An interview with Prof. Fiona Tomley: Plowright Prize 2024 winner

RCVS Knowledge

Welcome to this RCVS Knowledge podcast which features a very special guest; 2024 Plowright Prize winner Professor Fiona Tomley spoke with RCVS Knowledge chair Amanda Boag about her career so far, her Plowright Prize win, and how she's using the prize money to give back to the academic community.

Thank you for tuning in and we hope you enjoy the podcast.

Amanda Boag

Hi, I'm Amanda Boag, Chair of Trustees of RCBS Knowledge and it gives me great pleasure to be hosting this podcast, A Conversation with Professor Fiona Tomley. Fiona is the Professor of Experimental Parasitology at the Royal Veterinary College and Director of the UKRI GCRF Warn Health Poultry Hub.

She's had an amazing career over several decades now involving basic science discovery, technological advances, industrial collaboration, international research leadership and knowledge exchange. And I'm speaking to her today because last year she was the recipient of the RCVS Knowledge Plowright Prize, which we'll hear a little bit about later.

But to get us going, I wonder Fiona if you could maybe think back over your career and tell us tell us how you got started on this amazing journey that's led you to where you are today.

Professor Fiona Tomley

Well, thank you, Amanda. It's really nice to chat to you today. And I really barely recognise myself from what you've just been saying, because I think like lots of people, I know lots of people who have well plotted out careers, but I'm certainly not one of those. And I always feel like I've kind of lucked out really in what I've been doing. But I mean, was as a school kid, I was always very interested in science, but I wouldn't say I was passionate about it.

And actually, as a scholar, I was probably much better at languages and English than I ever was at hard science, but I was kind of inspired by a really awful TV program actually called The Expert with a man called Marius Gorin playing a forensic scientist. It was a very, you know, black and white, old style. And I always thought, I'd really like

to do something, you know, like that sort of science discovery, forensic science. And then I discovered that, you know, to be a pathologist, you needed to go to medical school and do lots and lots of study.

And I thought, I'm not sure I could do that. But I quite like this idea of microbial forensics. And so I applied and did microbiology in Manchester and then I was lucky enough to stay on and was offered to do a PhD in the same department and I did my PhD on vaccinia virus which was of course you know close relative of smallpox virus and I did a PhD then. It wasn't a particularly stunning PhD but it did give me a taste for research and what I enjoyed doing.

And from there, kind of carried on in virology for a number of years. I moved to University of Cambridge and did a postdoc at the vet school. That was my first sort of move into veterinary virology. I worked there on retroviruses in dogs. And then I moved across to pathology in Cambridge, where I worked on avian influenza.

And then the next thing that happened was really as a postdoc, an opening came up at what was then called the Hampton Poultry Research Station, which was in St Ives, just 20 miles away from Cambridge. And I applied for a position there because they wanted someone to work on developing poxvirus vaccine vectors for poultry. And I'd got this background of PhD in poxviruses. So I moved across there on what was called a, it was an agriculture and food research council, new investigative fellowship or something like that.

I got this five year fellowship to go back to the pox viruses, but this time working very much targeting chickens. And I was in a lovely group there. There were four or five of us who were quite young scientists and we were trying to make better vaccines against infectious bronchitis virus, which is a coronavirus that infects chickens. And my job was really, I was there as the pox expert, sort of trying to make the vectors that would express the antigens. And meanwhile, there were We sequenced the first full coronavirus genome actually, is that IBV genome which we... No really!

Amanda Boag

We never knew at the time.

Prof. Tomley

With SARS-CoV-2 suddenly that paper was getting lots of hits. But I wasn't the main author on it or anything, but I was contributing to that sequencing work. Yeah, and I got

involved with working in poultry then and from there it was a short leap from virology and I had been working on flu and on pox viruses, but a permanent position came up in parasitology and I was very much in awe of the woman who was the head of that department, Elaine Rose, who is still with us and is retired a long time ago. But she was heading up this group working on coccidiosis in poultry, is protozoan parasite. And I had no experience of parasitology at all. I had not studied that at uni. But I talked to her about this job as a permanent position. And she was looking for someone with molecular biology skills, which I had.

And I remember her saying, well, you know, there's not that much difference. They're all eukaryotes, you know, and they're all kind of behaving in the same way. It's just that this is much bigger and, you know, it's not quite the same as a virus, but a lot of the skills are the same. And so I was offered that position and I moved into peristology and I've been effectively dabbling in that ever since and always with poultry with this coccidiosis until I guess I moved to the RVC in 2010 and since then, largely through colleagues rather than through me, particularly my colleague, Damo Blake, who's a professor of parasite genetics, he's got a background in microbiology as well. And we've sort of still working on coccidiosis and parasites, but expanding that to be looking at gut health, interactions of bacteria with parasites and the whole kind of complexity of how the gut is responding to challenges from all kinds of different pathogens.

And then in 2017 or 2018, I was asked by the college if I would consider leading a bid for one of the 12 UKRI very big global challenge research fund hubs. A group of us put together this bid for the One Health Poultry Hub and to our astonishment, we got all the way through and were awarded this. Only 12 grants were awarded from about 250 original applications.

Yeah, so for the last seven years, I suppose, started in 2019. A lot of prep before that. I've been the PI for that hub and that's really looking at how infectious diseases, antimicrobial resistance, bacterial disease and avian influenza, the behaviors and the structures within the poultry industry in different parts of Asia, how that drives the differential transmission of pathogens through those chains. And so it's really linking how people work on the ground, the real life situations, the challenges that people have in how they conduct their farming, how they produce food, how we get poultry and other animals from the farms to the markets, to the plate. Layering the biology of the pathogens much broader than the focus earlier in career.

The genetics, you know, lots of sequencing, lots of analysis of the dynamic changes that are happening in pathogens, how that is overlaid on the movements of animals, the behaviours of people, the financial restrictions that people have, the social economic impact. So yeah, it's, that's been quite a journey. So I've had, I've quite an interesting career when I look back on it because it's gone from- You know, it has been very poultry specific from quite an early stage actually when I moved to Cambridge. yeah, that was a little bit accidental. yeah, you know, once you're in it, you kind of stay with it. That's it really. Sorry, a bit long.

Amanda Boag

Yeah, yeah, so the kind of the switch away, so you started out in in biology and that switch to parasitology then was, I guess it wasn't something conscious that you were working towards, was, it sounds like it was due to opportunities at the time and some persuasion from a senior colleague.

Prof. Tomley

Yeah, was slightly opportunistic. mean, I'm old enough to have been around at a time when you kind of expected that you needed to get a permanent job in science when you were kind of in your early 30s. And I was indeed. When I took the job in parasitology, was, I think I was just, I was 30 years older than expecting my first child. And again, it was very nice because I remember I was offered the job and I was like, I don't know, I was 10 weeks pregnant or something.

And I went along to the woman who was a point when I said, I think you need to know that I'm expecting a baby. So, you know, I'll be off for a few weeks at some point. And she said, that's no problem. know, a problem. congratulate you. And she was very accepting of that, which I think was quite tricky for some people. I think if you had a boss who wasn't sympathetic, it could be quite, quite awkward, you know. But yeah. And so actually a permanent position at that point was was very attractive, you know, to move into something where you were guaranteed that you weren't on soft money. That was at a research institute, not a university.

Amanda Boag

And that was the one just outside St Ives, was it?

Prof. Tomley

Yeah. So was the Houghton Poultry Research Station which then got amalgamated into the Institute for Animal Health and of course that is now the Perbright Institute because all three there was Houghton, Compton, Perbright and they've all been amalgamated one organization, one organization now.

Amanda Boag

Yeah, that's good. And that's lovely to hear that you have such a positive reception to taking the role in early pregnancy, because that's, you sometimes hear, as you say, less positive stories around that, which is incredibly frustrating.

Prof. Tomley

Yeah, definitely. And of course, you it was a different world in a sense in that, know, the provision for a maternity leave was pretty slim in those days, but nevertheless, it was still good to get that positivity.

Amanda Boag

Yeah, yeah, absolutely. And to ensure that, you know, that kind of the role you're looking for in that career progression and moving on to the next stage was there for you, which is really, really important. So and again, the kind of the focus on poultry through your career, was that, did that surprise you? I guess it sounds like it was again, it wasn't a kind of a career path you've mapped out, but you obviously found a home there and have had a huge, huge impact.

Prof. Tomley

Yeah, I think it was, it was for, yeah, it wasn't planned, but I think once you get into a world and if you are surrounded by people that you get on with and that you can work with, then it feels pretty natural to stay with it. You know, I mean, I was driven by some extent the technologies that were coming at that time, you know, that it was at the height of them.

And in Cambridge, I'd been exposed to, you know, we were next door to the Sango lab and everything and it was very cutting edge in terms of what was happening in the lab in terms of new sequencing technologies or being very early adopters I would say of sequencing technologies and everything else. So it's partly attracted by that part of it but also I think if you have a good experience early on and you get on well with the people that you're working with and you feel confident in it then that's something that you can... you can think, you know, there's no reason to shift, there's no reason to

move. can see a pathway to having impact, but also to being happy in what you do and having, you know, a good quality of career. And I think that's important.

I won't touch on that, I'm sure, in a little while, but I think that sort of early experience of, I was very, I mean, I look back on my days at Houghton. very fondly because there were, as I say, there were a small group of us all working in the same lab, all very focused on, you know, really trying to sort of work out how we could take antigens from important infectious diseases of chickens and develop platforms for trying to make better vaccines. Now we didn't ever commercialise a vaccine, but I think for me that the experience of working with people who'd got quite... we were all biologists but we had different skills and actually we got on very well and so being able to sort of you know move forward very quickly on things was really really positive.

Amanda Boag

Yeah, sort of bounce off each other a bit. Do you think at the time, you realise that you were fortunate to be in that kind collaborative, supportive environment where, as you say, you're kind of a tight team where you drove each other to success? Do you think you realised that at the time? did.

Prof. Tomley

I think it was quite unusual because the person who was like the most senior if you like in this group was a very nice chap and he actually got the opportunity to move to a position at the University of Cambridge and that left three of us who were of a I mean the other two were slightly more senior than me but only by a year or two and we got on very very well and then we recruited a fourth person came in and she was a very nice woman from Nigeria and she came in and we had this sort of, we had a very good set up in that we all kind of got on well and we just sort of got on with it and it didn't feel particularly hierarchical. Whereas I think in other sections of institutes you did have the lab boss you know and everything else. So yeah I think I did realise that I was very fortunate to be in that position.

Amanda Boag

Yeah, that's good. And is that something that you've tried to replicate as you've moved on in your career to more and more senior roles? Is that something you've consciously tried to?

Prof. Tomley

I've tried to do it but I've probably failed along the way quite a lot. mean it's really tricky isn't it because what you really want ideally is to have a group of e-course you know and that's what you're always striving for when you bring students or postdocs or people through you want to have that but inevitably the funding structures don't always let you do that you know I was in an institute as a postdoc and it was well funded at the time and there were quite a number of people working on these different problems and we all had proper jobs, we all had full-time jobs.

But that model isn't there any longer and so now you've got a lot of people on soft money who are maybe dependent on the head of the lab going out and winning grants and if you're in a university environment there's so many challenges, right? You know, can't just be a clinician or a researcher or a teacher, you have to be doing a lot of different things and you've got a lot of administrative stuff, you've got a lot of assessments and everything to do and so I think the pressures then come on you as a head of of lab and although you might wanting to bring people on you can't always find the funding to keep them going and everything so.

But I think as a principal I do think it's right and I think one of the things I've tried really hard to do is particularly, you know, for the last 10 or 15 years, is not to think about my career, because actually, you get to a point where you're thinking, well, if I never published another paper, does it matter? Probably not much, you know, you could stick it out for quite a long time without having to sort of, you know, justify your existence to some extent. But what you do want is for somebody else to be carrying on.

So the thread, the threads of work continue, you know, and so I've been very keen to make sure that that happens. And I think at RVC we've been quite successful in that. We've got very thriving groups, know, and that's not just because of me, but I think there is that sort of wish to keep things going and see, yeah, just see, just have a supportive culture and also to identify people who have clearly got leadership potential and provide them with the support so that they can just sort of run with it and do it.

Amanda Boag

Yeah, so touching on that before we move on to think about the Plowright Prize, how you're going to utilise that funding, I guess I just maybe wanted to explore, talk about that leadership element and the poultry hub is an enormous leadership project. So can you give us a sense of how you talked a little bit about, you know, looking at variety of different disease interactions and then the impact through to and the environment and

society that the poultry are living in and being part of. So how many people are involved with the poultry hub? How do you manage that?

Prof. Tomley

Wow, good question. yeah, the sort of facts and figures are it was 27 organizations in nine or 10 countries. There's a small group in France. And so, you know, some in Europe. And then we were also working in Bangladesh, India, Sri Lanka and Vietnam. So 27 institutions. I think it was 54 named investigators on the grant when we submitted it back in 2018.

And around about, I couldn't tell you how many people were employed over the whole course, but at the peak we probably had about 150 people working on the hub across all of the different institutions. Yeah, that's right, mean there's been obviously flux as people coming in and out of the project. So actually we managed it, think, I mean well I'm not the person to ask maybe to some extent, but I mean the management that we set up was quite unusual I think in that we obviously we had a lot of reporting to have to do to the funder, the access funded through UKRI and we had you know we had to sort of do all of our reporting in a very professional manner but we decided that the way we would monitor and determine you know make decisions if you like we had we had an advisory board a really effective advisory board.

We had a good executive board which was drawn from across the partnership. So all the countries and all the different skill sets were represented in the executive board. But actually the way that day to day and week to week decisions were made was through open meetings. So we had four programs and what we would do is every month each program would have a meeting where everybody, anybody and everybody could join. And that was where the nitty gritty and nuts and bolts of anything that was active at the time that came under that programme would be up for discussion and we would make decisions on, you know, because you're doing field work, you know, there's a lot of issues that come up and a lot of risks that might be associated. So we tended to do all of that on monthly meetings and then we drilled down so that there'd be site level meetings and the teams in the different sites were just great.

You know, there was a full-time paid national coordinator for each country and they had project managers and so they managed a lot of the local things. But for most sites it would be a weekly meeting with the UK team and some of the UK team and the site level team and there you really be drilling down into the, you know, if there's a problem and we faced all sorts of problems over five, five and a half years of active work. You're bound to, you know, everything from shipping samples around the world to...

There were various political and economic crises in countries, lots of elections where things have to go into stasis, so things that affect the pathway for, I don't know the trade pathway is, the supply chain. So you're trying to get consumables into the lab in Sri Lanka when importations are banned, or whatever it is. There's all sorts of things like that. So was quite interesting and challenging, but we seemed to manage it.

A very good team of people helping, know, supporting me in that. But latterly, I have had to get my hands quite dirty in terms of, you know, all of the financial reporting and everything. And that's been, you know, it's been quite trying. But yeah, it's been good. And then of course, a bigger part of it was, as you alluded to, it wasn't just doing research, it's also about communicating our findings back to the people who we've been, know, the farmers and the producers, the industry, but also to other stakeholders. And that includes, you know, people from public health, animal health, veterinarians, but also government. So a lot of policy briefings and exchanges and things like this. So, yeah, it's very big project.

Amanda Boag

Yeah, incredibly broad remit of activity to cover as well.

Prof. Tomley

And it will go on for ages. It has spawned some new projects. There's several big projects that have come out of it. There's others which are going through the review process at the moment, which I'm hoping will be funded. So there's been a lot of new activities that have come from that. And we're trying quite hard, as hard as we can, to keep that network of people connected in some way.

Amanda Boag

Can you us a flavour of some of those projects that have sprung from it?

Prof. Tomley

Yeah, so there's a couple which I can mention which are led by RVC. So one is a new project that Damer Blake is leading along with a couple of other people from RVC. And that's linking to the team that we have been working with in Gujarat for quite a long time. So this is with Camden University and the Genome Sequencing Centre in Gujarat. And that's really, again, going back to coccidiosis, but it's looking at interactions of coccidia with the gut microbiome and there's all sorts of things which are a lot of the technologies that were developed in the hub are continuing to be applied there,

particularly looking at the host genetics and how that's how the host genetics of the chickens affects the outcome of disease and also affects the interactions with the gut microbiome.

And then we also got another one which is led by Ludovic Peligald at the RVC and that's on antimicrobial residues in meat and in eggs and feed stuffs and the environment associated with poultry production and that's a follow-on from Hubwork. It's continuing to work in Vietnam where we're finding in all the countries you find quite high levels of antimicrobial usage and really what we're trying to do at the time in this new project is you know, why is it that there are quite high levels of antimicrobials being used? What's the motivation? What's the, you know, what's going into the kind of decision making there? But also, how much of it is coming through into the supply chain and into the products which are on sale to the public? So it's really examining that. That's two projects, but it's being led by the centres.

Amanda Boag

Yeah, no, no, that's great. And what do you and what have you enjoyed most about that kind of, because it's very different to the very detailed work that you might have done in the lab early in your career. What do you enjoy about those kind of broader leadership roles?

Prof. Tomley

I think the thing that for me it's been a bit of a revelation in a sense in that I wouldn't say that I was ignorant of One Health before. I I obviously knew quite a lot about it. RVC has got quite a long, long history of working, you know, in terms of trying to develop collaborations between different sectors and different areas of discipline. But I think something that really opened my eyes was the idea that you can set up a project and have a sort core concept about, it's a hypothesis, but it's a bit, it's more of a kind of framework really where you say, well, all this stuff is happening, you we know you can sit back and look at what's happening to things like avian influenza or antimicrobial resistance.

You get a lot of high level data saying, well, viruses are spreading here and we've got this number of chickens here and we've got expansion of the industry there. But what you don't have is very much detail of what's really happening on the ground and what are the drivers of what you see. we tend to rely a lot on consolidated high level data. And what that tells you is you can observe things, but it doesn't tell you why it's happening.

And bringing in social scientists and carefully integrating that, probably not as much as we should have done because it's just, you know, we had another five years you'd do a lot more of it, but basically it takes time to understand on the ground what's driving behaviour and often it's not that people are being awkward.

It's because, you know, or being deliberately bad, you know, putting too many antibiotics in or not using the vaccines or whatever it is. It's often the sheer structure of the industry. You know, the fact that the farms that are supplying the markets are maybe three days away in terms of travel and the traders who are picking up those birds are trading them at lots and lots of points along the way. You're getting mixing of chickens.

You're getting all kinds of you know maybe ducks and turkeys and chickens together which is going to favour the transmission of H5N1 for example and all kinds of things that are happening and that has a direct impact on the biological, the genetics of the viruses because the opportunities for mixing, the opportunities for mutation and selection are presented by the structure of the industry.

And that's not the fault of the people working in the industry. It's the sort of conditions and it's often driven by financial models. It's driven by culture and practice. So maybe, you know, people are operating where they're having to borrow money from someone, a trader or from a supplier, a feed dealer, for example, and they become indebted.

And therefore, you know, they will, if they want access to veterinary services, they may only have one route to do that and it might be to the person who's lending them the money to do, you know, there's all sorts of relationships and human behaviors in there. And actually what we're doing is really beginning to pull some of this out and say, actually, this tells us it was, and it was part of the hypothesis really at the beginning is that one size doesn't fit all. can't solve these problems by saying, right, we're just going to kill all the chickens, know, with outbreak of flu.

Well, that's no good if every morning there's newly infected birds coming in. You've got to go upstream. You've got to look at what's happening upstream and say, well, what's driving the distribution and the marketing and the way that this is happening and can we intervene at that point? So it's really for me, it's been this is not to do with the nitty gritty of the the, you know, the sequence change that means you can jump from one host to another.

Of course it is, it's phenomenally important and interesting, then zooming backwards and saying, but what's happening in the system and why is the system operating? So for me, that's been the most exciting thing actually, going from being a very reductionist biologist and saying, I'm known for my work on how parasites invade cells, a little bit known for that anyway. And it's like, here's a molecule, what's it doing? And then suddenly you're going, my gosh, how does it interact with this complex social financial system?

And also the recognition that no one person can do all of this. You have to have all these different skills. And not just that, you've got to listen to each other and you've got to not listen with your arms folded going, well, you know, I'm not going to have anything to do with that. You've got to listen and respect the information that's coming from a different approach, a different lens, as people would say. So for me, that's been a real eye-opener.

Amanda Boag

Good. Yeah, no, and I love your example of those, you the monthly open meetings where everyone was there and you really thrash it out with all of that information there, as you say, that kind of context on the ground as well as the...

Prof. Tomley

You try to, you try to. It doesn't always work, you I mean you still end up with lots of situations where there's only three people in the room actually contributing and everyone else is kind of sitting there, but you try to just bring people into the conversation.

Amanda Boag

Yeah, probably should turn our attention to the Plowright Prize, so which we were delighted at RCBS knowledge to be able to award that prize, which was one of the legacies from from Walter Plowright, which we award every every two years to someone who has a really fantastic, had a fantastic career in the broad area of infectious disease research. So tell us a little bit about how you, how you came to put the application in for that and what you hope to do with the award money.

Prof. Tomley

Yeah, so I have to say I didn't really put the application in. I was nominated by by Olly Pibis, who's the research and innovation at the RVC. And it really came after a conversation we had about I was sort of wanting to move towards retirement or semi

retirement. And we just had a chat about about, what I might do when the hub was finished. And I said that one of the things I would be very happy to do within RVC would be to maybe support his office in things like, you know, mentoring or helping people develop grant applications and this type of, know, soft skills stuff really, but particularly mentoring, you know, and he jumped on that straight away and said, you know, that sounds great, you know, we should do that, you know. And then he later said, actually, I think I might nominate you for the Plowright Prize and maybe you could think something to do with. And I said, yeah, well, I said, if I did what I would want to spend it on. said, I don't want to run another project.

I'm done with doing my own research, but if I were to be lucky enough to get the unit to win the prize, I would use it to try and set up a One Health mentoring network because I think, you know, if I can learn so much at my rather late stage of career about the benefit of really getting properly engaged with people who are all trying to solve the same problem, but they're not or doing it in the same way. If you can sort of learn to communicate with people and that way you you can go from your molecular I've got a great idea through to a population through to the people who really know how to put science at the science policy interface which is incredibly important.

How do you communicate with the politician? How do you communicate with the CEO of an industrialized chicken company or you know a veterinarian who really hasn't got the time to be faffing about with all sorts of, they're at the cutting edge of what they're doing. don't know exactly the science in the area or just dealing with the customers. I just thought actually, I think it would be quite useful. It would be more impactful to try and catalyse the formation of a network of early career people who are not so early that they don't quite know what they're doing, but are showing clear interest and potential to become research leaders. And they recognise already the importance of communicating with other people and working across sectors, but they don't yet have the contacts or the network that they need to do that. And that's really where we can help. And so the plan is, and this is very active at the moment we'll be kicking off this Plowright Network in August.

The first meeting will be held in Vienna and immediately after the Veterinary Immunology Symposium, which is happening there. And I've been very fortunate actually that so there's the Plowright Prize. But then through the offices of the International Veterinary Vaccinology Network, we had a long conversation and we've very kindly made another grant to the mentoring network. the POMS, the Plowright One Health mentoring scheme is supported both by RCVS Knowledge, the Plowright prize, but also by a grant from IVVN. So that's boosted our cash a little bit. they've just

appointed a dozen fellows in veterinary vaccinology who are from all over the world. So the fellows will be joined by, I'm at the moment, I've got a call out for people to join the POMS network and I'm expecting to recruit another 20 to 25 early career researchers and we're focusing it on the UK and Africa and South Asia because I'd love to do it worldwide but the logistics and the costs just get too high so for this first cohort which will run for a year from August we're focusing on that area.

Amanda Boag

Thank you so much, Fiona. It's been lovely chatting to you. You've had a, I think your career story from those early days, very focused on pox virus all the way through to switch to parasitology. And now that breadth of kind of leadership and that kind of, as you said, making sure that all voices are heard and we can't always solve problems as effectively if we don't access all of the brains and all the different ways of doing things. So what an amazing journey you've had and what an amazing thing to do with the Plowright Prize money. As a reminder to anyone listening, the prize is open to any veterinary surgeon, veterinary nurse or research scientist working in Europe or the Commonwealth in the area of infectious disease. So it's a pretty broad net and we were really excited to see your application come through. on that note, thank you. Thank you very much, Fiona. And thank you to everyone who's been listening.

RCVS Knowledge

Thank you for listening to this RCVS Knowledge podcast. you're interested in nominating someone for the Plowrite Prize in 2026, head to rcvsknowledge.org/plowright

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