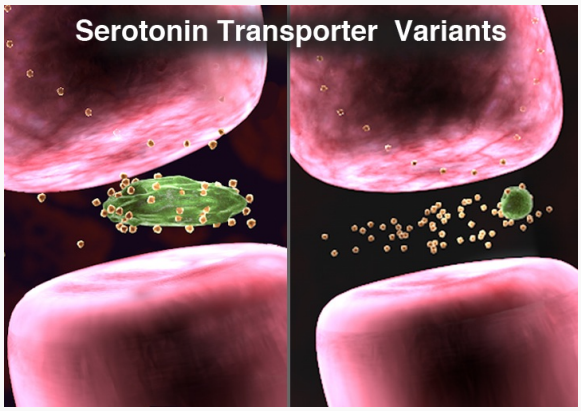
The Science Behind the Genecept™ Assay

The Genecept Assay contains a proprietary panel of ten genes that have been individually selected for actionable clinical applicability to treat neuropsychiatric conditions. The panel is unique for its dual approach; it includes both pharmacokinetic and pharmacodynamics genes.

Pharmacokinetic genes look at how the body metabolizes certain drugs, and pharmacodynamic genes indicate how certain drugs affect the body. Pharmacokinetic genes have traditionally led to important insights and treatment options for patients, while pharmacodynamic genes are leading us to new insights by focusing on brain chemistry. When certain drugs or neurotransmitters interact with a specific brain receptor, they modify the chemistry of the brain and directly influence behavior.

Serotonin Transporter (SLC6A4)

The serotonin transporter is a protein (a molecule) that controls the levels of the brain chemical, serotonin. This protein determines the amount of serotonin that is available between communicating cells in the brain called neurons. Genes, which are parts of DNA that encode for proteins, can influence the serotonin transporter protein.



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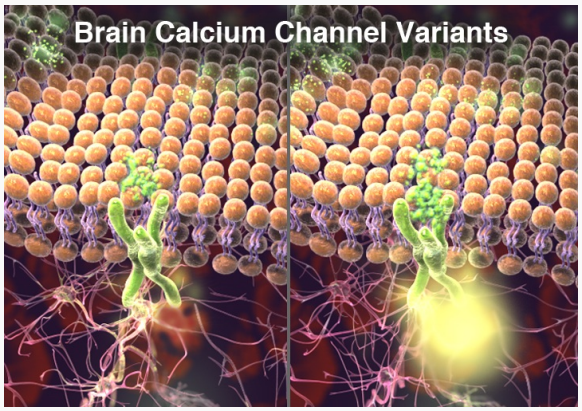
An individual with a change in the DNA that encodes the serotonin transporter may have a reduced ability to move serotonin, making it harder for neurons to communicate with other neurons. Therefore, this person may be less likely to respond to SSRI antidepressants that target this serotonin transporter protein and more likely to experience side effects from these medications related to excess serotonin levels.

Gated Calcium Channel

This channel controls the movement of calcium between cells. When cells get excited, they talk to each other, using calcium as the messenger. This excitement is a normal process, although too much excitement can be a problem.

There are certain genetic changes that may increase the flow of calcium into parts of the brain, producing a higher than normal amount of excitement. Variation in this gene has been associated with multiple psychiatric disorders, including bipolar disease and schizophrenia, although it accounts for only a very small amount of the risk associated with these disorders.



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Ankyrin G

This protein is important for the function of sodium channels which control the movement of sodium in and out of cells. When cells get excited, they talk to each other, using sodium as the messenger. This excitement is a normal process, although too much excitement can be a problem.

There are certain genetic changes that may increase the flow of sodium into parts of the brain, producing a higher than normal amount of excitement. Variation in this gene has been associated with multiple psychiatric disorders, including bipolar disease and schizophrenia, although it accounts for only a very small amount of the risk for these disorders.

Serotonin Receptor (5HT2C)

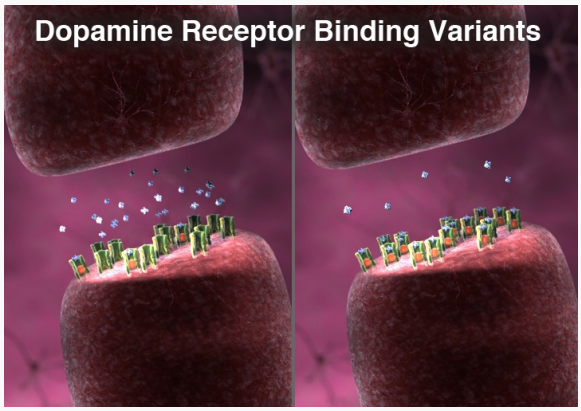
The serotonin receptor is a molecule that plays an important role in signaling the body that it has had enough food. Newer antipsychotic drugs, which block the activity of serotonin at this receptor may also cause metabolic syndrome (weight gain, diabetes and increased blood pressure and cholesterol).

Certain individuals have a genetic variation that can lead to an increased risk for metabolic syndrome with the use of newer antipsychotic medications.

Dopamine Receptor (DRD2)

The dopamine receptor is a molecule that receives signals from dopamine, a brain chemical that is important for movement and perception. All antipsychotic drugs bind to this receptor and work by blocking the activity of dopamine in parts of the brain.

Certain individuals have a genetic variation that can change the binding attraction of this receptor and lead to worse response with antipsychotic medications.



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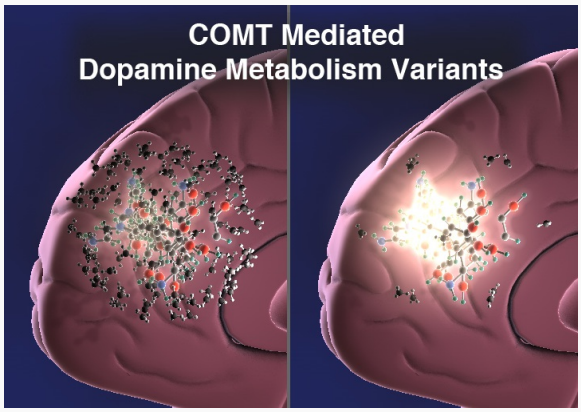
Catechol Methyl Transferase (COMT)

COMT is a protein molecule (or enzyme) responsible for breaking down dopamine and norepinephrine in parts of the brain. Dopamine and norepinephrine levels are critical for memory, attention, judgment and other “executive functions.”



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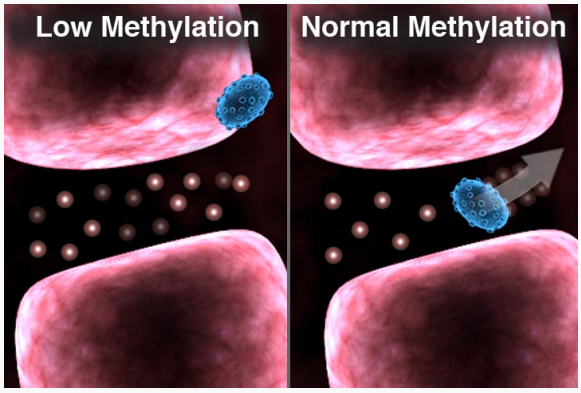
The activity of this enzyme is controlled in part by genetic factors. In certain individuals, COMT activity is higher than average, which can lead to increased dopamine breakdown and therefore lower levels of dopamine in the frontal lobe. This may have behavioral consequences, such as difficulty with memory and concentration, as well as experiencing symptoms of depression. Other individuals have higher levels of dopamine in their brain because the COMT enzyme doesn’t work as well and doesn’t break dopamine down quickly enough.

Methylenetetrahydrofolate reductase (MTHFR)

MTHFR is an enzyme that helps to convert folic acid to methylfolate, which the body uses to make brain chemicals like serotonin, norepinephrine and dopamine, and which ultimately helps to regulate DNA by turning certain genes on or off. Having changes in the DNA of the gene that makes MTHFR can lead to various behavior and cognitive problems.



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Metabolism (CYP2D6, CYP2C19 and CYP3A4)

CYP2D6, CYP2C19, CYP3A4 are enzymes found in the liver that work to break down a medication in order for the body to get rid of it. Changes in the genes coding for these enzymes can lead to faster or slower breakdown of

medications. Therefore, faster breakdown can lead to lower levels of a drug in the body than would be expected, and slower breakdown can lead to higher levels of drug in a body than would be expected.