THIS YEAR'S NOBEL PRIZE IN MEDICINE

30 years of proof that this shameful wrong must be righted

Why the idea of an MRI didn't occur to this year's two winners until **after** a medical doctor made his landmark discoveries

The initial idea for the MRI did not occur to anyone until 1969, yet the phenomenon on which it is based, magnetic resonance, was discovered way back in 1945. The question is, what were scientists doing with it for all those years?

The answer is that chemists and physicists were using it to analyze what chemists and physicists think about: the structure of chemicals and the physical properties of materials, which is exactly what this year's two winners of the Nobel Prize for the MRI – the chemist Paul Lauterbur and the physicist Peter Mansfield – were doing until after Raymond Damadian, M. D., asked himself if the NMR phenomenon might have a medical application.

He was a medical researcher who looked at a test tube of a sample to which magnetic resonance was being applied and wondered if the magnetic resonance could distinguish between cancer tissue and normal tissue. He got samples of the two tissue types and put them in test tubes. The signal difference he measured between them was 185%. This was an especially enormous number because the maximum difference by X-ray was only 4%, a barely visible difference that explains why X-rays were missing many cancers.

He also discovered that different types of normal tissue yield a markedly different response to magnetic resonance, so he realized – and was the first human being to do so – that the NMR could also show major differences in the normal tissues of the interior of the human body.

The rest is scientific history, that is, until this year's Nobel Committee for Physiology or Medicine got the illegitimate notion that they could rewrite history.

MRI SCIENCE BEFORE DR. DAMADIAN'S DISCOVERIES

From the medical textbook *MRI from Picture to Proton*[1]

"So what were NMR researchers doing between the forties and the seventies – that's a long time in cultural and scientific terms. The answer is: they were doing chemistry, including Lauterbur, a professor of chemistry at the same institution as Damadian. NMR [nuclear magnetic resonance, as the phenomenon was then called] developed into a laboratory spectroscopic technique capable of examining the molecular structure of compounds, until Damadian's ground-breaking discovery in 1971."

The Winner, Paul Lauterbur, Before Damadian's Discoveries[2]

"After he was discharged from the Army, Lauterbur [a specialist in boron chemistry] felt he wanted to continue doing NMR work, since he saw it as a valuable technique for a chemist to use in unlocking the secret of compounds. [Lauterbur]: 'The problem in chemistry is you take one flask of a substance and mix it with a second flask of a substance and create a third substance. How do you know what you've got? What is the structure of what you've done? These are questions you ask every day in the chemistry laboratory....' Since he had established himself as a powerful voice in NMR research, it was not surprising that Lauterbur was invited to become a member of the board of directors of Nuclear Magnetic Resonance Specialties [where Damadian had done his original experiments]...."

The Winner, Peter Mansfield, Before Damadian's Discoveries[2]

[Mansfield]: "The team had been doing NMR studies of various substances, and they were having quite a bit of success but had exhausted the materials that were immediately available in the lab. As Mansfield puts it, 'We didn't have any more materials to pop into the machine. So we were wondering what to do with it. It was going well, and it was sort of a pity not to do something else with it.' I was saying, 'What can we do with it? What is it good for?' It occurred to me in a flash around the coffee table that we could study the distribution of atoms linearly using gradients – basically do imaging.' Mansfield says he was entirely unaware at this point that Lauterbur had already had essentially the same idea.... He later worked on the mathematics and convinced himself that it was doable....

"Mansfield, though, was not thinking specifically of medical applications; in the first paper he published on this in 1974, in fact, he didn't even make any mention of imaging. Rather, he wrote of a general method to use an NMR machine to detect the faces of crystals in samples that possessed them...."

DOCTOR DAMADIAN'S DISCOVERIES[1]

"The initial concept for the medical application of NMR, as it was then called, originated with the discovery of Raymond Damadian in 1971 that certain mouse tumours displayed elevated relaxation times compared with normal tissues in vitro. [Called their T1 and T2 responses and still the basis of all MRI technology. T1 and T2 responses are the reason cancer tissue appears as white spots on MRI pictures and normal tissue appears as surrounding darker areas that set off the cancer in the picture.] This exciting discovery opened the door for a complete new way of imaging the human body where the potential contrast between tissues and disease was many times greater than that offered by X-ray technology and ultrasound.... Damadian and his colleagues at the State University of New York, starved of mainstream research funding, went so far as to design and build their own superconducting magnet operating in their Brooklyn laboratory and the first human body image by NMR is attributed to them."

MRI SCIENCE AFTER DR. DAMADIAN'S DISCOVERIES

Suddenly, lots of people started to think about the medical applications of magnetic resonance. Two of them imagined nothing more than an improved way to record the tissue signals Dr. Damadian had discovered. They are this year's two winners.

Paul Lauterbur After Damadian's Discoveries[2]

"Lauterbur remembers the events well. He had seen some of the readings being done on the rats by Economou[3] [With his companion Hollis, both from Johns Hopkins, repeating Damadian's experiments to confirm them], and he was intrigued by the experiments. A candle was lit....

[Lauterbur]: "'I had watched some of those experiments being done. And they were seeing some differences between the cancerous tissue and the normal tissue. A phenomenon seemed to be at work there. But I couldn't imagine that it was very likely that it would be important to do such investigations of tissue. A method that required cutting out the samples didn't seem all that interesting.... But it did seem useful if you could take measurements from the intact human body and create images. [Damadian had already very publicly proposed the idea of and was patenting a full-body scanner.] So I got to asking myself whether there was any conceivable way of solving this problem.

"'And I got to thinking that magnetic field gradients provide a general solution to this problem....' [Magnetic gradients had come as standard equipment on NMR machines since the 40's.] The next day he scribbled down his idea about gradients in a tan spiral notebook, suggesting in his notes that it could allow NMR images to be done of the body and therefore serve as an application of Damadian's research."

Here is Lauterbur's notebook entry, where he credits Damadian's prior discovery: "The difference in relaxation times that appears to be characteristic of malignant tumors (R. Damadian, Science, 171, 1151 (1971), should be measurable in an intact organism."[4]

Peter Mansfield After Damadian's Discoveries[2]

"Once he realized he could achieve spatial imaging, he looked around for applications, and Damadian's tumor experiments were drawn to this attention. "So he certainly had an influence," he [Mansfield] said. "I think Damadian's work had some influence on everyone."

MRI HISTORY FROM 1969 TO THE PRESENT

The indisputable truth of history is that the idea magnetic resonance might have a medical application never occurred to either of the two winners until after they observed or were told about Dr. Damadian's landmark tissue discoveries and his proposal to build a human-body scanner to take advantage of the cancer signal. You can understand the enormity of Damadian's idea when you realize that until then NMR machines were small devices, with less than a two-inch opening into which a chemical compound was placed for analysis. These NMR machines came complete with a magnetic gradient for the scientist to adjust the signal from the compound.

No wonder so many medical textbooks and history books on MRI credit Damadian's tissue discoveries as the start of MRI technology. He was awarded the prestigious National Medal of Technology, with Paul Lauterbur, by President Reagan. He was presented with the Lemelson-MIT Lifetime Achievement Award by MIT. And he was inducted into the National Inventors Hall of Fame as the inventor of the MRI. The world's first MRI, which he built by hand with two graduate students and performed the world's first full-body MRI scan with, has been in The Smithsonian Institution since 1989.

THE UNITED STATES SUPREME COURT UPHELD DAMADIAN'S MRI PATENT[5]

Dr. Damadian was granted the first MRI patent, which was upheld by the United States Supreme Court. The decision shows that the Court saw no difference between Damadian's original discoveries about the different signals magnetic resonance elicits from cancerous tissues and normal tissues and the signals all the world's MRI machines still use to record an image.

Quote from the upheld decision of the Supreme Court: "The assignment of a gray scale value for suspect tissue was determined in effect by a comparison of the tissue's signal strength with the standard values [signal strength of normal tissue]. This evidence provided a showing of insubstantial differences..."

Summary from our archives: "The Court concluded that MRI machines rely on the tissue NMR relaxations that were claimed in the patent as a method of detecting cancer, and that MRI machines use these tissue relaxations to control pixel brightness and supply the image contrasts that detect cancer in patients."

THE NOBEL COMMITTEE SEEKS TO REWRITE HISTORY

All of the above history was meticulously and repeatedly provided to the Nobel Committee for Physiology or Medicine over the years that the award for the MRI has been deliberated, yet this year's committee found a way to ignore it.

So inexcusably wrongheaded was their thinking that they even violated Alfred Nobel's will, which states that the prize in medicine must be awarded only for **"discovery."** He **does not allow,** as he does in chemistry and physics, for techniques or inventions that exploit a discovery, such as Lauterbur and Mansfield contributed – and techniques or inventions are the only thing being honored this year.

What's going on here? Distasteful as it may be to face, the decision is a vicious attempt by Nobel insiders and chummy research scientists to rewrite history, that is, to rob a great American medical doctor of his life's work – his nearly universally recognized and lauded identity – and transfer it to two research scientists they find more to their liking. Such a flagrant injustice simply cannot be allowed. (If you hear of a scientist who downplays the foundational significance of Dr. Damadian's discoveries, ask yourself if he is a research Ph.D. scandalously defending his own kind or a medical doctor dispassionately citing facts.)

THE SWEDISH PEOPLE AS THE CONSCIENCE OF THE NOBEL PRIZE

We have appealed to the Nobel Committee for Physiology or Medicine to right the shameful wrong of Dr. Damadian's exclusion. We have appealed to the two winners to step forward out of respect for the truth of science.

At this time, we turn to the Swedish people, who take such great national pride in the Nobel Prize. How can you allow this year's Nobel Committee for Physiology or Medicine to shame the award by this blatant affront to the history of science?

Three winners can be named for the Nobel Prize in Medicine

We ask you to let your voices be heard as the true conscience of the Nobel Prize. We ask you to insist that the long-honored history of the discovery of the MRI and the wording of Alfred Nobel's will be respected above all other considerations.

We ask you to stand up for the simple truth and for a wronged inventor, whose seminal discoveries have benefitted and continue to benefit many thousands of people around the world every day. We ask you to insist that Raymond V. Damadian, M. D., be included in this year's Nobel Prize for Medicine – insist until your voices cannot be ignored, insist because you know that righting this shameful wrong is the only way, the "noble" way, to preserve the prestige of the Nobel Prize, in which, we know, you take great national pride.

We also ask that concerned people everywhere join in the expression of worldwide outrage that this shameful wrong has provoked.

Insist that this shameful wrong be righted, now.

In addition to making the original discoveries on which all MRI's are based (T1 and T2 tissue relaxations), Dr. Damadian built the first MRI by hand, performed history's first MRI full-body scan, invented the first Open MRI, the first mobile MRI, and now the first Stand-Up™ MRI.

1. Cambridge University Press, 2003 2. *A Machine Called Indomitable,* by former New York Times reporter Sonny Kleinfield, Times Books, Inc., 1985 Reprinted with Permission 3. Actually, Leon Saryan
4. Lauterbur's handwritten note can be seen at www.fonar.com 5. Quote from the Court's decision. Interpretation from Fonar company archives.

Paid for by Friends of Raymond Damadian Contact DanielCulver@aol.com or call him at 631-694-2929.

All facts are public record. Details available on request.

HOW YOU CAN HELP RIGHT THIS SHAMEFUL WRONG

TO: The Nobel Prize Committee for Physiology or Medicine
Dear Members of the Nobel Committee: The TRUTH must have a place. I/We believe this year's Nobel Prize for Physiology or Medicine should include Dr. Raymond Damadian.

Name _____

Address _____ City _____ State ___ Zip Code _____

Mail to: The Nobel Committee for Physiology or Medicine, Nobel Forum, Box 270 SE – 171 77 Stockholm, Sweden E-Mail to: secr@mednobel.ki.se
Or call the Committee at 011-46-8-585-823-44 • 011-46-8-662-64-31 • 011-46-8-51-77-45-00