

Innovations in Neurology & Neurosurgery



*Rady Children's - A comprehensive system
focused solely on children.*

PEOPLE

Dr. Michael Levy: Surgeon, inventor, humanist



Michael Levy, M.D., Ph.D., F.A.C.S., is chief of pediatric neurosurgery at Rady Children's Hospital-San Diego and UC San Diego School of Medicine and clinical professor of surgery at UC San Diego.

Dr. Levy specializes in treating complex pediatric brain tumors and cerebrovascular malformations. He has evaluated the longevity and outcomes in children with brain tumors and how certain variables and treatments affect survival. He has also assessed survival and outcomes prediction models, including those for surgical management in pediatric and adolescent head trauma, and community-based efforts at prevention and communication.

His research includes the relationship of cerebral blood flow to cardiac output in patients with aneurysmally induced subarachnoid hemorrhage and vasospasm. Such research has led to methodologies by which patients are universally treated

with both hyperdynamic protocols and the use of inotropes. He is widely published, with more than 200 papers appearing in peer-reviewed literature, seven books and more than 60 book chapters.

Dr. Levy is actively involved with the design and utilization of endoscopy and three-dimensional imaging technologies to facilitate surgery. He has developed a number of novel intervention techniques for children and adults using modified endoscopes for catheter placement within the ventricular system of the brain. Additionally, he has developed picture-in-picture image graphics for the operating microscope and the use of head-mounted display systems for both endoscopic and microscopic neurosurgical procedures.

When not working at Rady Children's, Dr. Levy travels abroad to perform brain surgeries for underserved children (see "Programs" story below).



PROGRAMS

International outreach program brings surgery to the underserved

[Michael Levy, M.D., Ph.D., F.A.C.S.](#), travels to underserved areas around the world to treat children as part of the International Neurosurgical Children's Association (INCA). He directs the nonprofit along with Dr. Rahul Jandial, one of his former residents and INCA's founder.



For the past 15 years, the organization has been deploying its team of neurosurgeons to poor countries in Central America, South America, Eastern Europe and Africa. The surgeons typically go for one-week visits to establish relationships with neurosurgical programs serving pediatric patients. Along with providing equipment, they work with the host surgeons to perform complex brain surgeries and educate them on modern technologies and techniques.

For many years, Drs. Levy and Jandial have traveled to hospitals in Managua, Nicaragua, and Lima, Peru. One of the Peru trips was featured on ABC's "Nightline." In the past year, they have made two trips to Lima, one to Panama City and one to Managua.

In other international outreach projects, Dr. Levy, through a local catholic church, has been working in Uganda to help build a surgical center at Holy Innocents Children's Hospital. He has also traveled to Samoa to consult on concussions in athletes, brought surgical technologies to Kiev, Ukraine, provided emergency care in Nepal following the 2015 earthquake and established a mentorship program with physicians in Chile.



innovation
belongs in every moment





RESEARCH

Genomic profiling of brain tumors improves diagnostic accuracy

Through a [Neuro-Oncology Research fund](#) at the [Rady Children's Institute for Genomic Medicine](#), [John Crawford, M.D., M.S.](#), and [Jennifer Elster, M.D.](#), are performing genomic profiling for patients with rare diagnoses, diagnoses for which there is not a standard of care and recurrent tumors.

About 20 patients have had genomic profiling to date. Some were diagnosed with medulloblastomas, including infants, and some had high-grade gliomas. Two patients recently benefited from the testing.



One patient, who was the first to have genomic profiling conducted through the genomics institute, had a diagnosis of a metastatic pineoblastoma and lesions on her brain and spine. The tumor was not responding to therapy. A re-resection was done, enabling the tumor to be sequenced. The findings revealed that the patient had a different tumor: a high-grade glioblastoma. The treatment was changed to a less toxic chemotherapy regimen, which improved the patient's quality of life.

The second patient, who is now in treatment, was diagnosed with an ependymoma. She had multiple re-resections, radiation treatments and chemotherapy regimens, but the tumor grew. The re-resections also caused neurological complications. A biopsy was taken and extensive genomic sequencing was performed to help further classify this recurrent tumor.

Based on the results, which showed an overexpression in a growth pathway, Drs. Crawford and Elster decided to try a drug used in adults. They started with a low dose, which the patient is tolerating; she has no symptoms of neurological complications. A scan will soon be done to check the size of the tumor. No growth, the doctors say, would be a good response.

The Neuro-Oncology genomics program and its multidisciplinary molecular tumor board will pave the way for individualized therapy for all children diagnosed with brain cancer.

Quick Links

[About Us - Neurology](#)

[About Us - Neurosurgery](#)

[About Rady Children's](#)

[Questions & Comments](#)

[Past Issues](#)

