

Dr. Greenfield receives the College's Jacobson Innovation Award for 2010

Lazar J. Greenfield, MD, FACS, of Ann Arbor, MI, is the 16th recipient of the Jacobson Innovation Award of the American College of Surgeons (ACS). The Jacobson Innovation Award—which honors living surgeons who have been innovative in the development of a new technique in any field of surgery—was presented to Dr. Greenfield on June 4, during a dinner that was held in conjunction with the ACS Board of Regents meeting in Washington, DC.

Established in 1994 through a gift from Julius H. Jacobson II, MD, FACS, a general vascular surgeon and pioneer in the field of microsurgery, and his wife Joan, the award is administered by the Board of Regents' Honors Committee of the American College of Surgeons.

An internationally recognized expert in vascular surgery, Dr. Greenfield was honored with the award in recognition



Dr. Greenfield

of his seminal contributions in the technical development of the Greenfield filter, a device that changed the technology associated with the pulmonary embolic complications of deep venous thrombosis. The

Greenfield vena cava filter is an implantable device inserted via a peripheral vein, and was designed to prevent blood clots from reaching the lungs—a condition otherwise known as pulmonary embolism. Filter devices are implanted in more than 10,000 patients annually who are at high risk for clotting, including some undergoing knee and hip-replacement surgery, and certain cancer and trauma patients. Since its introduction, the Greenfield filter has been implanted in more than 600,000 patients.

The filter is invaluable to immobile patients, since they are at highest risk of a blood clot due to the lack of movement. Clots that arise in the vein can break loose and travel to the lungs from other parts of the body (usually the leg), producing pulmonary embolism. Before the invention of the Greenfield filter, surgeons would try to prevent pulmonary embolism by surgically closing, partitioning, or clipping the inferior vena cava (IVC)—the vein that returns blood from the lower body to the heart—thereby stopping blood flow in the vein and forcing the blood to return to the heart through other veins. Moreover, these procedures usually led to massively swollen legs, among other problems. For instance, ligation of the IVC had a high operative mortality rate (up to 15 percent), and pulmonary

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Support® (ATLS®) Course—premiered in 1978? The ATLS program is now taught in more than 50 countries. Under the auspices of the ACS Military Committee on Trauma, the program has been conducted for U.S. military doctors in the U.S. and around the world. For further information, go to <http://www.facs.org/trauma/atls/history.html> on the College website.



Dr. Greenfield (far right) and his wife Sharon (second from right), with Dr. and Mrs. Jacobson.

embolism recurred in 6 percent of patients. The introduction of the Greenfield filter in 1973 provided the first effective method of trapping clots within blood vessels, while simultaneously preserving blood flow within the IVC. Although blood-thinners have proved effective at preventing blood clots, many people, especially trauma patients, cannot take these agents because they pose an increased risk of internal bleeding and death.

The impetus for developing the filter came from a surgical emergency Dr. Greenfield encountered in 1968, when he treated a 23-year-old patient who sustained multiple

fractures to both legs and the pelvis following a motorcycle accident and developed massive pulmonary embolism. Despite putting the patient on a heart-lung machine and applying the most aggressive surgical treatment of the time to remove numerous blood clots from the patient's lungs, the patient did not survive. Dr. Greenfield realized that a better method could be found for preventing pulmonary embolism. Two years later, he worked with Garman Kimmel, an oil-industry engineer and prolific inventor, to create an implantable filter for trapping blood clots before they could reach the lungs. The cone-shaped device con-

sists of six legs converging in the center that spans roughly an inch across the vena cava. It has tiny hooks that secure it in place in the blood-vessel wall, and corrugations in the legs to keep clots from slipping through. Clots that collect in the filter's conical nose almost always dissolve as a result of the continuous flow of blood, which has natural clot-dissolving properties.

Currently, there are eight filter designs, including the Greenfield filter, approved for use by the U.S. Food and Drug Administration. For many years, the Greenfield filter has served as the benchmark by which newer filters are mea-

Jacobson Innovation Award recipients

- 1994 Professor Francois Dubois**, Paris, France: Laparoscopic cholecystectomy.
- 1995 Thomas Starzl, MD, FACS**, Pittsburgh, PA: Liver transplantation.
- 1996 Joel D. Cooper, MD, FACS**, St. Louis, MO: Lung transplantation and lung volume reduction surgery.
- 1998 Juan Carlos Parodi, MD**, Buenos Aires, Argentina: Treatment of arterial aneurysms, occlusive disease, and vascular injuries by using endovascular stented graphs.
- 1999 John F. Burke, MD, FACS**, Boston, MA: Development and implementation of a number of innovative techniques in burn care, including the codevelopment of an artificial skin (Integra™).
- 2000 Paul L. Tessier, MD, FACS (Hon)**, Boulogne, France: Development and establishment of the surgical specialty of craniofacial surgery.
- 2001 Thomas J. Fogarty, MD, FACS**, Portola Valley, CA: Design and development of industry standard minimally invasive surgical instrumentation, especially for cardiovascular surgery.
- 2002 Michael R. Harrison, MD, FACS**, San Francisco, CA: Creator of the specialty of fetal surgery and developing techniques of fetoscopy for minimally invasive fetal technology.
- 2003 Robert H. Bartlett, MD, FACS**, Ann Arbor, MI: Pioneer in the development and establishment of the first extracorporeal membrane oxygenation (ECMO) program.
- 2004 Harry J. Buncke, MD, FACS**, San Francisco, CA: Pioneer in the field of microsurgery and replantation.
- 2005 Stanley J. Dudrick, MD, FACS**, Waterbury, CT: Innovator of specialized nutrition support and a pioneer in the field of clinical nutrition.
- 2006 Judah Folkman, MD, FACS**, Boston, MA: Pioneer in the field of angiogenesis.
- 2007 William S. Pierce, MD, FACS**, Hershey, PA: Pioneer in the conception and development of mechanical circulatory support and the total artificial mechanical heart.
- 2008 Donald L. Morton, MD, FACS**, Santa Monica, CA: Pioneered research efforts toward the development and clinical application of sentinel lymph node biopsy.
- 2009 Bernard Fisher, MD, FACS**, Pittsburgh, PA: Set a new course for the treatment of breast cancer by proposing that it is a systemic disease that metastasizes unpredictably and would best be treated with lumpectomy combined with adjuvant chemotherapy.

sured, because it has the best long-term record of any filter on the market—it has a recurrent pulmonary embolism rate of only 3 percent, and studies have shown it to be more than 95 percent safe and effective.

Dr. Greenfield received his medical degree from Baylor University College of Medicine, Houston, TX, in 1958, and completed his surgical training in general and thoracic surgery at the Johns Hopkins Hospital, Baltimore, MD (1958–1966). During his training, Dr. Greenfield spent two years conducting research at the National Heart, Lung, and Blood Institute of the National Institutes of Health, Bethesda, MD. He began his academic surgical career in 1966 as assistant professor of surgery and chief of surgical services at the Oklahoma City Veterans Affairs Medical Center at the University of Oklahoma Medical Center. In 1974, Dr. Greenfield was appointed the Stuart McGuire Professor and Chair at the Virginia Commonwealth University (VCU), Richmond, a post he held for 13 years. Following his work at VCU, Dr. Greenfield became the F.A. Collier Distinguished Professor of Surgery and chairman of the department of surgery at the University of Michigan in Ann Arbor, where he is currently professor emeritus of surgery.

Dr. Greenfield has been a Fellow of the American College of Surgeons since 1968. He is Editor-in-Chief of *Surgery News*, the College's monthly newspaper, and is Associate Editor of its members-only Web portal, www.e-FACS.org.