Biomarkers: Clues to what's happening in your body

Biological markers, or biomarkers, are signals about your body's biology. They are useful to doctors and researchers because they can help:

- diagnose disease
- choose which treatment will work best
- determine if you are getting better.

Turn this card for examples of how biomarkers are being used within the Ontario Brain Institute's five Integrated Discovery Programs to advance our understanding of brain disorders.

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Putting clues together to detect disease

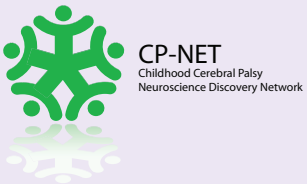
Researchers at the Ontario Neurodegenerative Disease Research Initiative (ONDRI) are looking at biomarkers across five neurodegenerative disorders. They are searching for early signs of the disorders. One candidate is the build-up of a protein called beta-amyloid in the eye lens. Beta-amyloid levels in the lens may hint to its build-up in the brain, which could be an early indicator of dementia. If this biomarker can be used to predict disease risk and detect early stages, treatment can begin earlier so that patients have the best outcomes.

Choosing the best treatment from the get-go

The Canadian Biomarker Integration Network in Depression (CAN-BIND) is working to discover biomarkers to predict treatment outcome in depression. Since each person experiencing depression is unique, a key issue is finding the right treatment for each individual. CAN-BIND aims to find biomarkers to guide treatment selection. Researchers are conducting a cross-Canada study of people being treated for depression. They are collecting biomarker data using blood tests, EEG and MRI scans, along with patient questionnaires. The ultimate goal is to improve quality of life by getting patients the right treatment the first time.

Using genetics to select treatment

Within the Province of Ontario Neurodevelopmental Disorders (POND) program, scientists are looking at shared risk genes across multiple neurodevelopmental disorders, including autism spectrum disorder and attention deficit hyperactivity disorder. One goal is that these shared risk genes will place patients into subgroups that suggest which treatment is most likely to work. If researchers also identify new risk genes, this can help them develop new treatments.



Understanding how a treatment works

The Childhood Cerebral Palsy Integrated Neuroscience Discovery Network (CP-NET) is working to develop new treatments for cerebral palsy (CP). People with CP often have challenges with controlling movement. Part of CP-NET's research looks at new technologies to help improve their lives, for example, seeing if robotics can help them walk. Researchers use brain scans like functional magnetic resonance imaging (fMRI) to look for changes in brain activation patterns after treatment. Brain imaging helps researchers find out how a treatment affects the brain. They hope to use specific brain activation patterns to help predict whether treatment is working for an individual.

Decoding inheritance to develop new treatments

The EpLink program aims to help people with epilepsy gain control over their seizures. Part of the research involves tracking the genetics of epilepsy in families. It is likely that many genes act together to increase the likelihood that a person will develop epilepsy. By sequencing the entire genome of a large number of people with epilepsy and looking at what gene variations are shared, scientists hope to find groups of genes that could act as biomarkers to predict the disorder and to identify new targets for epilepsy treatment.