

# Headlines

Summer 07

A newsletter for brain tumour patients and their families

## MEDICAL UPDATE

### Genetic factors associated with brain tumours

**P**EOPLE OFTEN ASK if brain tumours are hereditary, because we know that some types of cancer, such as breast and colorectal, may be. Hereditary tumours are those that are passed along in families. Tumours that originate in the brain, termed primary brain tumours, are rarely hereditary. This means that they are usually not passed from parents to children, and that even if your brother has one, your risk of getting one is about the same as for anyone else. However, all cancers, including brain tumours, are genetic diseases. Genes contain DNA, which carries all the information needed for every living cell to exist, perform its functions and reproduce. Normally, cell division is tightly controlled by a number of different genes. Two types are especially important: oncogenes turn cell division on, leading to the growth of tumours, including brain tumours; conversely, tumour suppressor genes function as brakes for the cell cycle, keeping cell division from getting out of control.

Our cells normally have other mechanisms to control the damage that naturally occurs within them over time. These mechanisms include apoptosis and DNA repair genes. Apoptosis is "programmed cell death," a kind of cell suicide. Abnormal cells have the ability

to sense when they are not capable of functioning normally and will shut themselves off permanently. Alternatively, specialized proteins called DNA repair genes may fix the damage that occurs in cells so that they are capable once again of reproducing without mutations.

Sometimes these normal mechanisms for faithful cell reproduction stop working properly. A damaged oncogene is like a car with the gas pedal turned on all the time, telling cells to divide continuously, without the normal restraints in place. Similarly, a damaged tumour suppressor gene no longer applies the brakes to cell division. Without the usual mechanisms for fixing damage and controlling cell division, mutant cells reproduce wildly and uncontrollably, and this leads to cancer.

**Brain tumour classification:** Most adult brain tumours are gliomas, so called because they arise from glial cells that support and nourish neurons, the primary cells of the brain. At present gliomas are classified and treated based on the way they appear under a microscope. The most commonly used characterization scheme for brain tumours is the one devised by the World Health Organization (WHO), which grades these tumours from 1 to 4, with 4 being the nastiest and most aggressive or malignant tumours. However, scientists

are learning that classification is not that simple, and that many brain tumours have special genetic features. Here are some of the things we now know:

1) Glioblastomas: If you asked 100 people to tell you something about dogs, most would tell you that dogs like to go for walks and fetch balls, and that they hate cats. All but a few would be surprised to learn that my dog, a spoiled old beagle, hates to walk, wouldn't dream of chasing a ball, and prefers to spend most of her time sleeping on the couch – curled up with her good friend, my cat. In the same way, if you asked 100 doctors about a brain tumour called glioblastoma multiforme, most would say that this tumour is so aggressive that it is virtually untreatable. However, it is now recognized that although all glioblastomas (WHO grade 4) look very much alike under the microscope, they actually behave differently. Analysis of the genetic characteristics of this very malignant brain tumour has led to the discovery that there are at least two different types of glioblastomas. One tends to occur more commonly in people over 50 years of age. This type is now called a primary glioblastoma. It may be distinguished from another type of tumour, called a secondary

*continued on page 2*

## Travel tips

**S**UMMER BRINGS THE SUN to Vancouver, making it a great place to stay put. And yet, many of us also think of traveling at this time of year. Traveling offers the opportunity to get away from it all, see new sights, connect with family and friends, and recharge our batteries. A brain tumour diagnosis need not stand in the way of travel plans, but there are a few things to consider before charting your travel course.

**Check with your doctor:** If you are feeling well and not on treatment requiring you to be at a hospital, you will likely be told that it is safe to travel. However, your doctor may want to check your blood counts and seizure medication levels to ensure that you are not particularly susceptible to infections, bleeding or seizures. This does not guarantee a trouble-free trip, but can help put your mind at ease.

**Cabin pressure and other risks:** There are usually no particular risks related to the pressurized airplane environment at high altitudes. It does not typically worsen pressure within the head. However, long flights do expose us all to the risk of blood clots. If you are traveling for more than 2 hours, plan to drink lots of fluids and get up and stretch your legs every few hours.

**Travel destinations:** Plan to travel to a location where emergency medical services are available should you require

them. Remote areas and developing countries may not have the people and facilities to help you should you become ill or develop seizures or infection. And consider how you would handle such a situation if you are in a country in which you do not speak the native language. Also, be aware that some countries have specific requirements or recommendations about vaccinations and preventative medicines before you travel there. Check with your brain tumour care team before considering travel to these locations. Your family doctor may be able to advise you further, or see the following link:

<http://www.who.int/ith/en/>

**Emergency health insurance:** Within Canada, your Medical Services Plan will cover any emergency medical care, although some provinces will require you to pay up front and wait to be reimbursed. In the U.S. and other countries, coverage for problems related to a “pre-existing medical condition” such as a brain tumour varies and is restricted. You should check with MSP and your extended health insurance benefits to see what sort of additional coverage is provided, if any. Your travel agent may also be able to recommend a source of additional travel insurance. See this website for more information about MSP coverage:

<http://www.healthservices.gov.bc.ca/msp/infoben/leavingbc.html#outsidebc>



**Medications:** Stock up on your medications, especially seizures medications (Dilantin®, Tegretol®, valproic acid, Keppra®, Lamictal®, etc.) and steroid medications (dexamethasone or Decadron®). These medications should NEVER be stopped abruptly – and it can be tricky getting refills in a foreign country! Keep your medications with you, rather than in your checked luggage, and carry them in their original containers, with the pharmacy’s label attached.

If you travel to a different time zone and need to adjust the times you take your medicines, it’s safe to move medication times forward (or backward) by 2 hours a day until the times are more convenient.

**Medical letter:** It may be helpful to have a letter stating your diagnosis, medications and medication allergies, and whether you are prone to seizures, as well as a contact name and phone number at your treating cancer agency, just in case a doctor in a foreign city needs to contact your health care team in B.C.

If you have other questions or concerns, please contact a member of your health care team.

### Genetic factors

*continued from page 1*

glioblastoma, by specific genetic features. Primary glioblastomas demonstrate overexpression (or overactivity) of an oncogene called epidermal growth factor (EGF). Remember that oncogenes are like cars with the gas pedal turned on, pumping out new cells without correcting mutations. In contrast, the development of secondary glioblastomas appears to be related especially to the mutation of

a tumour suppressor gene called tumor protein 53, or p53. Remember that these genes act like brakes on a car to prevent it from running out of control. P53 is very important in maintaining successful cell reproduction and can also activate **DNA repair genes** when necessary. Mutations leading to the loss of p53 function are responsible for a wide variety of cancers. A host of other distinct genetic mutations are involved in the development of primary and secondary glioblastomas.

2) Oligodendrogliomas have been

the center of a great deal of research in the last decade, with much of it concentrated on understanding the genetic characteristics of these tumours. Once considered a rare tumour, pathologists confirm that many gliomas have “oligodendroglial features” when studied under a microscope. P53 mutations are not very common in oligodendrogliomas. Instead, the loss of some genetic material on two specific chromosomes, 1 and 19, is fairly common in oligodendrogliomas.

*continued on page 4*

## RESOURCE GUIDE

By Diana Hall, BC Cancer Agency Librarian. To borrow any of these books, please contact the BCCA Library/Cancer Information Centre ([www.bccancer.bc.ca/Library](http://www.bccancer.bc.ca/Library)) at 604.675.8001 or toll free 1.888.675.8001, local 8001 or check with your Public Library.

### About brain tumours

*100 Questions and answers about brain tumors.* Virginia Stark-Vance & Mary Louise Dubay; Boston, MA. Jones and Bartlett Publishers, 2004.

*Brain tumour patient resource handbook: Adult version.* 5th ed. Brain Tumour Foundation of Canada, London, ON: Brain Tumour Foundation of Canada, 2005.

### About cancer in general

*100 Questions and answers about caring for family or friends with cancer.* 1st ed. Susannah Rose & Richard Hara. Sudbury, MA. Jones & Bartlett Publishers, 2005.

*After cancer: a guide to your new life.* Wendy Schlessel Harpham. New York, NY. Harper Perennial, 1995.

*Cancer is a word, not a sentence: A practical guide to help you through the first few weeks.* Robert Buckman. Toronto, ON. Key Porter Books, 2006

*Dancing in limbo: Making sense of life after cancer.* Glenna Halvorson-Boyd & Lisa K.Hunter. San Francisco, CA. Jossey-Bass Publishers, 1995.

*Everyone's guide to cancer supportive care: A comprehensive handbook for patients and their families.* Revised and updated. Ernest H Rosenbaum & Isadora Rosenbaum. Kansas City, MO. Andrews McMeel Publishing, 2005.

*Everyone's guide to cancer therapy: How cancer is diagnosed, treated, and managed day to day.* 4th ed. Malin Dollinger, Ernest H Rosenbaum, Margaret Tempero, Sean J Mulvihill. Kansas City, MO. Andrews McMeel Publishing, 2002.

*From this moment on: A guide for those recently diagnosed with cancer.* Arlene Cotter. New York, NY. Random House, 1999.

*Picking up the pieces: Moving forward after surviving cancer.* Sherri Magee, Kathy Scalzo. Vancouver, BC. Raincoast Books, 2006.

*Surviving disability: a positive approach to change and recovery: A self-help workbook for employees on disability and their families to assist with maintaining self esteem while coping with change.* Key Concepts Consulting; Cheryl Rosell. Toronto, ON. Key Concepts Consulting, 2002.

*What you really need to know about cancer: A comprehensive guide for patients and their families.* 2nd ed. Robert Buckman. Toronto, ON. Key Porter Books, 2006.

### Motivation and inspiration

*It's not about the bike: My journey back to life.* Lance Armstrong & Sally Jenkins. New York, NY. G.P. Putnam & Sons, 2000.

*Learning to fall: The blessings of an imperfect life.* Philip Simmons. Bantam Dell Publishing, New York, NY. 2000.

### Websites with brain tumour information

[www.btfc.org](http://www.btfc.org) The Brain Tumour Foundation of Canada: Canadian website

for the national foundation (located in London, Ontario) which provides support and education for patients and families and funds research.

[www.tbts.org](http://www.tbts.org) The Brain Tumor Society: information and support for patients and families

[www.braintumor.org](http://www.braintumor.org) The National Brain Tumor Foundation: support, information, survivor network, links to other sites

[www.abta.org](http://www.abta.org) The American Brain Tumor Association: award-winning website for patients and families

[www.clinicaltrials.gov](http://www.clinicaltrials.gov) Clinical trials in North America: sponsored by the National Institutes of Health and frequently updated

<http://www.cancer.gov/cancertopics/types/brain/> The National Cancer Institute's website

[www.bccancer.bc.ca](http://www.bccancer.bc.ca) BC Cancer Agency homepage includes library, cancer information, other links

[www.naturaldatabase.com](http://www.naturaldatabase.com) Natural medicines comprehensive database provides information about complementary and alternative herbal therapies

[www.discern.org.uk](http://www.discern.org.uk) Designed to provide health care consumers with a useful tool for assessing health information on the internet

<http://www.quackwatch.org/> Panel of medical advisors provides assistance in distinguishing between proven and unproven therapies

<http://medlineplus.gov/> Online medical encyclopedia, dictionary, drug information, links to other health sites

Editions of *Headlines* are also available as a pdf download at:

[www.bccancer.bc.ca/HPI/CancerManagementGuidelines/NeuroOncology/PatientResources.htm](http://www.bccancer.bc.ca/HPI/CancerManagementGuidelines/NeuroOncology/PatientResources.htm)

If you would like to submit an article, ask a question, or serve on our patient and family advisory board, please contact Rosemary Cashman at [rcashman@bccancer.bc.ca](mailto:rcashman@bccancer.bc.ca) or 604.877.6072 (phone) 604.877.6215 (fax).

All content by Rosemary Cashman unless otherwise specified.

**Q** My husband has just been diagnosed with a cancerous brain tumour and we are devastated. He has always been in perfect health, despite being a workaholic! What can you suggest to help us come to grips with this beast and all the changes we see ahead for us? He is starting radiation and chemotherapy in the next weeks. He is only 45 years old, I'm 40 and we have a 3 year old.

**A** The initial period following a malignant brain tumour diagnosis is universally an overwhelming emotional time for patients, their caregivers, family and friends. The nature of the diagnosis makes it especially challenging.

**1. Feel.** Express your feelings; know they are intense. This is especially important in the early stages of your journey as the emotions can feel almost unmanageable. Talk, write, cry, yell... do whatever works for you to identify with how you are feeling and move the emotions from inside of you to the outside, in a way that is safe for you and those around you. Often the feelings surrounding your diagnosis lead to exploring other areas of your life that haven't been addressed. Remember, it does get better as you settle in to your new world.

**2. Perspective.** I was talking to a patient recently who had been on his cancer journey for five years. He reminded me that the goal in life isn't to live to be 80

years old, but rather it is to live a good life in a way that has meaning for you. He has lived a very rich life during these five years.

**3. Hope.** Allow yourselves to remain hopeful. Worrying constantly about negative outcomes will likely lead to self pity and depression. Hope is an essential ingredient to joy – allow yourselves to have that. The future has not been written yet. This is not as easy as it sounds and there are many techniques to “re-train” your mind to focus on positive outcomes. Your spiritual beliefs may play a strong role in this. Also, the staff at the BC Cancer Agency can lead you to resources to help in this area. From my personal experience, starting my day off with positive visualization exercises is very powerful.

**4. Adapt.** Often patients have to “reinvent themselves.” Relationships may need to be adaptable too! For patients, be the best patient you can be for the sake of your family. Be sure to laugh – it has healing powers for you and those around you. Caregivers, family, friends, and support groups all form a network of support to make your journey easier, richer and more loving. Remember that accepting loving deeds is as important as giving them!

**5. Grow.** Imagine, in a few years from now, your husband doing well despite a bleak diagnosis. Your relationship is as strong as ever. Each of you had a part of that successful journey. Think of the person each of you was as you look back on the time, proud of each other. Who were you during that time? Be that person, everyday. Live your lives, fully, today.

**6. Support.** Life's journey is best travelled in the company of those you love – family and friends. One patient's counsellor shared these words with her, “Today is the only day we all have, not only you. Whether one currently carries a diagnosis or not, we are still in peril. The sand in the hourglass slips through for us all, daily. I am not endeavoring here to minimize your tragedy. I am asking that you let the rest of us be included, to take the whole living world into your troubled heart to keep you company.” Support groups can be a great source of knowledge, support and inspiration. The bottom line is that you're not alone in your journey.

More than ever, it is so important to stay engaged in living your lives – take it one day at a time.

*by Terry, fellow brain tumour patient*

## Question + answer



### **Genetic factors**

*continued from page 2*

When this genetic material is missing in oligodendroglial tumours, patients tend to be more sensitive to chemotherapy and radiation therapy. For that reason, we now perform special genetic tests (called 1p/19q testing) on tumour and blood samples from patients with oligodendroglial-type tumours. The results of these tests help oncologists to decide which treatments to use for a person with these kinds of brain tumours.

DNA repair genes: Scientists have identified over 130 human DNA repair genes to date. When these genes do not

work properly, mutations accumulate and are not corrected, leading to cancer. For example, when the DNA repair gene methylguanine methyltransferase (MGMT) does not work properly, people may develop certain kinds of aggressive lung cancer. Conversely, efficient DNA repair is also an important mechanism by which cancer cells become resistant to treatment. Chemotherapy and radiation work by damaging the tumour's DNA, so that the tumour can no longer reproduce tumour cells. Recent studies show that when MGMT in glioblastoma cells is inactivated or “silenced,” patients live longer and have a better response to chemotherapy treatment.

Our evolving understanding of glioma biology allows us to distinguish one tumour from another. At present, 1p/19q testing for oligodendrogliomas is in use at many brain tumour centres, including the BC Cancer Agency. Genetic testing for glioblastomas and for the DNA repair gene, MGMT, is quite new and not widely available. Over the next years, there will be more diagnostic tests to provide refined characterization of individual brain tumours. And as we are better able to identify precise tumour features and the pathways involved in creating these tumours, we will also have the ability to design better therapies aimed at specific targets.