*, which is a cancer hospital of pasture. We were other kind of a chemist in the middle of nowhere. And so, I went to see my director and I said, well, I think I want to go to medical school. He said, it's about time too, I was expecting you to say that. So, they organize it, but I had to stay for the first seven years. So, I get to worry about that. I will graduate with my MD degree in 88. So, I stayed in the *(inaudible)* in the department of chemistry. And that's where the synthesis of

nitazoxanide occurred. And it was nothing at the beginning until it was a rediscovered here in this country, by the people at Boston School of Veterinarian Medicine, where the famous story was Alexandra Fairfield, when she send the samples to Boston, the guy is used different tests, laboratory animals, and they said, *(inaudible)*, we have it.

Richard Miles 00:13:40

And more recently, it's being also used to treat COVID as well, is that correct?

Jean-Francois Rossignol 00:13:43

Yeah. You could use to beat COVID. Again, this is the same story. Collaboration of university is big institution. And a few days ago, I think yesterday *(inaudible)*, a famous professor of microbiology immunology, posted on BioRx, which is a new place, a phenomenal study showing that nitazoxanide is probably the best option we have for COVID. And this is done by a bunch of universities in the Northeast. Okay. We are probably about 25 or 30 authors; each represent most of the Northeast universities. And they showed that that is phenomenal and is going to make a huge noise because of the credibility. So, she's now publishing the paper or somewhere is going to go to Nature or Science, or major paper. And then my first clinical trial in the United States, which has been done in about 200 cases, I had to recruit about more than 1000 cases, is now accepted for publication by the Lancet Papers. There was a lot of confusion with this COVID, you know, in the world, I can tell you, it's not only in the United States, just in the world.

Richard Miles 00:14:49

And so, what is the next step with this as a treatment for COVID? I imagine it still has to get FDA clearance for use against COVID, even though it already has it as an antiviral.

Jean-Francois Rossignol 00:14:58

Well, the FDA has a problem with giving the temporary use utilization because at the beginning, they were very quick to give that, to give that, to grow acquaint for instance, or is there controversy today about Ivermectin, turn out to be absolutely a fraud. So, you kind of blame FDA to be a little cautious today. They are following our research. They were very pleased by the work done in Harvard, by *(inaudible)* Professor Rosenfeld and a team, because that's showing clearly that it is working a way where we need a treatment for COVID. So, we're going to do more clinical trials. And then eventually that would be approved. There is a thing that I should not say, but I'm going to say, if the doctors want to prescribe Alinia, which is the name, it's available. It's available in this country because it was registered for cryptosporidiosis. It's not like just going, it's not available. This is repurposing, but repurposing, it's a very confusing stage in which we are, with COVID. And we did not have the video sheet that we had in the eighties and nineties. Okay. So, we don't have that. So, the people who are talking sometimes don't have the expertise they are for publicity or for something like that. And it doesn't help.

Richard Miles 00:16:09

So, forgive my ignorance about how antivirals work, but could this potentially be a game changer and it, would it address or potentially cover all variants of the coronavirus or would it only be effective against a certain...

Jean-Francois Rossignol 00:16:20

This is what we did discover. And that was done by essentially two teams, one in Italy, at University of Rome and one in Harvard University. They looped in at arrive, which was working in all new touch. So, we have the five mutants, alpha, beta, gamma, omega, other, five mutants. And it works equally. Because the problem was ever saying, which is done, including the vaccine, is that the vaccine doesn't work against the omega mutant. And we have terrified public health people in the world. Very concerned about the fact that we may have to *(inaudible)* another mutant. More paragenetic than the omega. And as transmittable as it is, they say, what are we going to do? And then you have the problem, which is the confusion of the population. You may have seen Boris Johnson, the prime minister of the UK. He said, people don't do whatever they want. There is no more mass congregation. There is no more vaccination, any normal, anything like that. And guess what? After two or three months, it doesn't show much difference with a country like France, where the situation is still under the control of the government, saying you need to be vaccinated. You need to wear the mask. You need to default to the things. So it's very confusing, this virus.

Richard Miles 00:17:29

Well, I think that's one thing probably everyone can agree upon is that it's confusing no matter what.

Jean-Francois Rossignol 00:17:34

Terribly confusing. I don't blame anyone to be confused, to be argumentative about some of the measure. There is too much politics taking care of that as well. We lost 5 million people, I call in to WHO between 10 to 15 million real. And it's not over, or yeah, no pandemic in my life has been killing many people.

Richard Miles 00:17:55

Dr. Rossignol, I'd love to hear about your background. Usually all of our guests on the show, I ask them, tell me a little bit about their beginnings, even back to childhood, where did you grow up? I know you're from France, but maybe you could tell us a little bit about your childhood. And then in particular, when did you first know that maybe you wanted to go into chemistry or go into research? Was that as a young child or much later in your academic career?

Jean-Francois Rossignol 00:18:15

My family is a familiar physician for generations. So, my grandfather was a surgeon, mostly in tropical countries. My uncle was a pneumologist and so on. So, I've been, uh, raised in the middle of physicians and the discussion around the table were always about health. And sometimes I was terrified by that because they were coming out and I said, oh my God. And then what happened? I went to chemistry because I was lazy. So...

Richard Miles 00:18:45

I don’t hear that very often.

Jean-Francois Rossignol 00:18:45

I know. I was lazy. I was not good enough to get to physics.

Richard Miles 00:18:50

How old were you at this time? When you weren't very good at chemistry. Was this as a young child?

Jean-Francois Rossignol 00:18:53

1962. 1962. So, I was what, I was 19 years old.

Jean-Francois Rossignol 00:18:58

I have passed the preliminary examination to get to the University of Paris, which is the *(inaudible)*. Whatever. You have to do a year to prepare yourself after your *(inaudible)*. And the problem is at that point in time, chemistry was easy and physics, so mathematics, were not, and medicine was, I didn't even know about it. So, I went to chemistry. My family did nothing. They said nothing because in 1965, I was just not even finished my undergraduate degree. I was hired by the *(inaudible)* Institute to pursue my chemistry work and that was cancer in the hospital. So, I was back there. At that point in time, 1965, I remembered going to the director was a friend of my family, Professor Latasha. And I said to Latasha, I said, monsieur, I don't want to continue chemistry. And he said, you're going to continue chemistry. You're going to pass your doctorate degree. And then I will take care of you in medicine, but you will do all of that. So, results of that, 17 years at the University of Paris, undergraduate and two degrees. Okay. So that's what happened. But as soon as I reached April, 1965, the *(inaudible)* Institute, I was already in my mind thinking about only one thing, becoming a physician. *(inaudible)*

Richard Miles 00:20:18

Tell me a little bit more about where are you from in France?

Jean-Francois Rossignol 00:20:21

I'm born in Leon, which is the Southeast of France. My parents were originally from Paris have decided to go during the war in Leon because it was *(inaudible)*. And my father thought that it would be easier to leave. And I think it was, there was more freedom and more accessibility to essential things, such as food. So, I moved there, but very quickly after the war, my parents went back to Paris. So, I grew up in Paris, and I went to the University of Paris, and I left Paris in 1992 to go to the Third World. And I spent most of my time and I ended up in this country.

Richard Miles 00:20:57

And you live now, where in the United States?

Jean-Francois Rossignol 00:20:59

(inaudible) Florida.

Jean-Francois Rossignol 00:21:02

I came in Florida, and I discovered that there was a paradise. I went to the country like Africa, or Asia, where it was tough to survive the weather. The climate is horrible. We have no control, no running water. And so, after a few years, either you die, essentially, or you say, I cannot take it anymore. But if you do, your *(inaudible)* tropical disease. And there was a lot of heat, was a lot of things. And that's what happened to me. So now I believe that Florida is cold, even in December.

Richard Miles 00:21:34

So, one last question, I'd be committing podcaster malpractice. If I didn't ask you about skiing and your connection to skiing. Most people have seen your name on their skis. Is there a family connection there?

Jean-Francois Rossignol 00:21:48

Yeah, yeah, absolutely. This was my great-great-grandfather.

Richard Miles 00:21:49

Your great, great grandfather.

Jean-Francois Rossignol 00:21:50

Yeah. The story was that he was from Burgundy. This is where my family is originally, talking about 1850. My great-great grandfather was named Jean Batiste. And Jean Batiste, you know, was in the wine business originally. And then he was drafted to go to war the 1817 war. Okay. The first war we had with Germany. At that point in time, he *(inaudible)* for five years and he was a prisoner of war, and life was not as terrible as you would become later. So, he escaped finally, one day he said, hey, I'm going home. And when he came back, he did not find anything. The country, the French in '71 was absolutely devastated at the end of the second empire. And I put it on the third, it was chaos. So, he walked down *(inaudible)* without job. And they were poor, and they were *(inaudible)*. And they discovered his brother found a girl whose father was a carpenter. That's the beginning of this curiosity. Now they went to work, and they saw the mountains. They said, oh, there is mountain there. We would like to try to ski. And the father Lo said, okay, if you want to make yourself skis. And so that's what they did. And that's the beginning of the company and the turn of the century, '71, to becoming something famous in 1900.

Richard Miles 00:23:08

Right, right. That's a great story. So, invention runs in the family, then?

Jean-Francois Rossignol 00:23:12

Yeah, yeah. It looks like, absolutely.

Richard Miles 00:23:14

Dr. Rossignol. Thank you very much for coming on Radio Cade today. And again, congratulations on the award that you're about to receive tonight. And I hope maybe we can have you back sometime.

Jean-Francois Rossignol 00:23:22

Thank you very much.

Outro 00:23:24

Radio Cade is produced by the Cade Museum for Creativity and Invention located in Gainesville, Florida. Richard Miles is the podcast host and Ellie Thom coordinates inventor interviews. Podcasts are recorded at Heartwood Soundstage and edited and mixed by Bob McPeek. The Radio Cade theme song was produced and performed by Tracy Collins and features violinists Jacob Lawson.