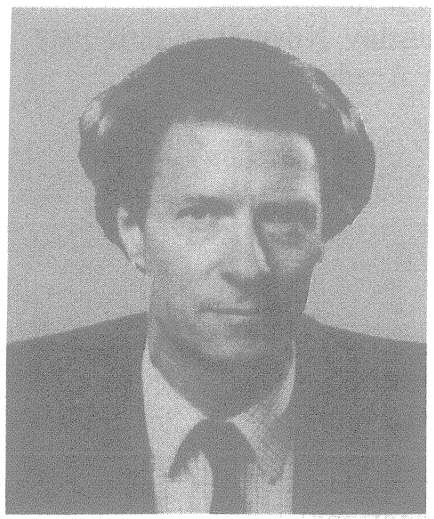
Prof. John Bertrand Gurdon



Date of Birth : October 2, 1933

Nationality : British

Address :
Department of Zoology
University of Cambridge
Downing Street
Cambridge CB 2 3 EJ
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Present Position :
John Humphrey Plummer Professor of Cell Biology,
University of Cambridge

Education and Academic Career:

1947－1952	Eton College, Windsor	
1952－1956	Christ Church, Oxford	Zoology 1 st Class Honours
1956－1960	Department of Zoology and Christ Church, Oxford	Embryology D.Phil. (Supervisor Dr.M.Fischberg)

1958－1961	Department of Zoology, Oxford	Beit Memorial Fellow
1961－1962	California Institute of Technology	Gosney Research Fellow
1963－1964	Department of Zoology, Oxford	Departmental Demonstrator
1963－1972	Christ Church, Oxford	Research Student (=Research Fellow)
1965	Carnegie Institution, Baltimore	Visiting Research Fellow
1965－1972	Department of Zoology, Oxford	Lecturer
1972－1983	Medical Research Council, Laboratory of Molecular Biology, Cambridge.	Member of Permanent Staff Head of Cell Biology Division, 1979－1983.
1974－1983	Churchill College, Cambridge	Extraordinary Fellow
1983－present	John Humphrey Plummer Professor of Cell Biology, University of Cambridge, England.	
1983－present	Churchill College, Cambridge.	Professorial Fellow

Award and Distinctions:

Albert Brachet Prize, Belgian Royal Academy, 1968.
Scientific Medal of the Zoological Society, 1968
Fellow of the Royal Society, 1971.
Feldberg Foundation Award, 1975.
Croonian Lecturer and John Jaffe Prize, Royal Society, 1976.

Paul-Ehrlich-Ludwig-Darmstaedter Prize, Germany, 1977.
Hon.Foreign Member, American Academy of Arts and Sciences, 1978.
Hon.D.Sc., University of Chicago, 1978.
Nessim Habif Prize, University of Geneva, 1979.
Ciba Medal and Prize of the Biochemical Society, 1980.
Foreign Associate, U.S.National Academy of Sciences, 1980.
Docteur Honoris Causa, Universite Rene Descartes, Paris, 1982.
Comfort Crookshank triennial Award for Cancer Research, Middlesex Hospital Medical School, 1983.
Foreign Member, American Philosophical Society, 1983.
William Bate Hardy triennial Prize, Cambridge Philosophical Society, 1984
Foreign Associate, Belgian Royal Academy of Sciences, Letters, and Fine Arts, 1984.
Prix Charles Leopold Mayer, Academie des Sciences, France, 1984.
Ross Harrison Prize, International Society of Developmental Biology, 1985.
Royal Medal, Royal Society, 1985.

Scientific Administration:

Cancer Research Campaign, Scientific Committee, 1972－present.
Beit Memorial Fellowships Selection Committee, 1979－1984
Council of Royal Society, 1981－1983.
Council, Imperial Cancer Research Fund, 1981－1984.
Advisory Board of ARC Institute of Animal Physiology, Babraham, 1982－1985.
President, British Society for Cell Biology, 1981－1985.

Representative Works:

Gurdon, J.B.(1962).Adult frogs derived from the nuclei of single somatic cells.*Devel.Biol.*, **4**, 256-273.

Gurdon, J.B., Lane, C.D., Woodland, H.R., and Marbaix, G.(1971).The use of frog eggs and oocytes for the study of messenger RNA and its translation in living cells.*Nature,* **233**, 177-182.

Gurdon, J.B.(1974).*The Control of Gene Expression in Animal Development.*Oxford and Harvard University Presses.Translated into Japanese and Russian editions.

Gurdon, J.B., De Robertis, E.M., and Partington, G.A.(1976).Injected nuclei in frog oocytes : a living cell syetem for the study of transcriptional control.*Nature,* **260**, 116-120.

Gurdon, J.B. and Melton, D.A.(1981).Gene transfer in amphibian eggs and oocytes.*Ann. Rev.Genetics,* **15**, 189-218

Gurdon, J.B., Fairman, S., Mohun, T.J., and Brennan, S.(1985). The activation of muscle-specific actin genes in *Xenopus* development by an induction between animal and vegetal cells of a blastula.*Cell,* **41**, 913-922.

(Many others)

Academic achievements :

1. Nuclear transplantation to eggs and oocytes

Prof.Gurdon was the first to obtain sexually mature adult animals from transplanted somatic nuclei of embryos, and later from intestinal epithelium nuclei of larvae. He subsequently obtained feeding stage larvae from nuclei of terminally differentiated skin, and of cultured cells grown from several adult organs. His work first established the principle that cell differentation can take place in the absence of any irreversible nuclear changes, and hence that the genome remains constant during development (except for special cases).

By his extended nuclear transfer experiments, Prof.Gurdon discovered that somatic nuclei in oocytes undergo changes in gene activity to conform to the oocyte type. This gave more general validity to the principle that cell cytoplasm has components which can regulate gene expression.

2. Microinjection of macromolecules

To simplify the analysis of nucleo-cytoplasmic interactions, Prof.Gurdon injected purified macromolecules instead of complete nuclei. He first demonstrated the synthesis of DNA injected into the cytoplasm of eggs.

By microinjection of mRNA into oocytes and eggs, he demonstrated that purified mRNA can be brought into normal and efficient translational use in the cytoplasm, and first established the lack of species and cell-type specificity during mRNA translation in living cells (all previous work having been done in cell-free systems). Prof.Gurdon and his colleagues also found that most post-translational steps in gene expression take place in injected oocytes.

Prof.Gurdon followed up these results with a similar analysis of DNA transcription in oocytes. He discovered that DNA injected into the germinal vesicle of an oocyte was accurately transcribed into mRNA.Post-transcriptional processing, including splicing, 5 'trimming, and polyA addition have all been shown to take place in DNA- and RNA-injected oocytes, and have been used in his laboratory to analyse the mechanisms involved.

His extensive series of experiments on oocytes and eggs have shown that most steps of gene expression, except for the initiation of transcription, take place in living cells in a way that it is neither cell type nor species specific.

3. Current work

Prof. Gurdon is now using many of the techniques previously developed in his laboratory (including nuclear transfer and gene transfer) to analyse the localized activation of embryonic muscle genes. He has shown that these genes are activated in one region of an embryo partly by localization of egg refined an embryonic induction system to the point when it can be usefully analyzed at the molecular level.

4. Conclusion

Having completed what are still the most decisive nuclear transfer experiments yet done on any organism, Prof. Gurdon pioneered the use of amphibian oocytes and eggs as "living test tubes" for the analysis of gene expression at all levels. His work has made major contributions to our understanding of gene control in development, but has also had widespread application to many other problems in molecular and cell biology.