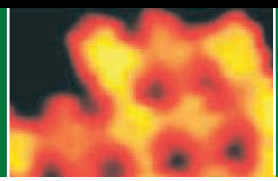


LETTERS

edited by Jennifer Sills

Unsung Hero Robert C. Gallo

AWARDING THE NOBEL PRIZE IN PHYSIOLOGY OR MEDICINE TO FRANCOISE BARRÉ-SINOUSSI and Luc Montagnier for the discovery of HIV-1, the causative agent of AIDS (*1*), is timely given the harm that the virus continues to inflict on the people of the world.

While these awardees fully deserve the award, it is equally important to recognize the contributions of Robert C. Gallo. Gallo definitively proved HIV-1 as the cause of AIDS through the successful isolation and long-term cultivation of HIV-1 and developed a diagnostic kit that prevented new infections and saved thousands of lives. These contributions, together with Gallo's earlier discovery of interleukin-2 (fundamental for growing HIV-1 in vitro) and of HTLV-1, the first human pathogenic retrovirus, warrant equal recognition.

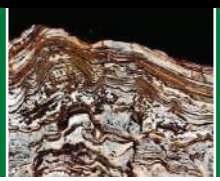
Previously, the Nobel committee acknowledged similar pioneering contributions. Karl Landsteiner and Erwin Popper identified the poliovirus in 1908, establishing the link with poliomyelitis, but the 1954 Nobel Prize was given to John Enders, Frederick Robbins, and Thomas Weller for learning to grow poliovirus, which was pivotal for Jonas Salk and Albert B. Sabin to develop vaccines. Like Landsteiner and Popper, Barré-Sinoussi and Montagnier isolated a virus but, unlike them, could not establish whether it was the AIDS virus (*2*), an achievement accomplished by Gallo and colleagues just one year later (*3*–*6*). Gallo—like Enders, Robbins, and Weller—learned to grow the virus and, furthermore, discovered its role, saved the blood supply, and opened the way for drug and vaccine development. Without Gallo's contributions, the relevance of this virus to AIDS might not have been recognized for years, and many thousands more lives would have been lost.

Given the enormous impact of these developments on the lives of countless thousands globally, Gallo's contributions should not go unrecognized.

GIOVANNI ABBADESSA,[1] ROBERTO ACCOLLA,[2] FERNANDO AIUTI,[3] ADRIANA ALBINI,[4] ANNA ALDOVINI,[5] MASSIMO ALFANO,[6] GUIDO ANTONELLI,[3] COURTENAY BARTHOLOMEW,[7] ZVI BENTWICH,[8] UMBERTO BERTAZZONI,[9] JAY A. BERZOFSKY,[10] PETER BIBERFELD,[11] ENZO BOERI,[6] LUIGI BUONAGURO,[12] FRANCO M. BUONAGURO,[12] MICHAEL BUKRINSKY,[13] ARSÈNE BURNY,[14] ARNALDO CARUSO,[15] SHARON CASSOL,[16] PRAKASH CHANDRA,[17] LUCA CECCHERINI-NELLI,[18] LUIGI CHIECO-BIANCHI,[19] MARIO CLERICI,[20] SANDRA COLOMBINI-HATCH,[21] CARLO DE GIULI MORGHEN,[20] ANDREA DE MARIA,[22] ANITA DE ROSSI,[19] MANFRED DIERICH,[23] RICCARDO DELLA-FAVERA,[24] ANTONINA DOLEI,[25] DANIEL DOUEK,[26] VOLKER ERFLE,[27] BARBARA FELBER,[28] SIMONA FIORENTINI,[15] GENOVEFFA FRANCHINI,[10] JONATHAN M. GERSHONI,[29] FRANCES GOTCH,[30] PATRICK GREEN,[31] WARNER C. GREENE,[32] WILLIAM HALL,[33] WILLIAM HASELTINE,[34] STEPHENS JACOBSON,[35] LARS O. KALLINGS,[36] VANIAMBADI S. KALYANARAMAN,[37] HERMANN KATINGER,[38] KAMEL KHALILI,[39] GEORGE KLEIN,[11] EVA KLEIN,[11] MARY KLOTMAN,[40] PAUL KLOTMAN,[40] MOSHE KOTLER,[41] REINHARD KURTH,[42] ALAIN LAFEUILLADE,[43] MICHELANGELO LA PLACA,[44] JONATHAN LEWIS,[1] FLAVIA LILLO,[45] JULIANNA LISZIEWICZ,[46] ANITA LOMONICO,[10] LUCIA LOPALCO,[6] FRANCO LORI,[46] PAOLO LUSSO,[26] BEATRICE MACCHI,[47] MICHAEL MALIM,[48] LEONID MARGOLIS,[49] PHILLIP D. MARKHAM,[37] MYRA MCCLURE,[50] NANCY MILLER,[26] MARIA C. MINGARI,[22] LORENZO MORETTA,[51] DOUGLAS NOONAN,[2] STEVE O'BRIEN,[28] TAKASHI OKAMOTO,[52] RANAJIT PAL,[37] PETER PALESE,[40] AMOS PANET,[41] GIUSEPPE PANTALEO,[53] GEORGE PAVLAKIS,[28] MAURO PISTELLO,[18] STANLEY PLOTKIN,[54] GUIDO POLI,[6*] ROGER POMERANTZ,[55] ANTONIA RADAELLI,[20] MARJORIE ROBERT-GUROFF,[10] MARIO ROEDERER,[26] MANGALASSERIL G. SARNGADHARAN,[37] DOMINIQUE SCHOLS,[56] PAOLA SECCHIERO,[57] GENE SHEARER,[10] ANTONIO SICCARDI,[20] MARIO STEVENSON,[58] JAN SVOBODA,[59] JIM TARTAGLIA,[60] GIUSEPPE TORELLI,[61] MARIA LINA TORNESELLO,[12] ERWIN TSCHACHLER,[62] MAURO VACCAREZZA,[63] ANGELIKA VALLBRACHT,[64] JAN VAN LUNZEN,[65] OLIVIERO VARNIER,[22] ELISA VICENZI,[6] HARALD VON MELCHNER,[17] ISAAC WITZ,[29] DANIEL ZAGURY,[66] JEAN-FRANCOIS ZAGURY,[67] GIORGIO ZAULI,[57] DONATO ZIPETO[9]

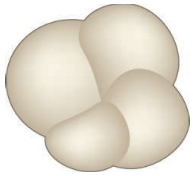
[1]ZIOPHARM Oncology Inc., Boston, MA, USA. [2]University of Insubria, Varese, Italy. [3]La Sapienza University, Roma, Italy. [4]IRCCS Multimedica, Milano, Italy. [5]Children's Hospital and Harvard Medical School, Boston, MA, USA. [6]San Raffaele University and Scientific Institute, Milano, Italy. [7]The Medical Research Foundation of Trinidad and Tobago, Port of Spain, Trinidad and Tobago. [8]Ben Gurion University, Beer Sheba, Israel. [9]University of Verona, Verona, Italy. [10]National Cancer Institute, Bethesda, MD, USA. [11]Karolinska Institute, Stockholm, Sweden. [12]Istituto Nazionale Tumori "Fond. G. Pascale," Napoli, Italy. [13]The George Washington University, Washington, DC, USA. [14]Center for Cellular and Molecular Biology, Gembloux, Belgium. [15]University of Brescia, Brescia, Italy. [16]University of Pretoria, Pretoria, South Africa. [17]University of Frankfurt Medical School, Frankfurt, Germany. [18]University of Pisa, Pisa, Italy. [19]University of Padova, Padova, Italy. [20]University of Milano, Milano, Italy. [21]National Heart, Lung and Blood Institute, Bethesda, MD, USA. [22]University of Genova, Genova, Italy. [23]Innsbruck Medical University, Innsbruck, Austria. [24]Columbia University, New York, NY, USA. [25]University of Sassari, Sassari, Italy. [26]National Institute of Allergy and Infectious Diseases, Bethesda, MD, USA. [27]GSF-Institut fuer Molekulare Virologie, Munich, Germany. [28]National Cancer Institute, Frederick, MD, USA. [29]Tel Aviv University, Tel Aviv, Israel. [30]Imperial College London, London, UK. [31]Ohio State University, Columbus, OH, USA. [32]Gladstone Institute of Virology and Immunology, San Francisco, CA, USA. [33]University College Dublin, Dublin, Ireland. [34]The William A. Haseltine Foundation for Medical Sciences and the Arts, Rockville, MD,

Published by AAAS



Mineral evolution

218



Marine nitrogen cycle

219

USA. [35]National Institute of Neurological Disorders and Stroke, Bethesda, MD, USA. [36]UN-Secretariat General, New York, NY, USA, and Djursholm, Sweden. [37]Advanced Bioscience Laboratories, Kensington, MD, USA. [38]University of Natural Resources and Applied Life, Vienna, Austria. [39]Temple University School of Medicine, Philadelphia, PA, USA. [40]Mt. Sinai School of Medicine, New York, NY, USA. [41]The Hebrew University Hadassah Medical School, Jerusalem, Israel. [42]Robert Koch-Institut, Berlin, Germany. [43]Hospital "Font Pre," Toulon, France. [44]University of Bologna, Bologna, Italy. [45]Fondazione San Raffaele G. Giglio, Cefalù, Italy. [46]Genetic Immunity, Budapest, Hungary. [47]University of Roma-2, Roma, Italy. [48]King's College London School of Medicine, London, UK. [49]National Institute of Child Health and Human Development, Bethesda, MD, USA. [50]Imperial College London, Norfolk Place, UK. [51]Istituto Giannina Gaslini, Genova, Italy. [52]Nagoya City University, Nagoya, Japan. [53]Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland. [54]Sanofi Pasteur, Doylestown, PA, USA. [55]Tibotec Pharmaceuticals Ltd., Yardley, PA, USA. [56]Rega Institute, Katholieke Universiteit Leuven, Leuven, Belgium. [57]University of Ferrara, Ferrara, Italy. [58]University of Massachusetts Medical School, Worcester, MA, USA. [59]Institute of Molecular Genetics, Prague, Czechoslovakia. [60]Sanofi Pasteur, Toronto, Canada. [61]University of Modena, Modena, Italy. [62]Medical University of Vienna, Vienna, Austria. [63]University of Cassino, Cassino, Italy. [64]Universitaet Bremen, Bremen, Germany. [65]University Medical Center Hamburg-Eppendorf, Hamburg, Germany. [66]Neovscs SA, Paris, France. [67]Conservatoire National des Arts et Metiers, Paris, France.

*To whom correspondence should be addressed. E-mail: poli.guido@hsr.it

References and Notes

1. Francoise Barré-Sinoussi and Luc Montagnier received the award along with Harald zur Hausen for discovery of HPV causing cervical cancer.
2. F. Barré-Sinoussi *et al.*, *Science* **220**, 868 (1983).
3. M. Popovic, M. G. Sarngadharan, E. Read, R. C. Gallo, *Science* **224**, 497 (1984).
4. R. C. Gallo *et al.*, *Science* **224**, 500 (1984).
5. J. Schupbach *et al.*, *Science* **224**, 503 (1984).
6. M. G. Sarngadharan, M. Popovic, L. Bruch, J. Schupbach, R. C. Gallo, *Science* **224**, 506 (1984).
7. This initiative was taken independently of Robert Gallo's influence. The authors are signing the letter as private citizens; this opinion does not necessarily reflect that of the authors' own respective institutions.

An Award for Science Is an Obsolete Notion

THE EXCLUSION OF ROBERT GALLO FROM THE Nobel prize this year ("HIV, HPV researchers honored, but one scientist is left out," J. Cohen and M. Enserink, 10 October 2008, p. 174) may appear controversial, but his situation is not unique. Any prize awarded for scientific discoveries is bound to overlook important contributors. Discoveries are built on the backs of many workers, and no matter the contribution, all contribute to the whole. Recognizing any one worker as seminal implies that the supporting work is less vital. Prizes would better serve the community by driving science forward. For example, a prize could be awarded prospectively for a particular goal, such as the X Prize (*1*), instead of retrospectively reviewing an accomplishment and naming one person crucial to its success. As illustrated by the vital yet overlooked contributions of Rosalind Franklin, Nicola Tesla, and Thomas Edison, the Nobel science prizes send the wrong message to the public and would-be scientists. **MARVIN GOZUM**

Division of Internal Medicine, Jefferson Medical College, Thomas Jefferson University, Philadelphia, PA 19107, USA. Email: gozum@computer.org

Reference
1. X Prize Foundation (www.xprize.org).

The Time to Demand Funding

THE FUNDING CRISIS FOR SCIENCE MAY FIND its solution, however unfortunately, in the recession at hand. There will be a need for federal spending on real infrastructure projects to rescue the economy. NIH and NSF should be among the foremost beneficiaries. In the 1930s, cultural and artistic endeavors were among the beneficiaries of economic stimulus programs through the Works Progress Administration. That was before the existence of NIH or NSF. Surely, science is among the highest achievements of human culture. Spending on NIH and NSF can rescue our endangered scientific infrastructure and save the scientific careers of what will otherwise be a lost generation. The proposals are ready to go in the form of thousands of unfunded but worthy grants, thus meeting the criterion of immediate implementation necessary for a stimulus package. And the public should welcome this. Increased spending on research is virtually certain to benefit us, our children, and their children.

Disappointingly, despite unprecedented opportunities for research in diverse areas that promise transformative and life-saving advances, we scientists seem rather quiet these days. We seem to be begging for scraps of funding that will keep us alive, rather than advocating for the steady diet of research support necessary to ensure that the engines of innovation keep running. If the United States can spend $700 billion on a Wall Street bailout and another $700 billion on the military and wars this year, can it not spend $10 to 20 billion more annually on research? This would be an investment in knowledge and life, not war and accumulation of personal wealth. It is time for the scientific community to speak out boldly and loudly for such funding.

CRAIG C. MELLO[1] AND JOHN V. WALSH[2]*

Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the previous 3 months or issues of general interest. They can be submitted through the Web (www.submit2science.org) or by regular mail (1200 New York Ave., NW, Washington, DC 20005, USA). Letters are not acknowledged upon receipt, nor are authors generally consulted before publication. Whether published in full or in part, letters are subject to editing for clarity and space.

[1]Department of Molecular Medicine, University of Massachusetts Medical School, Worcester, MA 01655–0127, USA. [2]Department of Physiology, University of Massachusetts Medical School, Worcester, MA 01655–0127, USA.

*To whom correspondence should be addressed. E-mail: john.walsh@umassmed.edu

Autistic Phenotype from *MEF2C* Knockout Cells

IN THEIR RESEARCH ARTICLE ("IDENTIFYING autism loci and genes by tracing recent shared ancestry," 11 July 2008, p. 218), E. M. Morrow *et al*. showed that gene expression associated with autism-spectrum disorders (ASD) is controlled by MEF2 transcription factors and hypothesized that autistic phenotypes result from abnormal activity-dependent regulation of synapse development caused by altered MEF2 signaling.

However, other studies suggest that the defects in MEF2 activity may be important even earlier in development, in embryonic neural progenitor/stem cells (NSCs). We recently showed that knockout of *MEF2C* in NSCs produces neurodevelopmental defects similar to ASD (*1*). In adulthood, these mice displayed autistic phenotypes resembling Rett syndrome in that they manifested altered anxiety and increased stereotypy (purposeless movements) on neurobehavioral testing, representing key characteristics of ASD. Coupled with our report that activated MEF2C drives the formation of neurons from NSCs (*2*), this work indicates that MEF2C plays a pivotal role in early neuronal differentiation. Additionally, mice with *MEF2C* conditionally knocked out at the NSC stage exhibited fewer, smaller, and more compacted neurons (*1*), similar to findings in Rett syndrome (*3*). When *MEF2C* was knocked out later in development, although synapse formation was altered, neurogenesis was not affected and no autistic behaviors resulted (*4*). Taken together, these reports are consistent with the idea that ASD may be initiated at the NSC stage and thus represent a defect in neurogenesis, of which one aspect is synapse formation. This suggests a broader role for MEF2 in neurogenesis and ASD than was previously appreciated.

STUART A. LIPTON,* HAO LI, JEFFREY D. ZAREMBA, SCOTT R. MCKERCHER, JIANKUN CUI, YEON-JOO KANG, ZHIGUO NIE, WALID SOUSSOU, MARIA TALANTOVA, SHU-ICHI OKAMOTO, NOBUKI NAKANISHI

Del E. Webb Center for Neuroscience, Aging, and Stem Cell Research, Burnham Institute for Medical Research, La Jolla, CA 92037, USA.

*To whom correspondence should be addressed. E-mail: slipton@burnham.org

References
1. H. Li *et al., Proc. Natl. Acad. Sci. U.S.A.* **105**, 9397 (2008).
2. Z. Li *et al., J. Neurosci.* **28**, 6557 (2008).
3. R. Z. Chen *et al., Nat. Genet.* **27**, 327 (2001).
4. A. C. Barbosa *et al., Proc. Natl. Acad. Sci. U.S.A.* **105**, 9391 (2008).

Science Should Stick to Science

THE NEWS OF THE WEEK STORY "SCIENTISTS plant grass-roots effort for Obama in final days of contest" by E. Kintisch (31 October 2008, p. 658) would have been fine in a newspaper, where we expect to find campaign articles. It was surprising and unwise in a magazine that reports on science.

Science did attempt to represent both candidates. Kintisch states that little or no grass-roots scientist effort for McCain was found. An objective piece about the observed differences in the parties' degree of support among scientists would have been more appropriate than the partisan tone of the piece as written.

There is a risk in publishing articles suggesting that only the politically like-minded are welcome readers of *Science*. It is in the long-term interest of the scientific enterprise that scientists do not make those who identify with other political parties uncomfortable in their midst. It is important to continue to judge scientists by their work in science. Likewise, it is important to keep *Science* about science.

ANN MARIE THRO

21298 Steptoe Hill Road, Middleburg, VA 20117, USA.

Science Careers: Where Does Advocacy Fit?

IN HIS PRESIDENTIAL ADDRESS ("A GLOBAL perspective on science and technology," 24 October 2008, p. 544), D. Baltimore warned against erosion of U.S. leadership in the biological sciences, acknowledging the entire scientific community's lack of involvement and personal responsibility in our government.

As a graduate student training for a career in the academe, I wonder at what point in my career it will be most appropriate to begin thinking about exercising responsibility for my nation's actions. Clearly, there are good reasons why scientists and engineers need to consider stepping outside our laboratories to serve our nation (*1*). Yet, there are few moments on the road to tenure where it would be wise

Published by AAAS

to step from the bench to engage in advocacy or policy.

More generally, how do scientists and engineers understand our scientific/technological citizenship? Does our employment by taxpayers or nonprofit organizations necessarily endow a specific role or responsibility in the larger global community? Or should action be taken only by those who sense a specific calling to act as representatives on behalf of the entire scientific community?

Moreover, in the training of graduate students who are still in the early stages of developing their personal scientific identities and personalities, how and when is it most appropriate to lead them in such self-discovery? How do we train students to consider the broader social impact of their work and livelihoods?

As I begin to form my own scientific identity, I wonder what it will mean for my fellow socially conscious students and me to exercise our voices in the world we'll inherit. I wonder if there will be meaningful opportunities for us to participate without having to first get inducted into the National Academies, or if we really have as much potential to shape our world as we want to believe.

JASON YANG

Department of Biomedical Engineering, University of Virginia, Charlottesville, VA 22908, USA. E-mail: jhyang@virginia.edu

Reference

1. W. A. Wulf, A. K. Jones, *Science* **322**, 1025 (2008).

Unintended Consequences at NIH

FORMER NIH DIRECTOR ELIAS ZERHOUNI HAS done his level best to destroy biomedical basic research in the United States ("Zerhouni's parting message: Make room for young scientists," J. Kaiser, News of the Week, 7 November 2008, p. 834). Zerhouni's parting shot is a devastating quota system that requires funding disproportionate numbers of new investigators.

The consequence will be a brutal "Darwinian" scenario in which hundreds of bright-eyed new assistant professors will sail through receiving their first R01. When they come to their competitive renewal, they will no longer be in the favored group, and most will fail (especially if the R01 payline stays at 10%). Their chances for promotion and tenure will vanish, and they may continue on their now severely crippled academic careers or they will branch into industry or a completely different career path. Many established investigators, in the peak of their careers and highly productive, will be forced out of science, to make room for the steady influx of new lambs to the slaughter. The best and brightest will avoid biomedical research because they will see a vicious and corrupt system in which tremendous intellect, work, and dedication produce little reward and no security. Obviously, this is a recipe for disaster.

THOMAS E. DECOURSEY

Department of Molecular Biophysics and Physiology, Rush University Medical Center, Chicago, IL 60612, USA. E-mail: tdecours@rush.edu

CORRECTIONS AND CLARIFICATIONS

AAAS News and Notes: "AAAS members elected as Fellows" (19 December 2008, p. 1808). In the Section on General Interest in Science and Engineering, Joseph J. Romm's affiliation should have been the Center for American Progress.