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SCHIZOPHRENIA Factsheet

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What are hormones and how do they relate to schizophrenia?

Hormones are chemical messengers secreted by the endocrine glands. Hormones travel through the bloodstream to tissues and organs, and control most of the body's major systems including heart rate, metabolism, mood, sexual function, and growth and development.

Neuroactive steroids, including testosterone, dehydroepiandrosterone and its sulphide ester, are important for brain development as they influence synaptic connectivity and neuronal differentiation. Thyroid hormones also play a role in neurodevelopmental processes, such as differentiation of neural cells, synaptogenesis, and myelination.

Prolactin is involved in many biological functions including reproduction, pregnancy and lactation, and growth and development. Body weight is regulated by anorexigenic or appetite suppressing hormones (e.g. insulin, leptin, peptide YY, and cholecystokinin) and orexigenic or appetite stimulating hormones (e.g. neuropeptide Y, orexins, agouti-related peptide, galanin, and ghrelin).

Melatonin is involved in various biological functions including sleep regulation, circadian rhythm, immune modulation, reproduction, anti-inflammation, antioxidant, and energy metabolism. Oxytocin and vasopressin are released through the posterior pituitary gland where they regulate a range of physiological functions. They are also released in the central nervous system, influencing a range of neurophysiological processes and behaviours, including feeding, anxiety, aggression, social recognition, and the stress/fear response to social stimuli.

What is the evidence for hormonal changes in people with schizophrenia?

Moderate quality evidence found a medium to large increase in dehydroepiandrosterone-sulfate levels in people with schizophrenia compared to controls, with testosterone elevated only in first-episode psychosis patients and in patients during an acute relapse. There were no differences in dehydroepiandrosterone levels.

Moderate to high quality evidence finds a small increase in thyroid-stimulating hormone in people with multi-episode schizophrenia compared to controls, with no differences in triiodothyronine or thyroxine. In people with first-episode psychosis who were drug-naïve, there was a small decrease in thyroid-stimulating hormone and a medium-sized decrease in total triiodothyronine. There was also a medium-sized increase in free thyroxine in first-episode patients.

Moderate quality evidence found a large increase in prolactin levels in antipsychotic-naïve males with schizophrenia and a medium-sized increase in antipsychotic-naïve females with schizophrenia. There was a small to medium-sized increase in leptin, particularly in chronic patients taking the second generation antipsychotics olanzapine and clozapine. There was a small to medium-sized increase in insulin levels and a trend effect of lower leptin levels in first-episode psychosis compared to controls. These effects were both significant in subgroup analyses of antipsychotic-naïve patients. The severity of negative symptoms was associated with an increased effect size for insulin. There may also be reduced adiponectin levels in patients taking clozapine or olanzapine, but no differences in other patients, including first-episode patients. There were also no differences in ghrelin, orexin, resistin, and visfatin in first-episode psychosis.

Moderate to low quality evidence finds a large decrease in oxytocin in blood serum, and a medium-sized increase in oxytocin in cerebrospinal fluid of people with schizophrenia. There were no differences in oxytocin in blood plasma of patients and controls. There was also decreased vasopressin in plasma of patients with schizophrenia, with no differences in cerebrospinal fluid.

Moderate quality evidence finds reduced midnight melatonin plasma levels in people with schizophrenia compared to controls. Unfortunately we found no systematic review specifically assessing estrogen levels in people with schizophrenia.

For more information see the technical table

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NeuRA (Neuroscience Research Australia) is one of the largest independent medical and clinical research institutes in Australia and an international leader in neurological research.

Diseases of the brain and nervous system pose the greatest health, economic and social burden of any disease group because they are chronic, debilitating and have no known cures.

Medical research is the cornerstone of efforts to advance the health and wellbeing of families and the community. Our dedicated scientists are focussed on transforming their research into significant and practical benefits for all patients.

While we hope you find this information useful, it is always important to discuss any questions about schizophrenia or its treatment with your doctor or other health care provider.

HOW YOUR SUPPORT HELPS

We are able to make significant advances due to the generosity of countless people. Your donation allows us to continue to work towards transforming lives. For information on how you can support our research, phone **1300 888 019** or make a secure donation at **neura.edu.au/donate/schizophrenia**.

NeuRA (Neuroscience Research Australia) Foundation
T 1300 888 019 **F** +61 2 9399 1082
ABN 57 008 429 961

Margarete Ainsworth Building
Barker Street, Randwick NSW 2031
PO Box 1165 Randwick Sydney NSW 2031 Australia

neura.edu.au