Marla B. Sokolowski

Canada

> My parents made me feel I could achieve whatever I wanted; the sky was the limit

Interview by Frances Henry*

Marla Sokolwoski at the University of Toronto, Canada

Professor and Canada Research Chair in Genetics and Neurology, Academic Director of the Institute for Human Development, Department of Ecology and Evolutionary Biology, University of Toronto.

Main research interests at this time

Main research interest is in genes and behaviour. She wants to understand how and why individuals behave differently. Her first research was on genetic analysis of behaviour in the fruit fly Drosophila. By watching the movement patterns of fruit fly larvae on and off their food she discovered the rover and sitter behavioural polymorphism which her group mapped to a single gene called foraging. When her group cloned the foraging gene they found it to be a signalling molecule called cGMP dependent protein kinase or PKG which

is found in most organisms including humans. This was the first time that a molecular basis for normal individual differences in behaviour was uncovered in any organism. The foraging gene in Drosophila has multiple functions affecting food related behaviours, metabolism, response to stress and learning and memory. Her group and others have shown that the foraging gene affects food related behaviours and metabolism in a wide range of species including nematode worms, honey bees and ants. She was a pioneer in the field of behaviour genetics at a time most biologists did not think that genes could actually affect normal individual differences in behaviour. Her current research interests include studies of gene-environment interactions on behaviour from neuro, molecular and evolutionary perspectives. She studies flies, rats and humans to address these questions.

Accomplishments and achievements she is most proud of

- Students and post-doctoral fellows who she has trained who hold positions around the world.
- Starting a new subfield of behaviour genetics on normal individual differences.
- Work with the Canadian Institutes for Advanced Research on the importance of early life and how experience gets embedded into our biology.
- Her 37-year marriage and her two wonderful children.

Honors and awards

- Fellow of the Royal Society of Canada
- Canada Research Chair in Genetics and Neurology, University of Toronto
- Co-Director, Brain and Biological Development Group of the Canadian Institutes for Advanced Research
- University Professorship
- Academic Director of the Institute for Human Development at the University of Toronto

Why she decided to enter a science career

As a young child, Marla loved to collect things and she loved playing school. Later, in high school, she was very good at math and physics. The environment for women studying physics and math was not very good in the early 70's when she was in school so she started taking biology courses and was made to feel more welcome. In her first course in genetics and animal behaviour, she actually enjoyed reading the text book. She says "It didn't put me to sleep". She decided to take more courses and when she was an undergraduate student she had an especially encouraging professor whose lab she worked in. He thought she was smart enough to go to graduate school so she applied and was accepted. Marla also noted that she came from a very supportive family. Her parents, although they had little formal education nevertheless worked very hard to enable her and her siblings to attend university.

Why is it important for women to be in science?

It's important not to lose the brain power of half of the population! Think of how many more mysteries would be solved if the pool of potential minds working on a problem almost doubled and included both men and women. On average women may approach science differently than men and their labs may be more welcoming to woman. Women scientists can act as role models and mentors to other young women so that these young women can see that it can actually be done. The style of my lab is very nurturing and interactive. Women's labs have different characteristics than men's - which is not to say that some men's labs are not nurturing - because they are. When I first started out, most of my students were women - about 5 or 6 to 1 man - but now it is about even - 50/50. I have graduated more women Master's students but more Ph.D's are men. Post-docs also seem to be about 50/50. In the 1980s, I was the only practising woman scientist in my department. Women came to talk to me and wanted to come into my lab because they felt welcome. Part of this had to do with me being female.

Who or what is your inspiration for doing science?

There are a few things which inspired me. I have two brothers and as a young girl, I was made to feel by my parents that I could do whatever I wanted. My mother taught young children and my father who was an immigrant had very little formal education. He sold shoes for a living. They both felt "the sky's the limit for me". I was also attracted in part to science because it was thought to be hard.

Once I started to read the scientific literature, I was influenced by several other scientists. As a student, I was interested in normal individual differences not those caused by mutant effects. My early perspective was evolutionary rather than mechanistic. One of my main influences was Richard Lewontin, the eminent evolutionary biologist, who was writing about how to perform rigorous evolutionary experiments. He said that there were three important attributes before a behavioral trait could be called adaptive. The trait had showed phenotypic variation, that this variation could be inherited, and third, that these heritable behavioural differences had adaptive consequences. This approach influenced my early research. Douglas Wahlsten's notions that gene-by-environment interactions and genetic background were neglected by those in the field also influenced me. So I was encouraged but it was a difficult field in the 70s, 80s and 90s - behaviour and genetics - and people didn't believe it was possible for genes to influence behaviour. It was an uphill battle until about 10 years ago.

Her first research project involved the genetic analysis of the behavior of the fruit fly

The food-seeking gene in the Drosophila contains numerous functions that affect behavior related to food, metabolism, stress response, learning and memory

What were the main barriers you experienced, and how have you overcome them?

The first main barrier Marla experienced was the recognition of her field of study. She was a pioneer in that field of study and there were many skeptics. Geneticists didn't believe that one could find genes that influenced behaviour and when she identified a single gene and cloned it, the evolutionary biologists said it was an exception. Everywhere she went, she says, "they said it was cute, it's neat" but there was no serious acknowledgement of her work. This made her dig in harder. In the nineties this area of research became very mainstream partly because of her work. Now the top journal want to publish papers in the area of genes and behaviour. Marla followed the questions that interested her. She overcame this barrier by continuing her line of research and accumulated so much evidence in favour of it that its significance could not be refuted.

Marla says that when she was a student, she never felt any discrimination as a woman. It was when she applied for her first job - a tenure track position at a major university - she became aware of discrimination during the job interview. She was applying to a department which did contain two women but both were elderly and no other women had been hired. During the interview she was asked such questions as "When you get pregnant, are you actually going to come back to us to work?" The chair asked "When you work so late at night, doesn't your husband expect dinner

on the table?" There were other comments like that and some "I wouldn't really tell you because they were even more inappropriate". What she did, even before she got the job, was to annotate everything inappropriate that was said to her. She presented her notes to the then President of the university and to the woman who was the head of the Status of Women Office on campus. She said "This is what happened to me in this department which was, in face, welcoming to women and interviewing women candidates for the position. And I don't want this to happen to anyone else." At that time, during the mid-eighties, a series of guidelines were written including questions that were acceptable and appropriate to ask women who were being interviewed. A committee was also set up to look at the status of graduate student women on campus. In addition to these changes, the department and the administration of the university apologized to her. She was pleased that some action was taken as a result of her difficult experience. She was very surprised about what happened to her at this interview because up to that point she had felt that she was treated equally. Only men were on the search committee for this position and later, she heard that there were many arguments among them as to whether she should be hired and that she was "barely chosen" even though her accomplishments were superior to those of the other candidates. She notes that experiences like hers were very common in earlier times. She was disturbed by her experience and felt that she had to do something about it, especially as she thought that the interview committee didn`t apparently see anything wrong with their language or their questions.

Marla did receive this appointment and stayed at this university for many years before moving to her present position. Many other women were subsequently hired in the department where she held her first appointment and several of them were visibly pregnant when they interviewed for their jobs.

Do you have a family?

Marla has been married for thirty-seven years to her high school sweet heart and they have two children, a boy and a girl, who are now 16 and 20 years old. Both children are interested in science and both are also musical. Her husband is a dentist who practiced professionally until recently when he started to teach in the dental clinic at the University of Toronto's School of Dentistry. He has always been very supportive of her career and assumed half or more of the child rearing responsibilities in the family. She says that she has a very balanced life between her professional career and her family life.

What do you like to do in your leisure time?

Her life is divided into work and family. Her children are older now and leisure time

is spent doing things with them and her husband including sports and travel. She also enjoys going to classical music concerts with friends. Her friends often question her as to why she does not have a major hobby. She says that she decided very much earlier in her life that "If I wanted to do very well as a scientist and a Mom, that's the way my life would be organized... and I'm happy with that... one has to make choices in life".

What is your advice to other women scientists?

She believes that they need to do what they love and women should not worry about whether there are jobs in this area or that area because there are always different trends in hiring practices at universities. Women scientists (and men, too, of course) should do what they are really most interested in and do it well so that they can be proud of themselves and their achievements. Women need especially to realize that leading a balanced life between family and academic work is possible - in fact, probably more so than in other professions. If one is fortunate to have supportive people around such as students and post-docs like she did, one can always stay home if necessary if your child is ill. If one wants to attend field trips with your children, that too is possible because the work hours provide a lot of flexibility for women scientists. Her children feel that she has a flexible career because she can be at home and although she is most often on the computer, she is always available to them when they need her. All told, Professor Marla B. Sokolowski leads a very productive and successful professional life as one of Canada's leading scientists but she also maintains a happy and healthy family life. ■

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