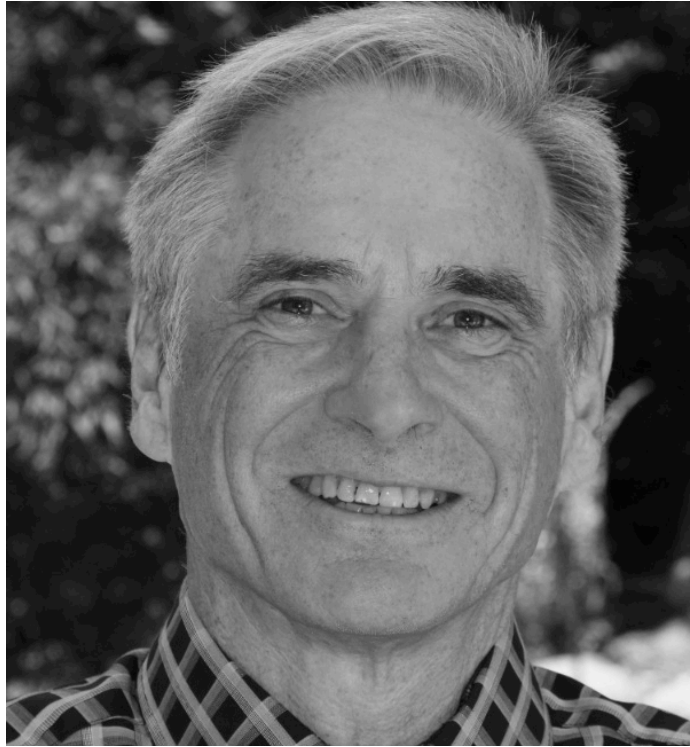


2014 年度

日本電気泳動学会国際学術賞平井賞受賞者



Patrick H. O'Farrell 教授

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McGill University, Montreal, Quebec, B.Sc., 1969, Genetics

University of Colorado, Boulder, Ph.D., 1974, Cell & Dev Biol

University of California San Francisco, Postdoc, 1978

1969-74 Graduate Student: lab of Jacques Pene (1969-72) & David Hirsh (1973-74).

Development of 2-D gel electrophoresis; pleiotropic control. MCD Biology,
University of Colorado

1974-76 Postdoctoral studies with Gordon Tomkins. Regulation of translational
accuracy; hormonal control; expression of recombinant DNA. Department of Biochemistry,
UCSF

1976-79 Postdoctoral studies with Bruce Alberts. Stringency of gene inactivation;
new preparative separation technology. Department of Biochemistry, UCSF

1979-85 Assistant Professor, Department of Biochemistry & Biophysics, UCSF

1985-89 Associate Professor, Department of Biochemistry & Biophysics, UCSF

1989-present Professor, Department of Biochemistry & Biophysics, UCSF

2014 Annual Meeting of Japanese Electrophoresis Society
Hirai Prize Award Lecture

Development of two-dimensional gel electrophoresis and early steps in the evolution of electrophoresis methods.

Patrick H. O'Farrell

In a largely historical part of my presentation, I will describe the scientific and personal context in which I developed two-dimensional gels, and events, including a course I presented at the Uji campus of Kyoto University in 1975, that led to the initial spread of the method. In summary, you will see that the novelty was in the details and technical success, which established a new standard for what could be achieved by electrophoretic separation. I will discuss my motivations, which drove me as a young graduate student to work out this method, and end with a brief description of the early applications of the method and its reception by the scientific community.

In a second part of the talk, I will present the story of the discovery of a second separation method that might be of some interest to members of the electrophoresis society. In the late 70's I developed a new approach to separation that is based on the opposition of two counteracting forces that move molecules to distinct equilibrium points. This novel concept can potentially be used to develop a wide range of specific methods. I will describe the concept, its reduction to practice and the remarkable resolution and capacity of a version of the approach that I called CounterActing Chromatography and Electrophoresis, CACE. While I did not fully optimize this method, the features of the separations achieved in my initial characterizations suggest great potential. In addition to conceptual interest, I decided to present this work in the hopes that it will inspire further refinement, and development of future applications.

References:

Historical part: O'Farrell, P.H. (2008) The pre-omics era: The early days of two-dimensional gels. *Proteomics* 8, 4842-4852

CACE: O'Farrell, P.H. (1985) Separation techniques based on the opposition of two counteracting forces to produce dynamic equilibrium. *Science* 277, 1586-1589

O'Farrell 教授は、米国 Boulder Colorado での学生時代にタンパク質の二次元電気泳動法を開発しました。その方法を 1974 年に学位論文として発表しています。また、翌年、その成果を *Journal of Biological Chemistry* に公表しました。これが、現在でも広く使われている O'Farrell の二次元電気泳動法です。この方法は、一次元目にタンパク質変性条件下の等電点電気泳動、二次元目に SDS ゲル電気泳動を最初に採用した二次元電気泳動法で、1回の分析できわめて多数のタンパク質の分離を可能にしました。O'Farrell 教授は、二次元電気泳動法開発後、カリフォルニア大学サンフランシスコ校に博士研究員として移り、1979 年に同校に研究室を立ち上げました。後年には、胚形成の分子レベルでの研究のパイオニアとなりました。これまでに発表した論文は 110 報以上にのぼります。このたび、タンパク質科学領域に大きな功績を残した O'Farrell 教授に平井賞が授与されることになりました。

国際学術賞平井賞: 日本電気泳動学会は、1983 年東京で開催された第 3 回国際電気泳動学会の大会長を務め、我が国の電気泳動研究の発展に多大の業績を挙げた北海道大学名誉教授平井秀松先生の栄誉を永く歴史に残し、電気泳動研究の発展に寄与することを目的として電気泳動研究基金(平井賞基金)を設立しました。平井賞選考委員会が毎年開催され、受賞候補者の選考が行われています。なお、日本電気泳動学会では、平井賞の他に、児玉賞、国際交流奨励賞、奨励賞の授与も行っています。