Robert Edwards

Pioneer of in vitro fertilisation

Robert Geoffrey Edwards PhD (Edin.) DSc (Wales) FRS, physiologist, born 27 September 1925; died 10 April 2013. CBE 1988, knighted 2011. Lasker Prize for Clinical Medical Research 2001, Nobel Prize in Physiology or Medicine 2010.

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Robert Edwards with one of the babies born as a result of his pioneering technique

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Bob Edwards was an extraordinarily gifted scientist. Few biologists have had such a positive and practical impact on the future of mankind through their basic research. For it was Bob, his clinical colleague Patrick Steptoe, and laboratory assistant Jean Purdy who in 1978 were to achieve the first birth after in vitro fertilisation (IVF),[1] a technique that has brought joy to millions of previously infertile couples.

Rather than a backroom boffin, Bob was immersed completely in the development of clinical progress through his deep understanding of reproductive biology and genetics, his prodigious knowledge of mammalian biology and animal husbandry,[2] and his empathy for the plight of the "undeserving infertile."

The possibility that fertilisation could be manipulated or assisted in the laboratory had been mooted by the early experiments of Gregory Pincus, inventor of the oral contraceptive pill, and referred to in a prophetic 1937 editorial entitled "Conception in a watch glass."[3] Bob was passionate about the possibility that infertile couples could be helped by new techniques being developed in the laboratory, and exemplified the principle of translational science: of bringing ideas from bench to bedside.

Robert Geoffrey Edwards was one of three brothers from humble beginnings in Yorkshire. His Mancunian mother worked as a mill machinist, and his father as a railway worker. He was schooled at Manchester Central High School for Boys, and his further education was unimpressive. Conscripted into the army in 1943, he later read agricultural sciences at the University College of North Wales but, disillusioned by the non-scientific content, transferred to zoology. To his dismay he managed only a pass, not honours.

In debt and disconsolate, he was amazed and delighted to be accepted on to a diploma course in animal genetics in Edinburgh, followed by a PhD. There he undertook experiments in mice towards the understanding of the role of chromosomes and chromosome number in the generation of developmental anomaly—novel research in those early days of developmental genetics. It was here that he met his wife and lifelong collaborator, Ruth Fowler. The experiments that Bob and Ruth undertook involved study of the dynamics of egg meiotic maturation, for which together they developed hormonal ovarian stimulation regimens, which formed the basis for those used in IVF today.[4]

He moved to the department of physiology in Cambridge in 1963 after periods overseas and at the National Institute for Medical Research at Mill Hill. He became increasingly interested in studying egg maturation events in the human, initially as a route to understanding the origins and early diagnosis of genetic disorders such as Down's syndrome. These experiments required human eggs, but at that time the only way to obtain them was through their incidental retrieval at laparotomy for other gynaecological procedures.[5] This is where his chance meeting with Patrick Steptoe was to prove crucial. Steptoe was a pioneer of the newly developing art of laparoscopy that allowed him access to women's ovaries though "keyhole" surgery.

Steptoe was regarded as a bit of a maverick. Not wholly accepted by the gynaecological establishment, he worked in a cottage hospital in Oldham in Lancashire. This necessitated many a trip for Bob or Jean Purdy bringing eggs from Oldham to Cambridge for the early experiments to develop the basic techniques needed.[6] Their landmark papers demonstrating the feasibility of human fertilisation[7] and early development[8] in the laboratory were pivotal in underpinning the later clinical techniques. These were to bring him into conflict with religious groups, especially the Catholic church, which opposed all work involving artificial conception, as it does to this day. Indeed, the day after Bob was awarded the 2010 Nobel prize for medicine, a critical Vatican statement was issued decrying the award.

It is difficult for clinicians and scientists now to appreciate the antipathy and repugnance to Bob's work between the 1960s and 1980s; it was viewed as unnatural and ungodly, and the slippery slope to Aldous Huxley's *Brave New World*. There were calls from the BMA for a halt to all embryo research, and, even after the birth of Louise Brown, the first child to be born after IVF, calls from a US Senate committee for a moratorium.

Bob did not brush aside these criticisms but took them seriously, as he did most things. He spent time in the early 1970s contemplating the ethical issues raised and published widely on bioethics from 1971.[9] With characteristic energy he proceeded to talk publicly about the work and to encourage debate—for which he was also roundly criticised by his colleagues. His visionary ideas were way ahead of his time: whether scientifically, ethically, or in educating the public about science. His 1965 paper in the *Lancet* on human egg maturation charted with remarkable and characteristic foresight a programme for assisted reproductive technology for the next 20 years.[10] He set the foundations for preimplantation genetic diagnosis[11] and understood the importance of embryonic stem cells for regenerative medicine.

He leaves his wife, Ruth, five daughters, and 12 grandchildren.

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References are in the version on bmj.com.

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