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Mary Lyon: an Appreciation

This special issue of *Genetical Research* is dedicated to Dr Mary Lyon on her official retirement from the scientific staff of the Medical Research Council. It honours her for exceptional achievements in the field of mammalian genetics and for her dedicated service over the past 22 years on the Editorial Board of this Journal. The number of contributors to this special enlarged issue gives some measure of the respect and admiration with which she is regarded by her fellow scientists.

It is not surprising that Mary's career has coincided with a meteoric rise in our knowledge of mouse genetics and in our realization of how important this is for a better understanding of human heredity. She herself has spearheaded this advance and has made sure that it will continue on firm foundations. Mary graduated from Girton College, Cambridge in 1946 and obtained her Ph.D. in 1950 as a student of R.A. (later Sir Ronald) Fisher. She then joined Toby Carter and Rita Phillips in an MRC group in Edinburgh, set up by C. H. Waddington to assess, through work on the mouse, the likely genetic risks to man of exposures to ionizing radiation. This group was housed in a small isolated building with limited facilities so it was only after its transfer in 1955 to larger premises at the MRC Radiobiological Research (now Radiobiology) Unit at Harwell that mutational studies could be carried out on a larger scale. Mary took over as Head of this Genetics Section of the Unit in 1962 and has shaped its development to the present day.

Everyone who knows Mary well is aware that despite her mild manner she is a tough and doughty fighter on research matters about which she feels strongly. For instance, she fought hard to make sure that the importance of fundamental genetic studies on the mouse, as well as mutational studies, was fully recognized. In this and other such battles, she was successful, so that the Genetics Division, as it is now called, is recognized as one of the principal mouse genetics research laboratories in the world. Largely through her efforts, the ways in which mouse genetic studies can help to illuminate our understanding of human genetic problems are now well established, as is shown by the support given by the Human Genome Mapping Project, the Human Genome Organisation and EEC initiatives.

The attached bibliography gives some idea of the wide range of significant discoveries which have resulted from Mary's meticulously careful analytical approach to research. They can not all be summarized in this brief appreciation, yet X chromosome inactivation is surely the phenomenon with which Mary's name will always be associated. Following her enunciation of the inactive X hypothesis in 1961, her subsequent research and that of many others around the world has amply demonstrated that 'Lyonization' is a mammalian phenomenon which is not only of great significance in clinical genetics but also serves as a model system, providing ideas on the regulation of gene expression, genomic imprinting and so on.

Thirty years after her original findings Mary and her co-workers (using modern techniques like *in situ* hybridization) continue to illuminate the mysteries of the mammalian X; she could justly be called the doyen of X chromosome investigators. Not content with this, she has also focused on number 17, with special reference to the *t*-complex. Her long-term research on this intriguing region has led to major advances in our understanding of its genetic structure and functions, so that it can now be regarded as the best known segment of the mouse genome and currently the target for intensive molecular investigation.

In addition to her outstanding contributions to knowledge of the mammalian genome, Mary has been responsible for major advances in the field of environmental mutagenesis, for example on comparative aspects, effects of low radiation doses and mutational responses of female germ-cells. She has devised new ways of assessing risks from chemical mutagens that are now in international use. As Chairman of Committee 4 of the International Commission for Protection against Environmental Mutagens and Carcinogens, she has produced some typically thorough and perceptive reports bearing on the risk aspect.

All mouse geneticists should be grateful to Mary for her 'extra-curricular' activities on their behalf. First,

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she has fostered the dissemination of relevant scientific information by her work for Mouse News Letter and its successor, Mouse Genome, e.g. as Editor from 1956 to 1970, more recently as a Chairman of Mouse News Letter Ltd and in many other ways. Equally important has been her service on the Committee for Standardized Genetic Nomenclature for Mice, which she joined in 1958 and has chaired since 1975. It is through her vigilance, foresight, powers of persuasion and sheer hard work that mouse genetic nomenclature is in its present satisfactory state, without any of the confusion and uncertainty which could easily have dogged such a rapidly advancing science. Thirdly, she found time among all her other activities to co-edit a new and greatly enlarged edition of *Genetic Variants and Strains of the Laboratory Mouse*, bearing her full share of all the extra work which that involved. It is also worth mentioning here that she has served or is serving on the Editorial Boards of at least eleven journals besides *Genetical Research*. She also officiated as Hon. Treasurer of the Genetical Society for a number of years and later as Vice-President.

Mary's scientific achievements led to her election in 1973 as Fellow of the Royal Society, which awarded her a Royal Medal in 1984. In 1979 she was elected a Foreign Associate of the US National Academy of Sciences, also a Foreign Honorary Member of the American Academy of Arts and Sciences in 1980. She is an Honorary Fellow of her old College, Girton, and has received many other honours and awards.

Despite her imminent 'retirement', Mary continues to work with the efficiency and drive for which she is noted, making full use of the latest techniques and computer wizardry. Transgenic mice are now tools for further investigation of the *t*-complex, the wide array of *p* mutations is receiving closer attention but, more evident still, is her considerable interest in unravelling genomic regions of man-mouse homology, with her *Mouse Chromosome Atlas* as a very elegant way of illustrating these. With funds to continue this work, Mary's retirement looks set to be purely nominal and, with freedom from administrative chores, we hope she can enjoy many more years of exciting research and discovery with her colleagues.

Mary, we salute you! Thanks for everything and best wishes for the future!

Bruce Cattanach
Jo Peters
Tony Searle

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