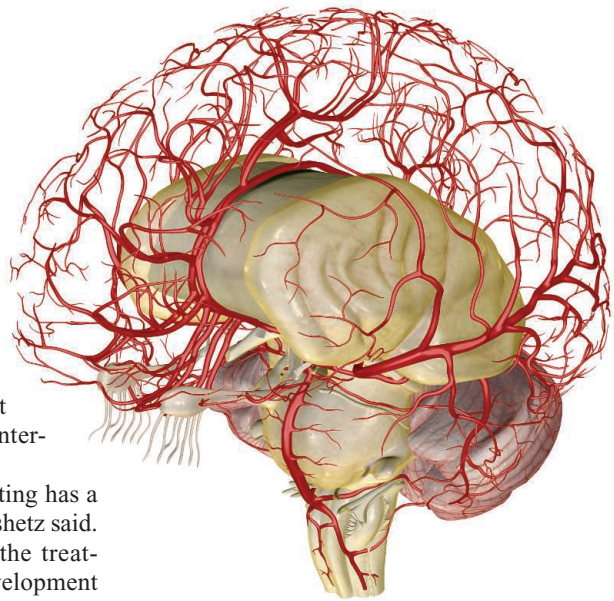
MEDICAL RESEARCH

Research Offers Hope for More Effective Stroke Treatments



Many of the statistics about stroke are troubling. The disorder is the third leading cause of death in the world. And, because stroke risk rises sharply after age 60, countries with large "boomer" populations, such as the United States, are on course for a substantial increase in stroke prevalence in upcoming decades.

There are two bright spots on the horizon, however, which Walter Koroshetz, deputy director of the National Institute of Neurological Disorders and Stroke, explained at a 22 May Capitol Hill briefing hosted by AAAS in conjunction with Representative Chaka Fattah (D–PA) and with support from the Dana Foundation.

For one thing, up to 70% of strokes are preventable by fairly simple measures, such as blood pressure control, improved diet, and exercise.

"The data for stroke show that if we really got our act together, we could make a huge difference because the science tells us that one's annual stroke risk decreases dramatically as known risk factors are controlled," Koroshetz said. "If we achieve optimal weight control, physical exercise, blood pressure, and diet earlier in life, then the health benefits to individuals, their families, and to the country as a whole would be enormous."

A central understanding in this research field is that when one part of the brain dies in a stroke, another part of the brain can "learn" to take over its function. Much of what scientists are learning about this dynamic rewiring of the brain comes from studying brain development in childhood, when connections between brain cells are being formed, strengthened, or pruned at an astounding rate as the child interacts with the environment.

"The stimulus the brain is getting has a lot to do with the rewiring," Koroshetz said. That same principle applies in the treatment of stroke, where neural development patterns that have been suppressed since childhood can start working again and be enhanced and molded by intensive rehabilitation therapy. He noted an Emory University-led study with stroke patients who had a disabled arm. With their good arms immobilized, the patients gained dexterity in the affected arm, including some who started the treatment regime as long as 21 months after their strokes.

As scientists learn more about these intrinsic repair processes, they are finding more potential targets for drug therapies. But most relevant for patients right now, Koroshetz said, are the efforts to improve standard rehabilitation care. He noted a clinical trial of stroke patients from five hospitals in Florida and California, which showed that intensive rehabilitation, either with in-home exercises or on a treadmill, led to improved walking ability as compared to "standard of care" rehabilitation. Even 6 months after their strokes, patients who had received only the standard of care could still make substantial improvements in walking by undergoing intensive treadmill training.

"This tells us that our standard of physical and rehabilitation therapy after a stroke is not optimal," said Koroshetz. Patients often can benefit from more intensive therapy regimes, he said.

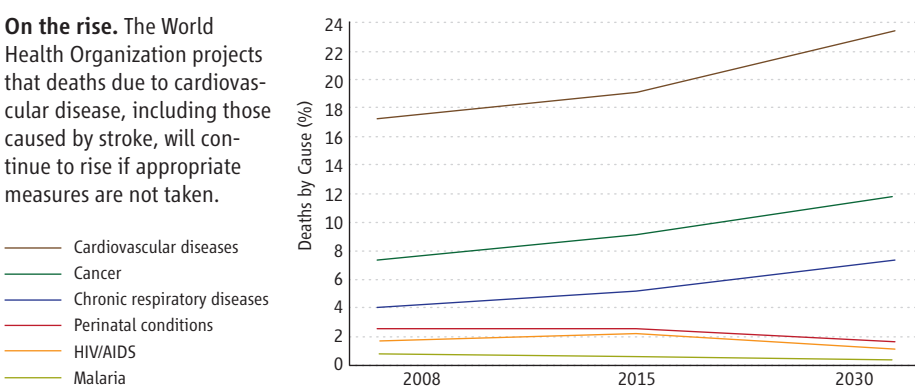
New technologies also offer promise. Koroshetz noted work with brain-machine interfaces using implanted electrodes that can record neuronal signals in the motor cortex of the brain. In a study reported last year, a woman paralyzed by a stroke learned to use her thoughts to generate neuronal signals to steer a robot arm to grab a bottle of coffee and lift it to her lips.

Other researchers have developed "therapeutic exoskeletons," motor-powered mechanical braces that do much of the work of walking or lifting. The devices can help patients carry out the intensive activity they need to perhaps trigger some of the brain's intrinsic repair mechanisms.

New recording technologies, such as optical probes that can detect tiny flashes of light by thousands of firing nerve cells, offer new possibilities for listening in on the electrochemical "language of the brain," Koroshetz said. The BRAIN Initiative (Brain Research through Advancing Innovative Neurotechnologies), announced recently by President Barack Obama, should greatly expand the amount of information scientists can glean from these new technologies.

–Earl Lane and Kathy Wren

On the rise. The World Health Organization projects that deaths due to cardiovascular disease, including those caused by stroke, will continue to rise if appropriate measures are not taken.



CREDIT: A GLOBAL BRIEF ON HYPERTENSION, WORLD HEALTH ORGANIZATION; MEDICALRF/SCIENCE SOURCE

SCIENCE DIPLOMACY

President of Poland Honors Long-Time AAAS Diplomat

In March 1967, Norman P. Neureiter arrived in Poland with his wife Georgine and their two young boys to serve as the first science attaché at the U.S. Embassy in Warsaw. During the next 2 years, Neureiter would develop many cooperative research projects bringing U.S. and Polish scientists together during some of the darkest days of the Cold War.

In recognition of this work and his subsequent support of Polish-American research, Neureiter, now a senior advisor to the AAAS Center for Science Diplomacy and director of the Center for Science, Technology and Security Policy, was on 6 June awarded the Officers Cross of the Order of Polonia Restituta (Polish Merit, one of the highest Polish State decorations) by the president of the Republic of Poland, Bronisław Komorowski.

By 1968, the student unrest in Western countries had spread in dramatic form to Poland and other parts of Eastern Europe. At the theater, Neureiter heard the audience cheer in response to anti-Russian sentiments in a play by beloved Polish poet Adam Mickiewicz. And, in Krakow, he watched as demonstrators were driven away by militias with red arm bands, leaving yellow flowers as a symbol of protest. In Czechoslovakia, where Neureiter was also assigned, he saw the start of the "Prague Spring" and its end with the Soviet invasion.

In the sciences, however, the prospects for progress were more auspicious. Neureiter broadened cooperation already beginning in agriculture, medicine, and health care and developed new areas, such as environmental protection and clean coal. After returning to the United States, he served as a U.S. Commissioner of the Maria Sklodowska-Curie Joint Fund II, which supported Polish-American research collaboration.

More recently, Neureiter helped to initiate a new awards program, announced last month, to be jointly administered by AAAS and the Foundation for Polish Science, recognizing scientists who have advanced science through U.S.-Polish cooperation.

Neureiter received the Officers Cross of the Order of Polish Merit during a ceremony at the historic Belvedere Presidential Palace in Warsaw. In his remarks, Neureiter stressed the value of science diplomacy in building and strengthening ties between nations, even in the face of severe strains in official relationships.

Committed to cooperation. Norman Neureiter (**right**) receives one of the highest Polish state decorations from the president of the Republic of Poland, Bronisław Komorowski.

"I think your security people thought I was a spy determined to discover your scientific secrets," he said. "But, in truth, my mission was just the opposite. It was to build friendly, cooperative relationships with the Polish science community and to foster cooperative projects wherever funding possibilities and joint scientific interests existed."

"In those days, we did not have a special name for these activities; we just called them science cooperation. But, in fact, those projects were examples of what today we call science diplomacy: the use of science cooperation as a way of improving relations between countries."

A research chemist in his early career, Neureiter entered the U.S. Foreign Service in the 1960s. Later, he served in President Richard Nixon's Office of Science and Technology, where he helped to develop the scientific elements of historic agreements with the Soviet Union and China. He then spent more than 20 years with Texas Instruments, and in 2000, he was named science advisor to U.S. Secretary of State Madeleine Albright. He remained in that post under Albright's successor, Colin Powell, and he joined AAAS in 2004.

Since that time, Neureiter has been a part of AAAS science-diplomacy delegations to Iran, Cuba, Syria, Myanmar, North Korea, and other countries. In 2008, Neureiter received the National Academy of Sciences Public Welfare Medal in recognition of his efforts as a science advisor and champion for international research cooperation. He also received Japan's Order of the Rising Sun, Gold and Silver Star decoration in 2010, for his efforts to advance U.S.–Japan relations and joint scientific efforts. Last year, Neureiter was awarded the Austrian Cross of Honour for Science and Art 1st Class for his efforts to support the International Institute for Applied Systems Analysis, a Vienna-based organization that addresses global challenges.

–Kathy Wren

BUDGET POLICY

AAAS Op-Ed: Don't Devalue Basic Research

Hefty federal deficits in Canada and the United States pose a significant threat to fundamental, basic research as some policy-makers seem to value near-term, industry-focused science more highly. That's shortsighted and will likely have damaging consequences for both countries, AAAS CEO Alan I. Leshner wrote in a 19 May op-ed published by Canada's largest daily newspaper, the *Toronto Star.*

AAAS News and Notes

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