Lab Spotlight: Bonifer Lab

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Deconstructing Blood Cell Research
Building the Hematology Community

Each month, Simply Blood spotlights a lab focused on the research of basic hematology, immunology, stem cell research, cell and gene therapy, and other related aspects. Get to know these different labs around the world! This month, we are featuring the Bonifer Lab at the University of Birmingham in Birmingham, UK.

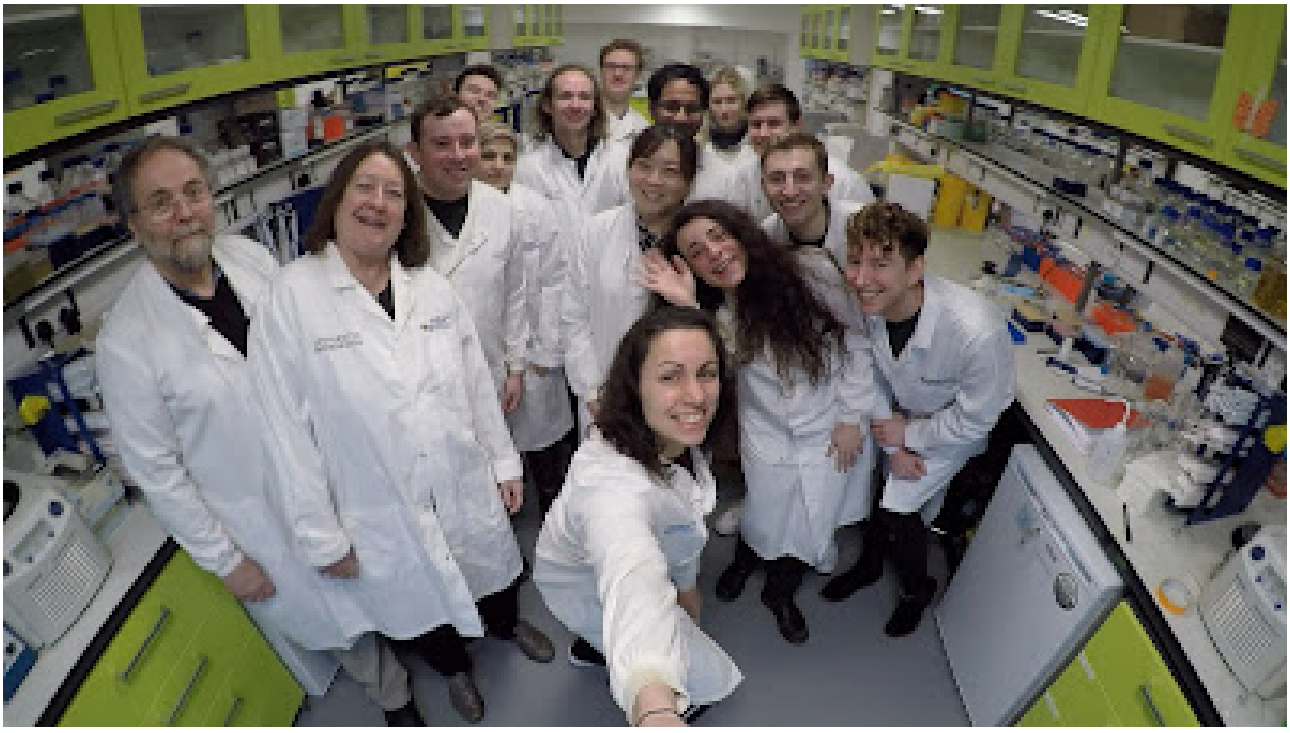

Image: Bonifer / Cockerill Lab

How long have you had your lab?

I have been an independent investigator since 1990, always in the field of gene regulation. First at the University of Freiburg in Germany, then at the University of Leeds, UK. In 2011 we moved to the University of Birmingham, UK

How many members make up your lab? Students/postdocs?
We are currently 5 students, 6 postdocs and two technicians.

What is the major research theme of your lab?
Our major research theme is to understand how the gene regulatory machinery and outside signals program a transcriptionally active chromatin structure and drive cell fate decisions in the hematopoietic system. We are interested both in normal, but also aberrant blood cell development as it occurs in acute myeloid leukaemia (AML). My lab has been working on this topic, with ups and downs since 1990.

What is the most exciting project in your lab right now?
This is very difficult to pick as my lab has a leg in both basic, but also disease motivated science. In our basic science we try to work out what determines the timing by which genes are being switched on and off during blood cell specification and which factors, signals and cis-elements are responsible for dynamic gene expression control, using ES cell differentiation as model system. In our AML research where I work together with my husband, Peter Cockerill, we use both systems-level data and detailed molecular analysis of the role of specific oncoproteins to identify the cis-regulatory phenotype of specific sub-types of AML.

What's your best approach to mentoring students in the lab?
Be firm, friendly, accessible and constructive and do not forget that without your staff, you are nobody.

What's the biggest accomplishment your lab has had recently?
The most important recent publications came from our AML research where we developed a methodology to construct proper gene regulatory networks in primary cells from AML patients representing different AML sub-types (Assi et al., Nat Gen. 2019). We integrated a large amount of “omics” data, including digital footprinting and promoter capture HiC data, thus linking binding events to their rightful promoters. This analysis clearly demonstrated that each of the mutations that defines an AML sub-type causes the epigenome to be reprogrammed in a different way, but most importantly, it highlights the real targets for therapeutic intervention. A huge step towards personalized medicine. This project was only possible through extended funding from the Bloodwise charity and by forging close bonds with our clinicians who provided the patient samples. It took us ten years to gather enough samples to be able to produce these data. This work was also dependent on dedicated staff who sacrificed their evenings and weekends to process the fresh samples when they came in. It was worth the effort.

What is the key to running a successful lab?
Hire the right people. Treat them well. Motivate them with exciting and ambitious projects. Do everything you can for them if they have a problem. Make friends and collaborate. And be

generous, don't squabble about minutiae such as co-authorship – whoever contributed, will be included.

What facilities or equipment does your lab absolutely depend on?
Besides good cell culture facilities, we depend on a good next generation sequencing facility that has a broad technical repertoire. Ours can do bulk and single cell RNA-Seq and ATAC-Seq as well as long reads and every dataset we get is of superb quality.

What has been your greatest challenge in managing your lab?
Mitigating the fallout from hiring the wrong people and failing to obtain grant funding for top people. And getting used to comments from the third referee.

What advice do you have for new investigators just opening their lab?
Hire the right people and wait for them if they don't appear after the first round of advertising. Listen to a red alert in an interview. Collaborate with colleagues who master techniques that you don't yet master and be generous with credit. Find the right mentor, get advice and listen to it. And learn how to manage your time and do not wait until the last minute for a task. A grant put together when tired cannot be well written. Do not take referees' comments personal, and after rejections reflect on why, pick up and turn it around. You are only allowed to rage for 12 hours, not more.

What was the most exciting part about starting your new lab?
The fun of actually being at the helm! To have ideas and being able to implement them. The pride of being able to tell somebody "WE discovered this". To now be able to see students and young postdocs grow from kids to mature scientists.

Does your lab attend the ISEH annual meeting?
Yes, whenever possible

What is the most beneficial aspect of ISEH membership for your lab?
The networking, the conference, the webinars and how ISEH cares for young people.

How do members of your lab celebrate accomplishments?
We have a party either in our house or in a pub.

Does your lab have any fun traditions?
Yes, we do. My husband Peter and I once went on a hiking holiday to Reunion Island. There we found a large number of shrines, giving little offerings to a local Saint called "St Expedite" who comes in form of a Roman soldier. A local explained to us that this is a Saint who helps you if you are in urgent need of something or you want to expedite something. We were impressed by this Saint, and brought back a plastic statue of him, and set up a shrine. Every time, we submit a paper or a grant, St. Expedite gets an offering. It works!

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