
WATERLOO REGION SUICIDE PREVENTION COUNCIL

Suicide Information and Awareness is Important – You're Not Alone

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Waterloo Region Suicide Prevention Council

Unravelling the Influence of Genes on Suicide: The Case for a Genetic Predisposition

Karl Torbicki

Is there a biological basis for death by suicide? Can science answer why certain people complete suicide while others ideate or attempt? Dr. Gustavo Turecki, Director of the McGill Group for Suicide Studies, has focused his research on the neuroscience and genetics of suicide. An accomplished scientist, Dr. Turecki is a physician with a specialty in psychiatry and, as well, holds a PhD in neuroscience. He has published over 80 articles in scientific journals and has received numerous awards for his research. Dr. Turecki was the keynote speaker at the first Waterloo Region Suicide Prevention Council's Dimensions of Suicide Conference this past November.

Determined to unravel the influence of genes as a predisposing factor to death by suicide, Dr. Turecki's research team has used gene chip technology to examine gene expression in the brains of people who died by suicide. Gene expression refers to the particular way in which some genes are active and others repressed in a given cell at a given time. The results of their preliminary work were published in the American Journal of Medical Genetics on February 15, 2005 in an article titled "Molecular Characterization of Suicide by Microarray Analysis."

Researchers were able to identify 292 genes that were expressed differently in the brains of people who died by suicide compared to people who died of other causes. These 292 genes were pinpointed using a gene chip, a silicon wafer which has millions of DNA fragments anchored to its silicon surface. Each DNA fragment corresponds to a different part of the human genome and will bind and retain a specific target gene if it is present in the DNA being studied. Researchers can then scan the gene chip to see precisely which of the 20,000 different genes in the human genome are active inside the cells being studied.

Each cell in our brain contains the entire human genome, a huge DNA 'database' that contains all the information required for cell

activities. The DNA genome sits inside the nucleus of each cell, specially packaged and protected from damage. In order to get the instructions out of the nucleus, the cell reads the information in the DNA and transcribes a copy, creating a messenger molecule called messenger RNA (mRNA). For example, mRNA describes exactly how to manufacture the proteins that carry out cell functions: enzymes which perform chemical reactions for the cell, and transporter proteins which move substances into and out of the cell. Enzymes and transporters are critical for signalling between neurons. Enzymes produce neurotransmitters (serotonin, acetylcholine) and transporter proteins send them out of the cell where they stimulate nearby neurons by interacting with receptor proteins on their surfaces.

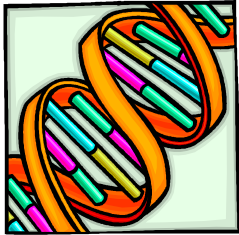
Thousands of mRNA instructions are present inside each cell and they are constantly being transcribed from the DNA and used to make proteins. There can be hundreds of copies of the same mRNA encoding the most

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important proteins that cells require in large quantity. The gene chips allow scientists to examine exactly which mRNAs are being produced in the brain cells of people who died by suicide compared to the ones produced in the brains of people who died of other causes.

mRNA samples were extracted from several sites in the post-mortem brain tissue of 6 suicide completers who had a major history of depression and 6 normal deceased individuals.



This provided a snapshot of the genetic activities inside brain cells right before death.

The researchers first looked at which genes were being expressed in all neurons, and confined their analysis to these 14,027 genes. Next, they compared the genes expressed in normal neurons to the genes expressed in the neurons of those who died by suicide. This comparison revealed 292 genes that were expressed differently in the brains of suicide victims compared to controls. Seventy three of these genes were expressed at a higher level and 218 were expressed at a lower level. An incredible task lies ahead in sorting out the role of the identified genes, but scientists did determine that some of the genes are involved in neurotransmission and neurotransmitter receptor activity particularly involving serotonin.

The gene chip experiments have big advantages compared to traditional research into the genetics of suicide, which used candidate-gene studies. Candidate-gene studies required that the

researchers guess which genes likely contributed to suicidal behaviour, often focusing on the genes involved in serotonin signalling. These studies examined genes one by one, but previous research by Dr. Turecki suggests that the interaction of many genes is responsible for a genetic predisposition to suicide. Gene chips examine all the genes being expressed at once, providing an overall picture of gene expression that would be impossible to discover by looking at individual genes one at a time.

Theoretically, diseases with a biological basis will have a particular pattern of gene expression in cells affected by the disease called a signature. The 292 genes that the McGill Group for Suicide Studies identified could represent such a signature, one which creates a predisposition to suicide. However, the exact purpose of these genes, their role within brain cells, their interactions and effects must all be explained before we can really answer the question of how genes contribute to death by suicide.

The research taking place at the McGill Group for Suicide Studies has the potential to change how we conceptualize suicide. In literature and the media, suicide is ascribed to just about every possible cause: it is shown as an act of passion, insanity, rebellion, sin, fear, escape, resignation and as a cult ritual. As more research is done into the genetic changes that accompany suicide, it is becoming increasingly clear that there is a significant biological basis for suicide. The 'silent epidemic' of deaths by suicide claims the lives of about 4,000 Canadians each year – more than the number of people who die

in vehicular fatalities. This is a huge medical challenge that requires much more attention, funding and preventative investment. Diseases that are traditionally considered to be biological, for instance cancer or an infection, are discussed much more openly and bear far less stigma than mental illness, which is associated with 87% of deaths by suicide. Perhaps by reconceptualizing suicide in terms of its biological pathology, it could be discussed more openly, allowing those at risk to more easily receive the medical intervention, treatment and attention they require and deserve.



Special thanks to Region of Waterloo Public Health for their support in the printing and distribution of this newsletter.

Canadian Mental Health Association – Waterloo Region: Mental Health Week

Linda Emch

Each May, the Canadian Mental Health Association (CMHA) provides unique opportunities for people to gather information, learn from one another, appreciate the talents among us, and to be entertained. This year, National Mental Health Week occurs from May 2nd –8th and your local CMHA has planned a variety of events around the theme of “**Living Life Connected ~ Mind, Body, Spirit.**”

Our overall goal during Mental Health Week is to promote the mental wellness of all members of our community and to increase

understanding about mental health. Our approach is from a health promotion perspective, believing in the value of activities that enhance the capacity of individuals and communities while eliminating stigma and prejudice. Our focus is on building awareness, strengths, resources, knowledge and skills for positive mental health.

The CMHA/Waterloo Region Branch invites the whole community to participate in the events of Mental Health Week. For information on how to get involved and what events are happening this year contact:

The Centre for Mental Health
Kitchener-Waterloo: (519)744-7645, Cambridge:(519)740-7782
Website: www.cmhawrb.on.ca



Mental Health Week 2005 Community Events Waterloo Region

Wellness Fair

Yoga~Nutrition~Reiki and More

Monday May 2, 2005

1:00 a.m. – 4:00 p.m.

Centre for Mental Health

9 Wellington St

Cambridge ON

Mind – Body – Spirit

Lunch hour relaxation

Wednesday May 4, 2005

11:30 a.m.-1:30 p.m.

Speakers & Experiences

6:30 p.m. – 9:00 p.m.

Centre for Mental Health

67 King St E

Kitchener, ON

Cambridge Celebrates the Arts

Displays by Local Artists

Thursday May 5, 2005

6:30 p.m. – 8:30 p.m.

Cambridge Centre for the Arts
For more information on any of these events call 1-866-448-1603 or visit our website at

www.cmhawrb.on.ca



Resources Available Through WRSPC

- ♦ Waterloo Region Suicide Prevention Council Brochure
- ♦ WHY?? Suicide Information Brochure
- ♦ WHY?? Youth Suicide Brochure
- ♦ Suicide Risk Assessment and Intervention for Caregivers Booklet
- ♦ Biannual Newsletter
- ♦ Suicide bookmark (while quantities last)



Waterloo Region Suicide Prevention Council Member List 2005

The following is a list of the volunteers that make up the 2005 council. We thank many of the agencies that provide the council with these wonderful volunteers.

Chairperson: *Kathy Payette* -
Lutherwood

Past Chair: *Pauline Potzold* -
Grand River Hospital

Vice Chair: *Dale Wombwell* -
The Salvation Army – Community and Family Services

Secretary: *Cathy McDonald-Reis* -
Waterloo Catholic District School Board

Treasurer: *Rose Kronschnabl* -
Victim Services Waterloo Regional Police Services

Sheryl Bergman-Wolfe -
Community; *Tom Connolly* -
Waterloo Region District School Board; *Nadine Cybulski* -
Waterloo Regional Police; *Lisa Cousineau* -
Community; *Mary Denomme* -
Region of Waterloo Public Health; *Cathy Du Preez-Kiss* -
Cambridge Memorial Hospital; *Linda Emch* -
Canadian Mental Health Association; *Debbie Emery* -
Community; *Marj Korte* -
Waterloo Region District School Board; *Lorie McMahon-Seremetkovski* -
Ministry of Community, Family and Children's Services; *Dena Moitoso* -
People Needing People; *Edward R Good*; *Karl Torbicki* -
Community; *Anne Tracy* -
Community Services.

If you have any questions of the council please contact us at (519) 744-7645 Ext. 310.

Traumatic Events Team

Tom Connolly

In December of 2004, the Waterloo Region District School Board engaged Tom Connolly as the Board's Traumatic Events Coordinator. Tom brings a wealth of experience to this position and currently in the process of organizing a team to respond to traumatic events that would have an impact on the students and staff in the Public school system.

One of the important initiatives that Tom has had a significant role in is the creation of the Suicide Prevention Committee. This Committee was developed in response to a parent of a student who died by suicide who approached the Waterloo Region District School Board in the spring of 2003. The questions that she

raised were, where in the curriculum is the issue of stress and the management of it addressed and what specific training do guidance counsellors receive in the area of suicide intervention. The Suicide Prevention Committee was formed to examine how the Board could be best able to respond to the needs of students in this important area. The Committee has representation from both local school boards, the Canadian Mental Health Association, Region of Waterloo Public Health, Waterloo Regional Police Services, People Needing People as well as parent representation.

Another current initiative uses a common training strategy for the secondary and elementary guidance counsellors in the Region. The training is based on the "Living Works" Applied Suicide Intervention Skills Training (ASIST) model and is offered by the Canadian Mental Health Association. A target date of June 2005 has been set for all counsellors to be trained in either a two day or modified one-day training sessions. Within the Board, other groups have since been approached to be trained, including social workers, police officers and public health nurses attached to the secondary schools, as well as some of the others in the region who support students.

The plan is to sustain this initiative by forming a "mental health" committee that has one member from each school involved. The proposed mandate of this group is to ensure that teachers in our region are aware of the many stress related issues that students face and to better recognize how and when to help and the supports that can be offered.



Upcoming Events

Connecting the World with Hope

August 17 – 21, 2005

The Westin Bayshore
Vancouver B.C.

World Gathering on Bereavement is unique in its commitment to bringing together the bereaved, bereavement support organizations, and the professionals who work with the bereaved to talk with each other, not at or about each other. Workshop topics include: Violent

Death/Trauma/ Homicide, Suicide/Mental Illness/ Developmental Disability, Multicultural Issues, Spirituality, Hospice/ Palliative Care/End of Life Issues, Care for the Caregiver, Children/Teens, HIV/AIDS, Art/Interactive Coping Strategies, Rituals, Related to the Type of Death (excluding murder/suicide), General Bereavement/Grief Process, Pet Loss/Animals, Relationship to the Deceased, Organ/Tissue Donation.

The *Compassionate Friends*, an international self-help group for bereaved parents will be holding their 4th International Gathering inside the larger gathering. Their workshops will specifically address the death of a child. Registration information is available online at www.worldgathering.org.

Canadian Association for Suicide Prevention (CASP) 2005 National Conference

October 16 – 18, 2005

Crowne Plaza Hotel
Ottawa ON

Presented by CASP in partnership with the Ottawa Suicide Prevention Coalition.

Canadian Association for Suicide Prevention (CASP) 2006 National Conference

Toronto ON

October 25 – 27, 2006

Be sure to mark the Second Annual Waterloo Region Suicide Prevention Council Conference on your calendar:

Dimensions of Suicide

Suicide Through the Life Cycle
Community Forum

Wednesday November 2, 2005
Conference

Thursday November 3, 2005

More information will follow.

St. Joseph Healthcare Hamilton presents "Creating Positive Change in Mental Health with Recovery"

Thursday May 5, 2005

8:30 a.m. – 3:30 p.m.

Liuna Station Banquet Hall
360 James St. N.

Hamilton ON

Cost: \$65.00

To register, contact Maureen Williams at (905) 522-1155 Ext. 6281 or

mwilliams@stjosham.on.ca

Waterloo Region Suicide Prevention Newsletter is published for the prevention of suicide through education, networking and resources.

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