**Immune Cells Determine How Fast Certain Tumors Grow**

Tumors arise when cells shake off their restraints and start to multiply out of control. But how fast a tumor grows does not depend solely on how quickly the cancer cells can divide, a new study has found.

By examining brain tumors in mice, researchers at Washington University School of Medicine in St. Louis discovered that immune cells that should be defending the body against disease sometimes can be enticed into providing aid and comfort to tumor cells instead. The more immune cells a tumor can recruit to its side, the faster the tumor grows, the researchers found.

The findings, published May 29 in the journal *Neuro-Oncology*, suggest that targeting immune system cells could potentially slow brain tumor growth in people with the genetic condition Neurofibromatosis type 1 (NF1).

While people with NF1 usually come to medical attention for birthmarks on their skin, they are also at increased risk of developing tumors. One of the most common of these tumors in children is a low-grade brain tumor called an optic glioma, which affects the optic nerve that connects the brain and the eye. Some of these tumors can cause vision loss.

Unfortunately, NF1 is a notoriously variable disease. Doctors can’t predict what kinds of tumors a person will develop, how fast these tumors will grow, or what types of medical problems the tumors will cause – all of which make it difficult for doctors to decide when a tumor needs to be treated with chemotherapy and when it is safe to simply watch and wait.

To better understand why some tumors grow faster than others, first author Xiaofan Guo, MD, a graduate student in Dr. David H. Gutmann’s research laboratory, created five mouse strains with different genetic changes in the NF1 gene and elsewhere in the mouse’s genome.

The five strains varied widely in tumor development and growth. Mice belonging to three of the strains grew tumors starting at about 3 months of age, with the tumors in one strain of mice growing particularly fast. Members of the fourth strain didn’t grow tumors until they were about 6 months old, and only a quarter of mice in the fifth strain developed brain tumors on the optic nerve at all.

When the researchers isolated tumor cells from the mice and grew them in a dish, they found little difference in tumor cell growth. The growth rates and other properties of the cancer cells were very similar, no matter which mutation the tumor cells carried.

What did correlate with overall tumor proliferation in mice was the presence of two kinds of immune cells – microglia and T cells – within the tumors. Guo and former postdoctoral research fellow Yuan Pan, PhD, discovered that the tumor cells themselves were releasing proteins that attracted immune cells to the tumor.

The researchers now are trying to take advantage of this relationship between tumor cells and immune system cells to find new ways to treat brain tumors in people with NF1. One strategy is to slow tumor growth by preventing microglia or T cells from providing support to the cancer cells. However, a more ambitious strategy is to reprogram the T cells to no longer aid tumor cell growth.

“The idea is to use T cells as Trojan horses,” Gutmann said. “These are experiments currently ongoing: We’re trying to change the T cells so that when they enter the brain, instead of promoting the tumor, they shut it down.”

*Written by Tamara Bhandari · Washington University News Hub
Dr. Guo’s study was spotlighted with a commissioned editorial by Dr. Michelle Monje in the journal *Neuro-Oncology*, as well as featured in the *Drug Target Review*, the American Association for the Advancement of Science *EurekaAlert*, and *Neurology Today*. 
PATIENT ENGAGEMENT

Every May and June, Peggy Dohlke rallies her family and friends to participate in a fundraiser supported by her employer, The Louvre Salon, in Fairview Heights. Friends, family, and the Louvre staff and clients, all offer generous donations to support NF and the Washington University NF Center. Peggy and her team raise money through raffle baskets, employees paying to wear jeans on weekend work days, product donations, and gift certificates.

The Washington University NF Center would like to thank the Dohlke Family for their generous support.

On November 27, 2019, Brian and Amanda Walk and their daughters, Jordan and Bella, visited the Washington University NF Center to celebrate another successful fuNFest event.

FuNFest is a family-friendly festival designed to create awareness about NF and to raise funds for NF research. The event includes games, obstacle course, music, a live auction, and silent auction bidding.

This year’s fuNFest raised a remarkable $24,894.53, which will fund Gutmann Laboratory research initiatives aimed at developing personalized medicine approaches for people affected by NF. The Washington University NF Center extends its heartfelt gratitude to Amanda and Brian Walk, who worked tirelessly to plan this event.

Recently, the Forward Strides 4NF committee visited the Washington University NF Center to present a $20,000 check. It was the largest yearly fundraising total since their inception.

Forward Strides 4NF is a charity that was started in 2016 by Gina Wilburn to honor her daughter and husband, who both have Neurofibromatosis (NF1). This year, the committee celebrated their 5th anniversary with a Superhero theme, and hosted over 200 registered walkers, with more than 30 volunteers. Entertainment at the event included an obstacle course slide, music, food and beverages donated from local restaurants, as well as superhero mascots to cheer participants at the finish line. Additionally, both a raffle and silent auction, which included many amazing items, has proven to be a huge attraction every year.
NF CENTER WELCOMES NEW FACULTY MEMBER

The NF Clinical Care Program at St. Louis Children’s Hospital welcome Dr. Amy Armstrong to the Division of Pediatric Hematology and Oncology, where she will spearhead our NF1 clinical trials for plexiform neurofibromas. Dr. Armstrong received her medical degree from Virginia Commonwealth University. Following internship and residency in Pediatrics, she completed a fellowship in Pediatric Hematology and Oncology at the Ann & Robert H. Lurie Children’s Hospital of Chicago. In 2018, she was recruited to Riley Children’s Hospital as an Instructor in the Division of Pediatric Hematology/Oncology, where she began her work on NF1-related tumors. Dr. Armstrong brings expertise in developmental therapeutics and NF1 clinical trials.

GUTMANN GIVEN PRESTIGIOUS NEURO-ONCOLOGY AWARD

David H. Gutmann, MD, PhD, the Donald O. Schnuck Family Professor and Vice Chair for Research Affairs in the Department of Neurology at Washington University School of Medicine in St. Louis, has received the Abhijit Guha Award from the Society for Neuro-Oncology and the Section on Tumors of the American Association of Neurological Surgeons/Congress of Neurological Surgeons.

The award honors an accomplished investigator who has achieved significant results both in the laboratory and in the clinic, and who has played an active role in mentoring the next generation of neuro-oncology professionals.

For more than 25 years, Gutmann has dedicated his academic career to genetic causes of childhood brain tumors, specifically the neurofibromatosis (NF) cancer predisposition syndromes, a set of complex genetic disorders that cause tumors to grow on nerves in the brain and throughout the body. He established a clinical program for NF at St. Louis Children's Hospital in 1994 and the Washington University NF Center in 2004. His work on NF has broad implications to neuro-oncology, ranging from defining the cells of origin for these cancers to elucidating the role of immune cells in tumor formation and growth, and in vision loss linked to brain tumors. In addition, Gutmann and his colleagues have leveraged both human stem cells and genetically engineered mice to define the factors that underlie disease risk, with a goal of improving precision medicine for this variable disease.

– Written by Tamara Bhandari, Senior Medical Science Writer, original article published on October 1, 2019, in the Washington University School of Medicine, News Hub.

NEW STUDY DEMONSTRATES UNIQUE PRESENTATION OF NF2 IN YOUNG CHILDREN

Young adults with neurofibromatosis type 2 (NF2) typically come to medical attention when they develop hearing and balance problems, leading to the discovery of bilateral vestibular schwannomas (BVS). However, school-age children frequently do not present with BVS.

In order to identify the earliest signs of NF2 in these young children, Cristina Gaudioso, MD, a pediatric neurology resident at Washington University, spearheaded a four institution study involving NF2 experts at Children's Hospital of Philadelphia, Stanford University, Lurie Children’s Hospital, and St. Louis Children's Hospital.

Dr. Gaudioso found that children younger ten years of age who later get diagnosed with NF2 more frequently exhibit other clinical problems, including eye abnormalities. This report represented the largest series of its kind, and highlighted the need to recognize other features of this condition in order to promptly identify children with NF2 for proper management and treatment.

This study was featured in the Neurology Advisor.
COURTNEY’S CORNER: LEARNING TO RIDE A BIKE

Learning to ride a bike can be challenging for any child, but it might be especially frustrating for children with NF1. Children with NF1 tend to experience developmental delays in some of the key skills necessary for riding a bike, such as balance and coordination. While this can make learning to ride a bike difficult, it also makes it all the more important! Not only is riding a bike great exercise, but it also teaches balance and coordination. The more your child practices these skills, the more capable he or she will become in activities that require balance and coordination.

Here are some steps to make learning to ride a bike stress free and fun:

1. Start your child on a tricycle. The skills necessary to ride a trike should emerge between the ages of three and four. If you start your child out young, it will make it easier to learn bike skills in the future.

2. Once your child outgrows the trike, try a low to the ground bike. Most children will feel more comfortable if they can easily reach the ground.

3. Once your child feels ready, focus on teaching him or her how to balance rather than how to move (pedaling). Balance is the primary issue, and pedaling will come with time. To teach balance, skip training wheels and bike down a hill (not too steep!). When your child does both these things, he or she will more readily understand what it feels like to balance on a bike.

If you follow these steps, learning to ride a bike should be a positive experience, but remember, the key may be lots of practice! If your child does not master bike riding on the first attempt, do not give up. Completing multiple short sessions several days in a row may reduce expectations and keep to process fun and stress free for you and your child.

- Courtney Dunn, PT, DPT

UPCOMING EVENTS

BEAT NF - SPRING 2020  -  MARCH 24 - APRIL 21, 2020
TEEN NF - GIVES BACK - MARCH 28, 2020
CLUB NF - XPERIENCE GAMING - APRIL 11, 2020

For more details please visit our events website at: https://nfcenter.wustl.edu/events/