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CELL SCIENTISTS TO WATCH

Cell scientist to watch – Susana Godinho

Susana Godinho graduated with a master's degree in biology from the University of Lisbon, Portugal. She then pursued her PhD with Alvaro Tavares at the Gulbenkian Institute of Science, including a year at the University of Cambridge, UK, in the laboratory of David Glover. In 2006, she joined the laboratory of David Pellman at the Dana-Farber Cancer Institute and Harvard Medical School, Boston, USA, to work on the mechanisms of extra centrosome clustering in cancer cells during mitosis. Susana established her own research group at the Barts Cancer Institute, Queen Mary University of London (QMUL), in 2013. She was the first lecturer of QMUL to be awarded the Lister Prize (2016). Her group investigates how tumour progression is affected by the presence of extra centrosomes in a cancer cell, and how these cancer cells employ mechanisms to adapt to supernumerary centrosomes.

What inspired you to become a scientist?

I have always been very curious about nature; as a child, I spent most of my time catching lizards that I then kept as pets, or opening plants to see what they were made of. I got my first microscope when I was ten – although what I really wanted was one of those chemistry kits for kids, but my parents thought they were too dangerous. Little did they know I would still be looking at cells under a microscope today. This was my first contact with science. In high school, I got into chemistry class so that I could finally mix colourful solutions, and when I set foot in a lab for the first time, that was it – I knew what I wanted to do.

What questions are your lab trying to answer just now?

We work on centrosome amplification, and what we try to do is to understand its role in tumour progression, as extra centrosomes are often found in cancer cells. We thus investigate how cancer cells survive in the presence of these abnormalities, and also how this impacts on cancer and tumorigenesis. One of our recent, very surprising, findings was that cells need to adapt to centrosome amplification in order to efficiently proliferate. It was puzzling, because we found that epithelial cells don't proliferate or divide very efficiently with extra centrosomes. But solid tumours, which are of epithelial origin, do indeed harbour extra centrosomes. To maintain these abnormalities, these cells adapt, and one of the mechanisms they use to do so is through loss of E-cadherin. Understanding such mechanisms is one of the key aspects of the lab, and another one is to look at non-cell autonomous roles for centrosome amplification in normal and cancer cells. Again, centrosomal abnormalities impose a proliferative disadvantage to the cells and, in tissue culture, they are selected against, so how are they maintained in tumours? We realised that, in fact, the presence of these cells can benefit the entire tumour through paracrine signalling. We think that this could help to explain why these cells are present in tumours and we are trying to understand how this works.

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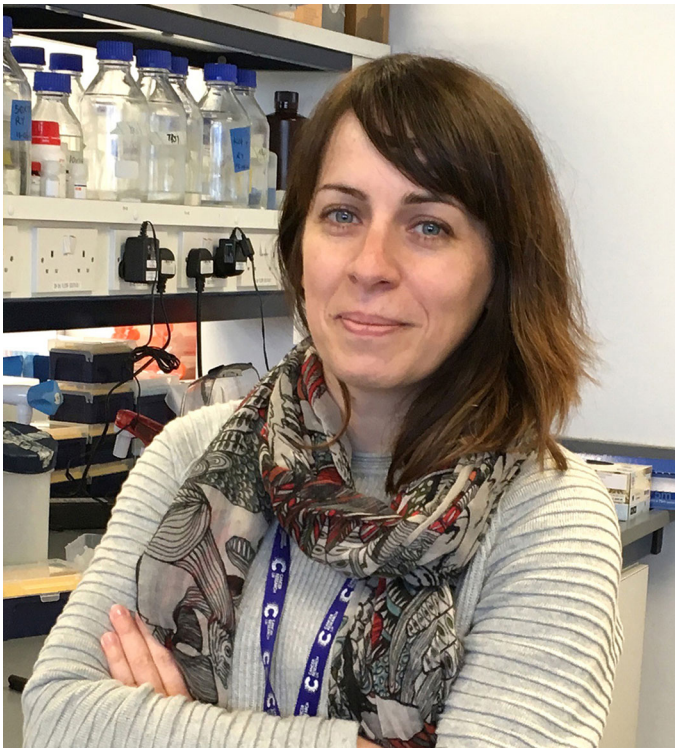

Susana Godinho

That's interesting. Cells with supernumerary centrosomes used to be seen as mainly posing a mechanistic problem during cell division, but it seems to touch upon all aspects of cell biology

Absolutely. I think in general, when we study a specific process in cell biology, we tend to be very focused on this aspect. Now there's plenty of data suggesting that extra centrosomes have a broad impact on cancer cells. What is exciting about this is that these cells can actually be pharmacologically targeted; many years ago, when I was a post-doc in David Pellman's (Boston) lab, we showed that there are specific cellular factors – like the kinesin motor HSET – that are essential for the survival of these cells. Thus, people developed inhibitors that target the factors, but these cells only exist in small populations within tumours – it's not really clear how it impacts tumorigenesis if you get rid of those cells with extra centrosomes. However, current data, such as ours on paracrine signalling, suggest that this might have a broad impact on tumour progression; it might be a really good idea to kill them!

What has been the most influential publication or work in your field recently?

I find it generally really exciting how our view on centrosomes has changed over the years. Several labs have used super-resolution microscopy to dissect how the pericentriolar material (PCM) is organized. Previously, we had thought that it's just a blob of proteins; now, the PCM actually has a structure and this structure may be important for its function. It has opened a new way of looking at centrosomes, and of course, therefore, also centrosome abnormalities.

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Like fish in the water – Susana on a sea kayak trip in New England (USA) in 2010.

What challenges did you face when starting your own lab that you didn't expect?
It was a strange time, because I had just submitted my last paper as a post-doc when I moved to London. For its revisions, I had to get back to Boston. As a result, during the first six months of my lab, I alternately spent one month in London and one month in Boston. At the same time, my first PhD student arrived, so it was challenging. Nothing ever prepares you well for the transition to group leader: as post-docs, we are very self-sufficient, autonomous, we develop a project, or supervise a master's student. But as a group leader, there are several projects with different people, and you have to write grants and do all the administrative work. It was also a learning process for me to realise how much supervision people need in the beginning to gain independence in the lab.

How are the challenges that you're facing now different?
It does feel like the lab has entered the next stage. Now it's about not losing the momentum of our research. Everything's up and running, the projects are maturing, my first PhD student has graduated and my first post-doc has left. As a group leader, you want to get the papers out and apply for more funding, so that the lab can grow – it's about maintaining the continuity of the lab.

How do you achieve a work–life balance when you're trying to establish yourself as an independent investigator?
The beginning has mostly been about the lab, but subsequently I tried to find a balance. When I leave the lab, I reduce checking emails or actually working at home, so that I can relax a little bit. We keep thinking about projects and grant applications all the time anyway, so it can become too much. I picked up reading fiction again during my commute to work here in London, and it really helps me to take my brain off work a little bit.

What is the best science-related advice you ever received?
Great advice I got from my post-doctoral mentor David was not to be in a hurry to fill the lab with people; I tend not to follow his advice that much, but there I thought, 'ah maybe he has a point' [laughs]. As it takes time to adapt to the new challenges of being a group leader, doing it slowly is definitely a good thing. Another thing that I didn't realise until I started and went to a leadership workshop is that there are different sorts of leadership, you have to define the type of leader you want to be for your lab. The sooner you do that, the better.

What kind of leader are you then? Are you hands-on, helping with experiments and so on?
I don't have much time to be at the bench; currently, I'm doing cloning experiments to develop a new system for a grant application, or I help people for their specific projects or during revisions of a manuscript. As for leadership: it may sound like a cliché, but I like to lead by example. If you'd like people to work hard in the lab, and set ambitious tasks, they need to see that you're putting in the extra effort as well. I think that people respond really well to this; it motivates your co-workers to see that they are a part of a bigger story, of a lab culture where we help each other in different projects.

"…you have to define the type of leader you want to be for your lab."

What is your advice on establishing good collaborations?
Engage people with your science. I believe that if people see that you're doing something very interesting and that you are motivated about what you are doing, they engage and they won't mind helping you with the project. It's important to be generous, to share your ideas, and then people will give more than reagents or handling a technique – they will spend time discussing and thinking about your science.

"…one of the best parts of this job: people from different places working together for a common goal."

You worked in Portugal, the United States, now in the United Kingdom. The ways to communicate and the style of doing research can be quite different depending on the country and the culture. Is that something you had to consider in your career?
Absolutely, this is something very important. How people around you deal with problems or react to things that happen are so different, depending on their background. I had a culture shock when I went to the US; there, I learnt so much about how people react differently, with people from anywhere in the world. Science is international; this can make life in the lab complicated if you ignore this, so it's important to realise this aspect of communication. It can be challenging at times, but it is definitely one of the best parts of this job: people from different places working together for a common goal.

How do you get the most out of the meetings you attend, particularly in the early stages of your career?
Don't miss any opportunity to present your work through a talk at a conference. Also, when you're a junior group leader, you don't have much choice but to present unpublished data. It's risky, but I feel that it's a risk that pays off. People need to know what you are doing in your lab, and I would rather take the risk than to wait a few years

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until I have something almost published to be presented at conferences.

Could you tell us an interesting fact about yourself that people wouldn't know by looking at your CV?

One of the things that people probably wouldn't guess is that I used to play canoe polo a lot. That's basically water polo, but inside small kayaks, which is really fun if you like ball games and water. I was in the national team in Portugal and we played the European Championship and World Championship, so that was quite fun. I stopped doing that at the end of my PhD, but I used to travel with my paddle all the time, even when I was in Cambridge, and we even played with the Cambridge team against Oxford.

Susana Godinho was interviewed by Manuel Breuer, Features & Reviews Editor at Journal of Cell Science. This piece has been edited and condensed with approval from the interviewee.