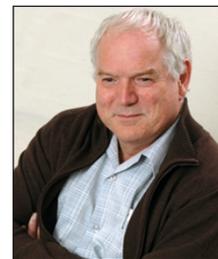


# Three isn't the magic number

Michael Houghton

**Most research prizes in biomedicine, from the Nobels to the Laskers, are restricted to three recipients. But in an age of big science, when much larger teams are generally needed to make important research discoveries, all the people who provide seminal contributions deserve to be awarded.**



Karin Foster

Earlier this year, I was greatly honored with the offer of a 2013 Canada Gairdner International Award for my contributions to the discovery of the hepatitis C virus (HCV). I was selected along with Harvey Alter, chief of clinical studies in the Department of Transfusion Medicine at the US National Institutes of Health's Clinical Center in Bethesda, Maryland, and Daniel Bradley, a consultant at the US Centers for Disease Control and Prevention in Atlanta, both of whom had a vital role in the research that eventually led to the identification and characterization of the virus.

My colleagues accepted their awards. However, I declined my C\$100,000 (\$98,000) prize because it excluded two other key contributors who worked with me closely to successfully isolate the viral genome for the first time. I felt that given their crucial inputs, it would be wrong of me to keep accepting major prizes just 'on their behalf', a situation that has developed because major award foundations and committees around the world insist that prizes be limited to no more than three recipients per topic.

HCV was identified in 1989 in my laboratory at the Chiron Corporation, a California biotechnology firm since purchased by the Swiss drug company Novartis. The discovery was the result of seven years of research in which I worked closely, both intellectually and experimentally, with Qui-Lim Choo, a member of my own laboratory, and George Kuo, who had his own laboratory next door to mine at Chiron. We finally identified the virus using a technically risky DNA-expression screening technique through which we isolated a single small nucleic acid clone from among many millions of such clones from different recombinant libraries. This was achieved without the aid of the still-evolving PCR technology to amplify the miniscule amounts of viral nucleic acid present in blood. We ultimately proved that this clone derived from a positive-stranded viral RNA genome intimately associated with hepatitis, but one not linked to either the hepatitis A or B viruses<sup>1,2</sup>. The finding represented the first time any virus had been identified without either prior visualization of the virus itself, characterization of its antigens or viral propagation in cell culture.

The high-titer infectious chimpanzee plasma used for our molecular analyses at Chiron was provided in 1985 by Bradley, an expert in chimpanzee transmission of HCV and in the virus's basic properties and cellular responses, with whom I had an active collaboration since 1982. The proposed aim of the collaboration was for my laboratory to apply contemporary molecular cloning methodologies to a problem that had proven intractable since the mid-1970s, when Alter and his colleagues first demonstrated the existence of non-A, non-B hepatitis (NANBH), as it was then known. Alter's team went on to define the high incidence and medical importance of NANBH, including the virus's propensity to cause liver fibrosis, cirrhosis and cancer. They also identified high-titer infectious human plasma in 1980 and were instrumental in promoting the adoption of surrogate tests for NANBH by blood banks to reduce the incidence of post-transfusion infection.

With regrets to the Gairdner Foundation—a generous and altruistic organization—I felt compelled to decline the International Gairdner Award without the addition of Kuo and Choo to the trio of scientists offered the award. In 1992, all five of us received the Karl Landsteiner Memorial Award from the American Association of Blood Banks. But subsequent accolades given in honor of HCV's discovery have omitted key members of the group:

only Bradley and I received the 1993 Robert Koch Prize, and only Alter and I won the 2000 Albert Lasker Award for Clinical Medical Research—in both cases, despite my repeated requests that the other scientists involved in the discovery be recognized. With the exclusion once more of Kuo and Choo from this year's Gairdner Award, I decided that I should not continue to accept major awards without them. In doing so, I became the first person since the Gairdner's inception in 1959 to turn down the prize.

I hope that my decision helps bring attention to a fundamental problem with many scientific prizes today. Although some awards, such as the Landsteiner, are inclusionary and emphasize outstanding team accomplishments, the majority of the world's prestigious scientific awards—including the Gairdner, Lasker and Shaw prizes, which all seem to be modeled on the Nobel Prize and indeed are sometimes known as the 'baby Nobels'—are usually restricted to at most three individuals per discovery. Unsurprisingly, this limitation often leads to controversy, when one or more worthy recipients are omitted from the winners list.

Perhaps what may help this situation is for awards committees to solicit, and then be responsive to, input from potential recipients themselves prior to making their final decisions. Some of the recipients are best placed to know the full and often intricate history of the discovery and collaborative efforts, and such input should help committees better understand the size of the contributing team from which they can then choose recipients according to each award's particular policy.

With this information in hand, award organizers should be willing to award more than three researchers. As knowledge and technology grows exponentially around the world and with an increasing need for multidisciplinary collaborations to address complex questions and problems, there is a case to be made for award committees adjusting to this changing paradigm. Moreover, it is inherently unfair to exclude individuals who played a key part in the discovery. Why should they and their families suffer such great disappointment after contributing such crucial input? Some award restructuring could also be inspirational to young scientists, encouraging them to be highly interactive and collaborative in the knowledge that when a novel, long-shot idea or approach actually translates to scientific success, all key parties will be acknowledged appropriately.

In this vein, I am happy to note that the inaugural Queen Elizabeth Prize for Engineering, a new £1 million (\$1.6 million) prize from the UK government, was awarded at a formal ceremony last month to five individuals who helped create the internet and the World Wide Web, even though the original guidelines stipulated a maximum of three recipients. If the Queen of England—the very emblem of tradition—can cast protocol aside, clearly other institutions can too. I hope more awards committees will follow Her Majesty's lead.

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- 1 Choo, Q.L. *et al. Science* **244**, 359–362 (1989).
- 2 Kuo, G. *et al. Science* **244**, 362–364 (1989).