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In this head the all-baffling brain,
 In it and below it the makings of heroes.
 —Walt Whitman

When forensic neuropathologist Bennet Omalu (Fel '02) published his 2005 *Neurosurgery* paper showing that the late and famed Steeler Mike Webster's brain was clogged with tau proteins, indicating severe and chronic traumatic encephalopathy (CTE) likely resulting from football trauma, he was met with derision. When he examined a second player's brain and found the same proteins (which are also found in Alzheimer's patients), he was attacked by other investigators and the sports community. It was the classic story of David and Goliath.

The diagnosis of "chronic traumatic encephalopathy" had been used to describe the dramatic cognitive decline of boxers; it presented differently in these football players. The brain appeared normal from the exterior, not shriveled or bruised. Though he'd worked with his mentors, including Pitt's top-tier neurologist Steven Dekosky and Ronald Hamilton, of pathology, to confirm his results, Omalu would be doubted for years.

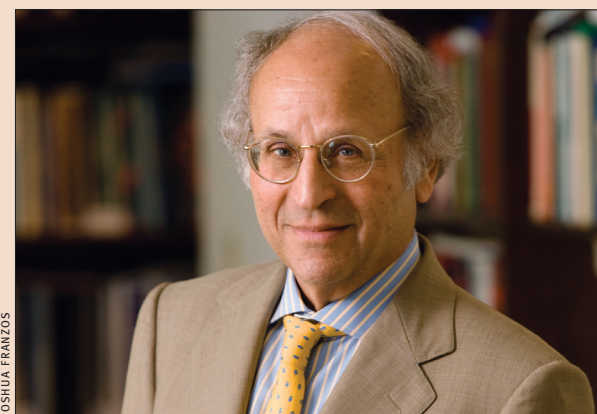
People were not just skeptical, but angry that anyone would take on an American icon like football. But Omalu and colleagues kept presenting evidence; they kept doing the research.

It can take courage to change conventional thinking. And scientists, like other fallible humans, have a difficult time shifting paradigms even in the face of new and compelling evidence. When Pitt's Bernard Fisher (MD '43) suggested that lumpectomy, a much less invasive surgery than the accepted treatment of radical mastectomy, was sufficient treatment for many breast cancers, he was doubted and scorned. He had concluded, on the basis of rigorous evidence, that breast cancer is a systemic disease, rather than local, and that local surgery plus systemic chemotherapy was at least as effective, and likely more so, than radical mastectomy. His basic research into the biology of cancer changed how we think about breast cancer and other malignancies.

Our school has a storied history of Davids up against doubting Goliaths. (See our Ernest Sternglass story on p. 23.) And now, Hollywood has recognized this. In July, the Chancellor and I flew to Los Angeles to meet Sir Ridley Scott, producer of *Concussion*, a movie to be released on Christmas Day, based on Omalu and Webster's saga (chronicled in a *GQ* story written by Jeanne Marie Laskas, a Pitt English professor). Our purpose was to discuss Pitt's deep engagement with this history.

Thanks in part to Omalu's perseverance, there is growing recognition that traumatic brain injury may be associated with contact sports, and the NFL (subject of a class-action lawsuit by retired players and their families) is now funding high-definition fiber-tractography research at Pitt that maps brain abnormalities associated with concussions. Pitt's Walter Schneider and our neurosurgeons are partnering with our concussion program faculty, including Micky Collins and Anthony Kontos. Notably, the association of acute brain injury with CTE is not limited to athletes—soldiers and others exposed to blasts are also vulnerable.

The movie will probably have a major influence on how we view seemingly "benign" concussions in young people. In some, perhaps those with a particular genetic susceptibility, a lifetime of neurodegeneration may follow. Whether a deeper awareness will mean an undoing, or reimagining, of a national institution like football remains to be seen. Americans would have to demand a change to a deeply imbedded cultural paradigm.



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