Lifeline

For more on the **International NeuroHIV Cure Consortium** see https://www.inhcc.net/

For more on **pseudomedicine in brain health** see **Editorial** *Lancet Neurol* 2019; **18:** 415

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What has been the greatest achievement of your career?
The small glimpses of broader systemic change that may reduce suffering, now and in the future.

What inspires you?
New ideas, gorgeous natural landscapes, making a difference, and people who have endured great hardship, often in relative silence.

If you had not entered your current profession, what would you have liked to do?
International development work or to be a master carpenter.

Who was your most influential teacher, and why?
My high school Advanced Placement biology teacher, David Brock, who led me to see a future in science.

What is your favourite book or film, and why?
Despite the intense violence, the film *Children of Men* does a fantastic job of balancing suffering with hope.

What is your idea of a perfect day?
I would sleep in, go crabbing for Dungeness crab, and then indulge in a crab feast over great conversation.

How would you improve the public's understanding of research?
I would incentivise opportunities for scientists to interface with the public regarding their fields of research.

What was your first experiment as a child?
For an early elementary school science fair project, I apparently wanted to know "Do different spiders spin different webs?". As family lore goes, I made my dad collect spiders from the basement, put them in jars, and drew the obvious conclusion.

What one discovery or invention would most improve your life?
We recently got a robot vacuum cleaner, which is a game changer if you have pets.

What is the best piece of advice you have received?
Follow your own voice, despite what others may say. It has served me well.

Focal Point
Antiviral amantadine

Amantadine was first approved by the US Food and Drug Administration (FDA) as a prophylactic agent against Asian influenza in 1966 and against influenza A in 1976. The drug had been shown to inhibit the penetration of influenza virus in cells in the chicken embryo.[1] However, through serendipity, amantadine is now instead used in the treatment of patients with Parkinson's disease.

In the early 60s, Robert Schwab and David C Poskanzer of Harvard University suggested an association between the development of Parkinson's disease and influenza pandemics, believing that an underlying viral process was important for the development of Parkinson's disease.[2] However, as their observations were unblinded, and the incidence of Parkinson's disease continued to rise in patients with no apparent exposure to influenza, their hypothesis was questioned.[3]

In the late 1960s, these two neurologists collaborated again on a landmark case of a 58-year-old woman with moderately severe Parkinson's disease, whose symptoms of rigidity, tremor, and akinesia improved upon taking amantadine as prophylaxis against influenza, and recurred in 6 weeks when she stopped taking the drug.[4] These observations led the pharmaceutical company Smith, Kline, and French to conduct small scale studies that showed reproducible improvements in the motor symptoms of Parkinson's disease without substantial side effects.[4,5] In 1973, the FDA approved amantadine for the treatment of motor symptoms in patients with Parkinson's disease.[1] Amantadine's exact mechanism of action in Parkinson's disease was unknown at the time.[3] Interestingly, amantadine is no longer recommended for either prevention or treatment of influenza, for which it was originally developed.[6] Amantadine has been also used off-label for improvement of fatigue in patients with multiple sclerosis.[7]

Taha Nisar, Harry Sutherland-Foggio, Walter Husar

1 Maugh TH 2nd. Panel urges wide use of antiviral drug. *Science* 1979; **206:** 1058–60.
2 Poskanzer DC, Schwab RS. Studies in the epidemiology of Parkinson's disease predicting its disappearance as a major clinical entity by 1980. *Trans Am Neurol Assoc* 1961; **86:** 234–35.
3 Hubsher G, Haider M, Okun MS. Amantadine. *Neurology* 2012; **78:** 1096.
4 Schwab RS, England AC Jr, Pskanzer DC, Young RR. Amantadine in the treatment of Parkinson's disease. *J Am Med Assoc* 1969; **208:** 1168–70.
5 Schwab RS, England AC Jr. Amantadine HCL (Symmetrel) and its relation to Levo-Dopa in the treatment of Parkinson's disease. *Trans Am Neurol Assoc* 1969; **94:** 85–90.
6 Alves Galvao MG, Rocha Crispino Santos MA, Alves da Cunha AJ. Amantadine and rimantadine for influenza A in children and the elderly. *Coch Dat Syst Rev* 2014; **11:** Cd002745.
7 Cohen RA, Fisher M. Amantadine treatment of fatigue associated with multiple sclerosis. *Arch Neurol* 1989; **46:** 676–80.