Brain Medicine

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INNOVATORS & IDEAS: RISING STAR

Alessandra Borsini: What neuroinflammation has to do with depression and how nutrition can play a beneficial role

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Alessandra Borsini is a Lecturer in Psychoneuroimmunology at the Institute of Psychiatry, Psychology and Neuroscience (IoPPN), King's College London. Her research interest focuses on the role of inflammation and stress on brain neurogenic alterations, particularly in the context of neuropsychiatric and neurodegenerative disorders, and on the ability of psychotropic, anti-inflammatory, and nutrition-based treatments to prevent such alterations. She has been a member of the Medical Research Council (MRC) Immunopsychiatry Consortium, the AMBROSIAC ERA-NET/MRC Consortium, and the European College of Neuropsychopharmacology (ECNP) Immuno-Neuropsychiatry Network Core Group. She has received various awards, including the Psychoneuroimmunology Award from the Psychoneuroimmunology Research Society (PNIRs) and the Preclinical Psychopharmacology Award from the British Association for Psychopharmacology (BAP). As of April 2024, Dr Borsini has published over 50 papers, with a current H-index of 25, and has been the recipient of both national and international research grants from the National Institute for Health and Care Research (NIHR), Wellcome Trust, MRC, European Commission and Rosetrees Trust. She is part of the Editorial Board of several journals, including *Brain, Behavior, and, Immunity*, *Frontiers in Neuroscience*, and *Frontiers in Psychiatry*. She is also the programme leader for the new MSc in Psychology and Neuroscience of Mind-Body Interface launching this September 2024 at the IoPPN. Dr Borsini is passionate about public engagement. To discuss her research or topics broadly related to mental health, she has made multiple media appearances in newspapers, including *The Sunday Times*, *The Guardian*, and *The Independent*, and radio and TV programmes, such as *BBC Radio 4 Today*, *BBC Radio 4 All in the Mind*, and *BBC One Health: Truth or Scare*. Dr Borsini graciously answered the Genomic Press Interview, providing our readers with reflections on her personal and professional journey.

Part 1: Alessandra Borsini – Life and Career

Could you give us a glimpse into your personal history, emphasizing the pivotal moments that first kindled your passion for science?

I have always found the possibility of becoming one day a researcher and neuroscientist fascinating. I have a strong sense of curiosity, which led me to move from my little town in Italy to London and to apply for what at that time was considered a very novel BSc course in Psychology and Neuroscience. Studying the neuroscience of the brain and conducting laboratory experiments already during my degree, as well as being immersed in such an international academic and research environment, all contributed to increasing my passion for a career in neuroscience research.

Figure 1. Alessandra Borsini, PhD, King's College London, UK.

We would like to know more about your career trajectory leading up to your current role. What defining moments channeled you toward this opportunity?

After finishing my undergraduate degree, I have had a very continuous career path. I had the opportunity to meet Carmine M. Pariante at the IoPPN, King's College London, and to do a PhD under his supervision. Since then, I have had the great fortune to have him as my mentor and friend. As soon as I finished my PhD, I was awarded a Fellowship from the NIHR, which allowed me to continue my academic career at the IoPPN. I was lucky to find a fantastic community of friends and scientists, so I decided to continue my research there even after my Fellowship ended. Even though I am now a Lecturer in Psychoneuroimmunology at the IoPPN, and have been at the Institute for many years, I feel like I am still at the beginning of my journey.

Please share with us what initially piqued your interest in your favourite research or professional focus area.

I have always been fascinated by inflammation – its complexity, ability to change, adapt, and interact with multiple systems, and affect simultaneously both the brain and the body. At the same time, my parallel interest in the intricate complexity of specific brain processes, such as neurogenesis

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and neuroplasticity, brought me closer to the research I am doing at the moment – understanding the neuro-immunological mechanisms underlying mental health disorders. While psycho-neuro-immunology has always been my main research interest and focus, over the years, I have had the opportunity to connect with neuroscientists working in the field of nutritional psychiatry, and I immediately felt captivated by how diet/nutrition can regulate our immune response and ultimately affect our mental health.

What impact do you hope to achieve in your field by focusing on specific research topics?
I do hope my research will be able to provide novel insights into the neuroinflammatory mechanisms underlying mental health disorders and, as a consequence, to contribute to the development of novel and more personalized therapeutic approaches for patients with mental health disorders with sub-chronic levels of inflammation, who are not responding to current antidepressant treatments.

Please tell us more about your current scholarly focal points within your chosen field of science.
Currently, my team of researchers and I are focusing on several projects. For our NIHR-funded study, we are gaining mechanistic insights on how long-COVID-19 affects the brain via exposing human brain cells directly to blood from these patients – this is indeed a follow-up study from a previous Rosetrees Trust-funded project where we tested how peripheral inflammation in acute COVID-19 patients with neurocognitive symptoms was affecting brain neurogenesis. In parallel, for our European-funded project, EarlyCause, we have developed multiple in vitro models of early life stress (ELS) using cells from the brain and the body in order to investigate causative mechanisms linking ELS to the development of psycho-cardio-metabolic multi-morbidities. Finally, we are in the last stage of the Symprove study, a project funded by Parkinson's UK, which aims to uncover the neurobiological mechanisms underlying the effect of oral Symprove (a probiotic) for the management of non-motor symptoms, including depression and anxiety, in people with Parkinson's. Papers from these studies should come out soon.

What habits and values did you develop during your academic studies or subsequent postdoctoral experiences that you uphold within your research environment?
Over the years, I have been involved in many new projects and supervision roles. The two habits I have developed most are working hard and planning ahead. There are times when multiple deadlines are approaching, and organizing tasks in advance has allowed me to perform at my best without experiencing anxiety or feeling pressure. Science is fun, and I value celebrating every success, no matter how big or small it is – this is something I learned over the years working with Carmine Pariante. I do the same with the people who are working with me.

At Genomic Press, we prioritize fostering research endeavors based solely on their inherent merit, uninfluenced by geography or the researchers' personal or demographic traits. Are there particular cultural facets within the scientific community that warrant transformative scrutiny, or is there a cause within science that deeply stirs your passions?
Inclusion, for me, is a fundamental aspect of science. I genuinely believe there should be no sign of cultural, social, or ethnic barriers within our scientific community. As a woman and a mother, I also condemn any form of pregnancy or maternity discrimination.

What do you most enjoy in your capacity as an academic or research rising star?
The freedom to develop and investigate your own scientific hypothesis, the excitement of creating new collaborations every day, and the privilege to work with amazing people and scientists.

Outside professional confines, how do you prefer to allocate your leisure moments, or conversely, in what manner would you envision spending these moments given a choice?
I love spending time and playing with my daughter; it gives me much joy – I also recently realized that it involves much physical activity, precisely what I need for my mental health. I come from a small town near the sea in Italy, so it is inevitable not to mention that I am constantly searching for a sunny beach, hot weather, and blue sky, so whenever I can, I fly back to Italy to remind myself of those scenarios.

Part 2: Alessandra Borsini – Selected questions from the Proust Questionnaire[1]

What is your idea of perfect happiness?
Being surrounded by my family.

What is your greatest fear?
Not to be surrounded by my family in difficult times.

Which living person do you most admire?
Not a specific person, but anyone who managed to find a balance in life.

What is your greatest extravagance?
My interest in aviation and karaoke.

What are you most proud of?
Being a mum and a researcher.

What is your greatest regret?
I would have loved to visit more remote destinations, but there is still time.

What is the quality you most admire in people?
Resilience.

What is the trait you most dislike in people?
Arrogance.

What do you consider the most overrated virtue?
Perhaps confidence.

What is your favourite occupation (or activity)?
I love walking through the streets of central London.

Where would you most like to live?
In a sunny and hot place, by the sea.

What is your most treasured possession?
My memories of the time spent with my grandmother.

[1]In the late nineteenth century, various questionnaires were a popular diversion designed to discover new things about old friends. What is now known as the 35-question Proust Questionnaire became famous after Marcel Proust's answers to these questions were found and published posthumously. Proust answered the questions twice, at ages 14 and 20. In 2003, Proust's handwritten answers were auctioned off for $130,000. Multiple other historical and contemporary figures have answered the Proust Questionnaire, including among others Karl Marx, Oscar Wilde, Arthur Conan Doyle, Fernando Pessoa, Stéphane Mallarmé, Paul Cézanne, Vladimir Nabokov, Kazuo Ishiguro, Catherine Deneuve, Sophia Loren, Gina Lollobrigida, Gloria Steinem, Pelé, Valentino, Yoko Ono, Elton John, Martin Scorsese, Pedro Almodóvar, Richard Branson, Jimmy Carter, David Chang, Spike Lee, Hugh Jackman, and Zendaya. The Proust Questionnaire is often used to interview celebrities: the idea is that by answering these questions, an individual will reveal his or her true nature. We have condensed the Proust Questionnaire by reducing the number of questions and slightly rewording some. These curated questions provide insights into the individual's inner world, ranging from notions of happiness and fear to aspirations and inspirations.

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When and where were you happiest? And why were you so happy then?
Now is the happiest time of my life, as I am a wife, mum, and an active scientist.

What is your current state of mind?
I feel serene.

What is your most marked characteristic?
I am a reliable person, both in personal and professional relationships.

Among your talents courses, which one(s) give(s) you a competitive edge?
I am very persistent and do not give up easily.

What do you consider your greatest achievement?
I have developed and led an entirely new MSc course in Psychology and Neuroscience of Mind-Body Interface, which launches this September 2024. For further information on this exciting new programme, click on this link.

If you could change one thing about yourself, what would it be?
I often ask too much of myself.

What do you most value in your friends?
Honesty.

Who are your favourite writers?
Patrick McGraph, Doris Lessing, Paulo Coelho.

Who are your heroes of fiction?
Sherlock Holmes.

Who are your heroes in real life?
Men and women who are committed to their families and their community

What aphorism or motto best encapsulates your life philosophy?
Per aspera ad astra.

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