BRAIN BEHAVIOUR

Given the complexity of human psychology, research on brain and behaviour requires a multidisciplinary approach, spanning molecular biology, cognitive and affective neuroscience, and public mental health. Women in a number of different departments across the university have made a significant contribution to the efforts of the Brain and Behaviour Initiative (BBI), one of UCT’s signature themes. The BBI initially focused on psychological trauma and resilience, but over time these scientists have also addressed other questions that are particularly relevant to South Africa, including neuroHIV/AIDS and addiction.

Professors Nicola Illing and Vivienne Russell investigate the molecular aspect of brain-behaviour studies. Professor Illing has a particular interest in gene expression, with an interest in how psychological stress changes gene expression in the brain. In order to begin to address this question, she mentored a student project that focused on comparing gene expression in white cells and in the brains of rodents exposed to stress. The data were the first to be published in this area, and have led to a patented test. She is currently working with a postdoctoral research fellow on gene expression in white cells in people who abuse methamphetamine.

Genes are ultimately translated into proteins. Professor Russell and postdoctoral research fellow Dr Jacqueline Dimatelis have focused on protein expression in animal models of stress and of substance use. Their work suggests that the combination of early-life adversity and later methamphetamine use results in more alterations in protein concentration in a key area of the brain – the nucleus accumbens – which is involved with reward...
processing. Ultimately, the hope is that, by understanding such molecular processes in more detail, new targets for treatment can be developed.

Professor Ernesta Meintjes is the DST/NRF SARChI Chair in Brain Imaging, and has played a particularly important role in conducting clinical research relevant to the BBI mission. Her work has included studies of children with fetal alcohol syndrome, as well as children with neuroHIV/AIDS, and involves collaborations with clinician-scientists abroad and locally. Much of her research is funded by the National Institutes of Health. As children are not easily able to lie still during imaging, she and her collaborators at the Massachusetts General Hospital have developed new MRI sequences, which facilitate motion correction during the analysis of scans.

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Dr Katherine Sorsdahl, the project manager of the BBI, represents the public health aspect of brain-behaviour studies. Together with her mentor, Honorary Associate Professor Bronwyn Myers, she has been involved in intervention studies for people suffering from substance-use disorders. Given the resource constraints that local mental-health services face, she has focused on using lay counsellors to provide the interventions, an idea known as “task-shifting.” Her preliminary findings indicate that such interventions can make a large difference. Dr Sorsdahl is enthusiastic about continuing to study treatments that are simple and inexpensive enough to be rolled out to the public on a large scale.

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A number of young scientists have focused on translational science in particular, moving between “the bench and the bed”: Dr Fleur Howells, for example, has undertaken a series of animal and human studies in order to address the role of particular neurotransmitter systems in mental disorders.

“Our aim,” Professor Stein says, “is to go from bench to bed and beyond, in order to begin to address key questions in the brain-behaviour sciences, and to find new approaches to the diagnosis and treatment of mental disorder.” The BBI is keen to attract more staff and students to work in this area.

Celebrating 100 Years of Health Sciences