



## Signe Altmäe

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### Q1 What led you to want to specialise in biomedicine (molecular biology) and particularly in reproductive health?

To be honest, I did not know what to study. I knew more clearly what I did not want to study, and biomedicine sounded interesting, although I did not know its full meaning. So, I chose this as it sounded more interesting than others. In my case, it has been a mixture of timing, coincidences, and luck. I've been always following the path that is exiting, challenging, and interesting for me. I think that, for me, the key point was meeting Andres Salumets and joining his group of reproductive biology and medicine in 2003.

### Q2 What are your current research interests? Have these shifted since you began your career?

Yes, of course my interests are evolving, changing along with my experience and knowledge in the field. My current research interest is to understand what is the role of commensal microbes in the female and male reproductive tract, specifically to unravel the host-microbe interactions in reproductive functions. More and more evidence is demonstrating that reproductive sites that traditionally were considered sterile (e.g., uterus, testes) harbour commensal microbes on low levels, but we do not know what their role is. If they are there then must be function for them.

### Q3 You read for two PhDs, the first at the University of Tartu, Estonia, and the second at

### the Karolinska Institutet, Stockholm, Sweden. What led you to read for a second doctorate, and how did these periods of focused study impact your research interests?

I started my PhD studies at the University of Tartu (in the group with Andres Salumets) and then I had an opportunity to do a 5-month research stay. I applied for funding from Estonia and research stay in Karolinska Institutet, Sweden and was granted both, so I could unite both fundings and finally perform a 10-month research stay instead. That was long enough time to realise that I would like to stay at the Karolinska Institutet and the only option to stay there was to apply for PhD funding. I was, again, lucky to get this funding and my 'path' was chosen; to conduct PhD studies at Karolinska Institutet under the supervision of Anneli Stavreus-Evers, but also to continue my research work with Salumets in Estonia. As I did not want to quit something that I had already started, I finalised my PhD studies in Estonia in parallel. Indeed, it was a period of focused study and work (a minimum 70 hours per week, I believe), but in those days that was my life; my lifestyle of 'living' in the laboratory, including weekends. It might sound sad, but I was very happy. In fact, I was with a bunch of international students, and we had a lot of fun together, working hard but also enjoying lunches, gym, saunas, and fikas together. The two key words for me from this intensive period are: enjoy and freedom.



**Q4** You currently work at the University of Granada, Spain. How has the COVID-19 pandemic impacted your teaching and what have the effects been on your students? Have you found any unexpected benefits from the shift in remote teaching practices?

I have a researcher contract that includes rather small amount of teaching, so, of course, the pandemic has impacted my teaching (remote or in-person); but, altogether, it has been fine. The practical classes in the lab have been with a reduced number of students, about 50% of the class, which actually has been even nice. But what does bother me is that when some students greet me, I do not recognise them as I've never seen their faces. I also miss this student–teacher interactions that happen in the in-person classes (and classes without masks). In regard to research, the remote world has activated a lot of collaborations and, while I took part in international collaborations before, there

are now days where I basically spend the whole day in online meetings, and this feels normal today.

**Q5** You have written an impressive number of research papers and have also authored three book chapters to date. Can you pick out one or two that led you to discover something important, or of interest, in the field of reproductive health?

Every paper has a story behind it, but I believe we all remember our first 'baby', the first submission, and receiving comments and critics from reviewers, answering the reviewers and resubmitting, in short getting to know this world. But, if I were to highlight one work, then I must say it has been really exiting to enter into the transcriptome world (the analysis of RNA molecules) and to predict molecular interactions between the embryo and endometrium in order to understand the molecular dialogue, leading to embryo implantation in humans.



**Q6** A paper that you co-authored entitled 'Genitourinary microbial screening for all infertile men?' was published in April 2022. What do you think are the benefits of genitourinary microbial screening and which conclusions did you come to in your research?

Genitourinary microbial screening would definitely provide answers (the confirmation or discarding) of possible microbial dysbiosis/imbalance that are otherwise not detectable and thereby could help to refine a diagnosis of infertility and treatment options. It feels like we are doing a puzzle, with every piece we get closer to the full picture; but there is still a lot to discover, starting from how we define what is 'normal' and 'abnormal'; what role the microbes in our body play, specifically in the upper reproductive tract; and what impact it has on oocyte fertilisation, embryo implantation, and pregnancy establishment.

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**Q7** You have received many prestigious awards from all over Europe, including the Young Scientist Award from the Egon and Ann Diczfalusy Foundation for Supporting Research in Reproductive Health. Which of your awards are you most proud of and how do you feel that this recognition has helped your career to develop?

I don't know how other researchers feel but, at least for me, all the awards have been important to my recognition, independently of the prestige. I have been equally happy in receiving European Society of Human Reproduction and Embryology (ESHRE) award for the best poster as receiving a local distinction; both have made me equally happy and proud. In the research field, we usually get (constructive) critiques (reviewers commenting manuscripts, research projects, etc.) and the positive feedback is lacking. However, I am truly grateful for all the prizes and awards. I believe that the recognition has, in the end, helped me to get more recognition and also funding, which are crucial for any scientific career.

**Q8** How has the landscape of reproductive health shifted during your career? In your opinion, which breakthroughs have had the biggest impact on current practices?

Just the other day I was saying that I feel that there has been a dramatic shift in the field of reproductive health. When I started 20 years ago, molecular studies involved analyses gene by gene: the single gene approach. Then, 13–14 years ago, the ‘omics’ revolution arrived in the field of reproductive health and today we are able to provide molecular tests for personalised infertility treatment protocols. Now, we are mainly exploiting transcriptome data; however, there is still much to see of the microbiome, metabolome, and proteome world.

**Q9** Which new technologies and techniques in the field of reproductive health are you most excited about and why? How do you feel these innovations will impact health-care in the future?

I’m excited about the microbiome testing, the unexplored options that the detection of ‘good’ bacteria and ‘bad’ bacteria (the eubiotic and dysbiotic) microbial sites offer. We still need to clarify what is ‘normal’ in microbial

composition in the upper reproductive tract (both female and male) and how it can change as a result of disease, whether it is a cause of consequence. But once we have this knowledge, we could aim to modify, to improve the dysbiotic conditions (with nutrition and local pro- and prebiotics) and, hopefully, we could cure some conditions or even prevent different diseases.

**Q10** What advice would you give to someone hoping to pursue a career in reproductive health? Which lessons, if any, do you wish you had been taught as a young student?

I don’t remember any specific lessons, but I truly believe (and it applies to any field in any profession) that you have to like what you do. And don’t worry if you don’t know what you want today; start eliminating options that you are sure you don’t want and, in the end, there will be fewer ‘paths’ to choose. Also, it is normal to make mistakes, and a problem is not a problem if it is fixable. And to always try to give your best.

When entering the research field, it is important that you do research with people you understand and enjoy being around.