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***Personal details***

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<i>Date of birth:</i>	8th August 1951
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***Education***

Whitley Bay Grammar School, Whitley Bay, Tyne and Wear  
Corpus Christi College, University of Cambridge

## ***Qualifications***

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Bachelor of Arts (Honours), University of Cambridge (1973)

Master of Arts, University of Cambridge (1977)

Doctor of Philosophy, University of Cambridge (1978)

## ***Career***

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- 1974-77: Wellcome Research Training Scholarship with Professor Martin H. Johnson, Department of Anatomy, University of Cambridge
- 1978-79: Postdoctoral Research Assistant with Professor Martin H Johnson, Department of Anatomy, University of Cambridge
- 1980: Postdoctoral Fellow with Professor Michael Edidin, Department of Biology, The Johns Hopkins University, Baltimore, Maryland, USA
- 1981: Postdoctoral Research Associate with Professor Sir Martin J Evans and Professor Matthew H Kaufman, Department of Genetics, University of Cambridge
- 1982-86: Scientific Officer, MRC Experimental Embryology and Teratology Unit, MRC Laboratories, Carshalton, Surrey.
- 1986-97: Senior Lecturer then Reader, Institute of Obstetrics & Gynaecology, Royal Postgraduate Medical School, University of London
- 1997-99: Reader, Department of Obstetrics and Gynaecology, Guy's, King's College and St Thomas' Hospitals (GKT) School of Medicine, King's College London, University of London
- 1999-2005: Professor of Developmental Biology, Faculty of Biological Sciences, University of Leeds
- 2006-to date: Visiting Professor, Faculty of Biological Sciences, University of Leeds
- 2005-2006: Scientific Director, The London Bridge Fertility, Gynaecology and Genetics Centre, London
- 2006-2008: Director, The London Bridge Fertility, Gynaecology and Genetics Centre, London
- 2009: Person Responsible and Consultant in Preimplantation Genetics, London Bridge Fertility, Gynaecology and Genetics Centre, London

## ***Research***

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My research interests have focussed on the areas of (1) the cellular and molecular mechanisms of mouse and human preimplantation development, (2) embryonic stem cells, their embryonic origin and use in transgenesis, (3) single cell genetic analysis particularly as applied to the human preimplantation embryo, and more recently, (4) reproductive genetics.

These studies have been reported in about 150 original peer reviewed articles, many as first or senior author, in a range of journals including Nature, Science, New England Journal of Medicine, Lancet, British Medical Journal, Development and Developmental Biology and numerous reviews and published abstracts (see Publications).

## Research highlights

### Mouse preimplantation development

- Demonstrated that the inner cell mass of the early mouse blastocyst is totipotent and can regenerate trophectoderm when isolated by immunosurgery. The regenerated blastocysts are capable of normal development after transfer to pseudopregnant recipient female mice.
- Demonstrated that cell polarisation along radial axes and differentiative cell division results in the generation of two subpopulations of outer and inner cells with distinct properties and allocation to the trophectoderm and inner cell mass lineages of the mouse blastocyst.
- Developed the technique of differential labelling to follow the dynamics of the trophectoderm and inner cell mass lineages of mouse preimplantation embryos and quantified apoptosis in the two lineages both in vivo and in vitro.

### Embryonic stem cells

- Initiated renewed attempts to isolate embryonic stem (ES) cells from the epiblast cells in the inner cell mass of outgrowing mouse blastocysts with Prof Sir Martin Evans and Prof Matthew Kaufmann which subsequently led to first derivation of ES cell lines and the award of the Nobel Prize for Medicine (2007) to Sir Martin Evans (jointly with others for the development of gene targeting in ES cells).
- Isolated a homozygous diploid ES cell line from parthenogenetically activated mouse eggs which was later used to map the location of the X inactivation centre on the mouse X chromosome.

### Germ line transmission of transgenic embryonic stem cells

- Isolated a mouse ES cell line and a subline with a partial deletion of the hypoxanthine phosphoribosyl transferase (hprt) gene. These ES cell lines have since been used to produce numerous other transgenic mice including models of cystic fibrosis.
- Demonstrated germ line transmission of the hprt-deficient ES cells after injection into the blastocoel cavity of host blastocysts and transfer to pseudopregnant recipient female mice.
- Backcrossed to produce the first transgenic 'knock out' mice using ES cells deficient in hprt as a model for the human inherited disease, Lesch-Nyhan syndrome.
- Examined lineage allocation in somatic and gonadal tissues in chimaeric embryos produced by injection of male ES cells into female host blastocysts.

### Mouse models for preimplantation genetic diagnosis

- Demonstrated that cleavage stage biopsy and biochemical analysis of isolated blastomeres could be used to accurately diagnose the sex or hprt activity in embryos produced from matings with heterozygous hprt-deficient mice.

### Human preimplantation development

- Used differential labelling to study the allocation of trophectoderm and inner cell mass cells in the human preimplantation embryo in vitro.
- With Prof Henry Leese, studied the energy substrate requirements of human preimplantation embryos at different stages which provided the basis for the development of sequential media widely in use today.
- Demonstrated that Y-linked genes are expressed as early as the 1-cell zygote stage

### Preimplantation genetics

- Demonstrated that cleavage stage biopsy of one or two cells does not adversely affect human preimplantation development.
- Achieved the first pregnancies worldwide following preimplantation genetic diagnosis using PCR based gender identification in X-linked inherited disease.

- Achieved the first pregnancies worldwide following preimplantation genetic diagnosis for the single gene defect, cystic fibrosis.
- Developed fluorescence in situ hybridisation (FISH) for gender identification in X-linked disease.
- Demonstrated a high level of chromosomal mosaicism in the human preimplantation embryo using multicolour FISH.
- Developed the use of isothermal multiple displacement amplification for whole genome amplification from single cells for preimplantation genetic analysis.

#### Research grants

- Medical Research Council (most recently, 2004-07, £310K for human stem cell research)
- Wellcome Trust
- BBSRC
- Muscular Dystrophy Group
- Other charities

#### Postgraduate research training

- Numerous MSc projects
- Supervised or co-supervised 12 PhDs, with 2 ongoing
- Regular MSc/MD/PhD examiner both in UK and abroad, notably including Prof David Gardner, Prof Karen Sermon and Dr Lynette Scott

#### Invited lectures

- Regular invited lecturer at national and international meetings including regular appearances at the annual meetings of:
  - British Fertility Society
  - European Society for Human Reproduction and Embryology
  - European Society for Human Genetics
  - American Society for Human Genetics
  - American Society for Reproductive Medicine
  - Gordon Research Conferences
- Numerous research seminars in the UK, Europe, USA and Canada, Japan, Korea, India and Australia

### ***Teaching***

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Chair of Developmental Biology, Faculty of Biological Sciences, University of Leeds (1999-2005)  
 Visiting Professor, Faculty of Biological Sciences, University of Leeds (2005 to date)

#### Undergraduate teaching

- Lecturer and examiner for several 2<sup>nd</sup> and 3<sup>rd</sup> year undergraduate modules in mammalian developmental biology and human genetics
- Module manager and principal lecturer for two 3<sup>rd</sup> year undergraduate modules, 'Understanding inherited disease' and 'Transgenesis in mammals'
- Module manager and sole lecturer for medical embryology for medical students at all levels

### Postgraduate teaching

- Lecturer for MSc Human Genetics
- Founding faculty member and lecturer on MSc Clinical Embryology, a distance learning course with annual residential teaching weeks in Leeds
- Manager and sole lecturer on MSc Bioscience module on 'Reproductive Genetics and Stem Cells'

As a Visiting Professor, I continue to teach on the MSc Clinical Embryology and MSc Bioscience courses

### Other teaching

- MSc courses in human reproductive biology or assisted reproduction at Hammersmith and in Nottingham
- Frontiers of Reproduction, Woods Hole, Mass., USA (1998 and 2000)

### Courses and workshops

- Organised and lectured on numerous ESHRE postgraduate courses
- Organised ESHRE Workshop 'Preimplantation diagnosis of genetic disease' Wolfson Conference Centre, Royal Postgraduate Medical School, September 22nd-23rd, 1993
- Organised and lectured on several international workshops of preimplantation genetics

### *European Society for Human Reproduction and Embryology*

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- Member of ESHRE since the late 80s
- Founder and Chairman of the ESHRE Special Interest Group in Reproductive Genetics (1995-2002)
- Co-founder and Chairman of the ESHRE Preimplantation Genetic Diagnosis (PGD) Consortium (1997-2002)
- Organised and lectured on numerous ESHRE postgraduate courses

### *Human Fertilisation and Embryology Authority*

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- In the late 80s, worked with Dame Anne McLaren, chairwoman of the Voluntary Licensing Authority and member of the Warnock Committee, to provide evidence on the safety of human cleavage stage embryo biopsy in preparation for the first clinical application of preimplantation genetic diagnosis
- Actively participated in efforts to lobby Parliament in favour of human embryo research prior to the final reading of the Human Fertilization and Embryology Bill 1990
- In the mid 90s, worked with the HFEA to establish the basis for licensing centres to perform PGD and to license individual embryologists as embryo biopsy practitioners
- HFEA Inspector for embryo biopsy practitioners
- HFEA External Consultant/Inspector
- Person Responsible for research licence, Assisted Conception Unit, St Thomas' Hospital, London (1998-99)
- Regular reviewer for research licence applications

### ***Professional societies***

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British Society for Developmental Biology  
British Society for Cell Biology  
Society for the Study of Fertility  
Progress  
British Fertility Society  
European Society of Human Reproduction and Embryology  
Clinical Genetics Society  
International Society for Early Prenatal Diagnosis  
Alpha: International Society for Clinical Embryology (Founder member)  
British Society for Immunology (1975-88)  
Royal Microscopical Society (1983-88)

### ***Editorial boards***

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Journal of Assisted Reproduction and Genetics  
Zygote  
Regular reviewer for original articles in a range of journals

### ***Other professional activities***

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- European Commission (EC) working group for the Protection of the Human Embryo and Fetus advising the Commission on ethical issues related to research and treatment involving human embryos and the drafting of the Bioethics Convention and report on any ethical issues raised by proposals for European funding under the Biomed framework programme
- NIH panel considering the funding issues related to human embryo research and preimplantation genetics
- Board and founder member of the International Working Group for Preimplantation Genetics

### ***Professional development***

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- Several University of Leeds staff development courses covering such issues as discrimination and staff appraisal
- BFS course on Quality Management (2006)

### ***Media reports***

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- Numerous print and television reports, both nationally and abroad, related to human embryo research and preimplantation genetics including Scientific American, Time and Tomorrow's World
- Front page report in the Daily Telegraph (April, 1990) on first clinical pregnancies following preimplantation genetic diagnosis
- Front page report in New York Times (September, 1992) following publication of first successful screening of human embryos for a single gene defect, cystic fibrosis
- BBC Horizon (1990) 'The first 14 days'
- BBC Horizon 'Cracking the Code – Designer Babies'
- Channel 4 feature on PGD and history of assisted reproduction (1999)

## *Publications*

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### *Original articles*

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1976:

**Handyside, A.H.** and Barton, S.C. (1976). Evaluation of the technique of immunosurgery for the isolation of inner cell masses from mouse blastocysts. *J. Embryol. exp. Morph.* 37, 217-226.

1978:

**Handyside, A.H.** (1978). Time of commitment of inside cells isolated from preimplantation mouse embryos. *J. Embryol. exp. Morph.* 45, 37-53.

Johnson, M.H. and **Handyside, A.H.** (1978). Temporal and spatial patterns of the synthesis of tissue-specific polypeptides in the preimplantation mouse embryo. *J. Embryol. exp. Morph.* 44, 191-199.

1979:

Johnson, M.H., **Handyside, A.H.**, Chakraborty, J., Willison, K., and Stern, P. (1979). The effect of prolonged decompaction on the development of the preimplantation mouse embryo. *J. Embryol. exp. Morph.* 54, 241-261.

1980:

**Handyside, A.H.** (1980). Distribution of antibody and lectin-binding sites on dissociated blastomeres from mouse morulae: evidence for polarization at compaction. *J. Embryol. exp. Morph.* 60, 99-116.

Rastan, S., Kaufman, M.H., **Handyside, A.H.**, and Lyon, M. (1980). X-inactivation in extra-embryonic membranes of diploid parthenogenetic mouse embryos demonstrated by differential staining. *Nature* 288, 172-173.

1981:

**Handyside, A.H.** (1981). Immunofluorescence techniques for determining the numbers of inner and outer blastomeres in mouse morulae. *J. Reprod. Immunol.* 2, 339-350.

Surani, M.A.H., Kimber, S.J., and **Handyside, A.H.** (1981). Synthesis and role of cell surface glycoproteins in preimplantation mouse development. *Exp. Cell Res.* 133, 331-339.

Wolfe, D.E., **Handyside, A.H.**, and Edidin, M. (1981). Changes in the organisation of the mouse egg plasma membrane upon fertilization and first cleavage: indication from the lateral diffusion rates of fluorescent lipid analogues. *Dev. Biol.* 85, 195-198.

1982:

Johnson, M.H., **Handyside, A.H.**, and Ziomek, C.A. (1982). The developmental potential of mouse 16-cell blastomeres. *J. Exp. Zool.* 221, 345-355.

Kaufman, M.H., Robertson, E.R., **Handyside, A.H.**, and Evans, M.J. (1982). Establishment of pluripotential cell lines from haploid mouse embryos. *J. Embryol. exp. Morph.* 73, 249-261.

Wolfe, D.E., **Handyside, A.H.**, and Edidin, M. (1982). Diffusion of molecules on biological membranes of non-planar form - an experimental verification. *Biophys. J.* 38, 295-297.

1983:

Surani, M.A.H. and **Handyside, A.H.** (1983). Reassortment of cells according to position in mouse morulae. *J. Exp. Zool.* 225, 505-511.

1984:

**Handyside, A.H.** and Hunter, S. (1984). A rapid procedure for visualising the inner cell mass and trophectoderm nuclei of mouse blastocysts in situ using polynucleotide-specific fluorochromes. *J. Exp. Zool.* 231, 429-434.

1986:

**Handyside, A.H.** and Hunter, S. (1986). Cell division and death in the mouse blastocyst before implantation. *Roux's Arch. Dev. Biol.* 195, 519-526.

1987:

**Handyside, A.H.**, Edidin, M., and Wolfe, D.E. (1987). Polarized distribution of membrane components on two-cell mouse embryos. *Roux's Arch. Dev. Biol.* 196, 273-278.

**Handyside, A.H.**, Hooper, M.L., Kaufman, M.H., and Wilmut, I. (1987). Towards the isolation of embryonal stem cell lines from the sheep. *Roux's Arch. Dev. Biol.* 196, 185-190.

Hooper, M.L., Hardy, K., **Handyside, A.H.**, Hunter, S., and Monk, M. (1987). HPRT-deficient (Lesch-Nyhan) mouse embryos derived from germ line colonization by cultured cells. *Nature* 326, 292-295.

Monk, M., **Handyside, A.H.**, Hardy, K., and Whittingham, D.G. (1987). Preimplantation diagnosis of deficiency in hypoxanthine phosphoribosyl transferase in a mouse model for Lesch-Nyhan syndrome. *Lancet II*, 423-425.

1988:

- Monk, M. and **Handyside, A.H.** (1988). Sexing of preimplantation mouse embryos by measurement of X-linked gene dosage in a single blastomere. *J. Reprod. Fert.* 82, 365-368.
- 1989:
- Coutelle, C., Williams, C., **Handyside, A.**, Hardy, K., Winston, R., and Williamson, R. (1989). Genetic analysis of DNA from single human oocytes: a model for preimplantation diagnosis of cystic fibrosis. *BMJ.* 299, 22-24.
- Handyside, A.H.**, Pattinson, J.K., Penketh, R.J., Delhanty, J.D., Winston, R.M., and Tuddenham, E.G. (1989). Biopsy of human preimplantation embryos and sexing by DNA amplification. *Lancet* 1, 347-349.
- Handyside, A.H.**, O'Neill, G.T., Jones, M., and Hooper, M.L. (1989). Use of BRL-conditioned medium in combination with feeder layers to isolate a diploid embryonal stem cell line. *Roux's Arch. Dev. Biol.* 198, 48-56.
- Hardy, K., Hooper, M.A., **Handyside, A.H.**, Rutherford, A.J., Winston, R.M., and Leese, H.J. (1989). Non-invasive measurement of glucose and pyruvate uptake by individual human oocytes and preimplantation embryos. *Hum. Reprod.* 4, 188-191.
- Hardy, K., **Handyside, A.H.**, and Winston, R.M. (1989). The human blastocyst: cell number, death and allocation during late preimplantation development in vitro. *Development.* 107, 597-604.
- Penketh, R.J., Delhanty, J.D., van den Berghe, J.A., Finklestone, E.M., **Handyside, A.H.**, Malcolm, S., and Winston, R.M. (1989). Rapid sexing of human embryos by non-radioactive in situ hybridization: potential for preimplantation diagnosis of X-linked disorders. *Prenat. Diagn.* 9, 489-499.
- 1990:
- Handyside, A.H.**, Kontogianni, E.H., Hardy, K., and Winston, R.M. (1990). Pregnancies from biopsied human preimplantation embryos sexed by Y-specific DNA amplification. *Nature* 344, 768-770.
- Hardy, K., Martin, K.L., Leese, H.J., Winston, R.M., and **Handyside, A.H.** (1990). Human preimplantation development in vitro is not adversely affected by biopsy at the 8-cell stage. *Hum. Reprod.* 5, 708-714.
- Hardy, K., Carthew, P., **Handyside, A.H.**, and Hooper, M.L. (1990). Extragonadal teratocarcinoma derived from embryonal stem cells in chimaeric mice. *J. Pathol.* 160, 71-76.
- 1991:
- Ansell, J.D., Samuel, K., Whittingham, D.G., Patek, C.E., Hardy, K., **Handyside, A.H.**, Jones, K.W., Muggleton Harris, A.L., Taylor, A.H., and Hooper, M.L. (1991). Hypoxanthine phosphoribosyl transferase deficiency, haematopoiesis and fertility in the mouse. *Development.* 112, 489-498.
- Griffin, D.K., **Handyside, A.H.**, Penketh, R.J., Winston, R.M., and Delhanty, J.D. (1991). Fluorescent in-situ hybridization to interphase nuclei of human preimplantation embryos with X and Y chromosome specific probes. *Hum. Reprod.* 6, 101-105.
- Leese, H.J., Humpherson, P.G., Hardy, K., Hooper, M.A., Winston, R.M., and **Handyside, A.H.** (1991). Profiles of hypoxanthine guanine phosphoribosyl transferase and adenine phosphoribosyl transferase activities measured in single preimplantation human embryos by high-performance liquid chromatography. *J. Reprod. Fertil.* 91, 197-202.
- Patek, C.E., Kerr, J.B., Gosden, R.G., Jones, K.W., Hardy, K., Muggleton Harris, A.L., **Handyside, A.H.**, Whittingham, D.G., and Hooper, M.L. (1991). Sex chimaerism, fertility and sex determination in the mouse. *Development.* 113, 311-325.
- 1992:
- Griffin, D.K., Wilton, L.J., **Handyside, A.H.**, Winston, R.M., and Delhanty, J.D. (1992). Dual fluorescent in situ hybridisation for simultaneous detection of X and Y chromosome-specific probes for the sexing of human preimplantation embryonic nuclei. *Hum. Genet.* 89, 18-22.
- Handyside, A.H.**, Lesko, J.G., Tarin, J.J., Winston, R.M., and Hughes, M.R. (1992). Birth of a normal girl after in vitro fertilization and preimplantation diagnostic testing for cystic fibrosis. *N. Engl. J. Med.* 327, 905-909.
- Tarin, J.J., Conaghan, J., Winston, R.M.L., and **Handyside, A.H.** (1992). Embryo biopsy on the 2nd day after insemination for preimplantation diagnosis: biopsy of a quarter of embryo retards cleavage. *Fert. Steril.* 58, 970-976.
- 1993:
- Conaghan, J., **Handyside, A.H.**, Winston, R.M.L., and Leese, H.J. (1993). Effects of pyruvate and glucose on the development of human preimplantation embryos in vitro. *J. Reprod. Fert.* 99, 87-95.
- Conaghan, J., Hardy, K., **Handyside, A.H.**, Winston, R.M.L., and Leese, H.J. (1993). Selection criteria for human embryo transfer: a comparison of pyruvate uptake and morphology. *J. Ass. Reprod. Genet.* 10, 21-30.
- Chong, S.S., Cota, J., Hardikar, S.D., **Handyside, A.H.**, and Hughes, M.R. (1993). Preimplantation diagnosis of X-linked disease: reliable and rapid sex determination of single human cells by restriction site analysis of simultaneously amplified ZFX and ZFY sequences. *Hum. Mol. Genet.* 2, 1187-1191.
- Delhanty, J.D.A., Griffin, D.K., **Handyside, A.H.**, Harper, J., Atkinson, G.H.G., Pieters, M.H.E.C., and Winston, R.M.L. (1993). Detection of aneuploidy and



- chromosomal mosaicism in human embryos during preimplantation sex determination by fluorescent in situ hybridization (FISH). *Hum. Mol. Genet.* 2, 1183-1185.
- Griffin, D.K., Wilton, L.J., **Handyside, A.H.**, Atkinson, G.H.G., Winston, R.M.L., and Delhanty, J.D.A. (1993). Diagnosis of sex in preimplantation embryos by fluorescent in situ hybridisation. *Brit. Med J.* 306, 1382.
- Hardy, K., Winston, R.M.L., and **Handyside, A.H.** (1993). Binucleate cells in human preimplantation embryos in vitro: failure of cytokinesis during cleavage. *J. Reprod. Fert.* 98, 549-558.
- Hardy, K. and **Handyside, A.H.** (1993). Cell allocation in twin half mouse embryos bisected at the 8-cell stage: implications for preimplantation diagnosis. *Mol. Reprod. Dev.* 36, 16-22.
- Schrurs, B.M., Winston, R.M., and **Handyside, A.H.** (1993). Preimplantation diagnosis of aneuploidy using fluorescent in-situ hybridization: evaluation using a chromosome 18-specific probe. *Hum. Reprod* 8, 296-301.
- 1994:*
- Ao, A., Erickson, R.P., Winston, R.M.L., and **Handyside, A.H.** (1994). Transcription of paternal Y-linked genes in the human zygote as early as the pronucleate stage. *Zygote* 2, 281-288.
- Coonen, E., Harper, J.C., Ramaekers, F.C.S., Delhanty, J.D.A., Hopman, A.H.N., Geraedts, J.P.M., and **Handyside, A.H.** (1994). Presence of chromosomal mosaicism in abnormal human preimplantation embryos detected by fluorescent in situ hybridization (FISH). *Hum. Genet.* 54, 609-615.
- Griffin, D.K., **Handyside, A.H.**, Harper, J., Wilton, L.J., Atkinson, H.G., Soussis, I., Wells, D., Kontogianni, E.H., Tarin, J., Geber, S., Ao, A., Winston, R.M.L., and Delhanty, J.D.A. (1994). Clinical experience with preimplantation diagnosis of sex by dual fluorescent in situ hybridisation. *J. Ass. Reprod. Genet.* 11, 132-143.
- Harper, J.C., Coonen, E., Ramaekers, F.C.S., Delhanty, J.D.A., **Handyside, A.H.**, Winston, R.M.L., and Hopman, A.H.N. (1994). Identification of the sex of human preimplantation embryos in two hours using an improved spreading method and fluorescent in situ hybridisation (FISH) using directly labelled probes. *Hum. Reprod.* 9, 721-724.
- Harper, J.C., Robinson, F., Duffy, S., Griffin, D., Delhanty, J.D.A., **Handyside, A.H.**, and Winston, R.M.L. (1994). Identification of fertilization in embryos with accelerated cleavage by fluorescent in situ hybridization. *Hum. Reprod.* 9, 1733-1737.
- Nikas, G., Paraschos, T., Psychoyos, A., and **Handyside, A.H.** (1994). The zona reaction in human oocytes as seen with scanning electron microscopy. *Hum. Reprod.* 9, 2135-2138.
- Van den Veyver, I.B., Chong, S.S., Cota, J., Bennett, P.R., Fisk, N.M., **Handyside, A.H.**, Carton, J., Le Van Kim, C., Colin, Y., Snabes, M.C., Moise, K.J., and Hughes, M.R. (1994). Single cell analysis of the Rhesus D blood type for use in preimplantation diagnosis in the prevention of severe hemolytic disease of the newborn. *Am. J. Obstet. Gynecol.*
- 1995:*
- Ao, A. and **Handyside, A.H.** (1995). Cleavage stage human embryo biopsy. *Hum. Reprod. Update* 1 (3) CD-ROM
- Chia, C.M., Winston, R.M.L., and **Handyside, A.H.** (1995). EGF, TGF- $\alpha$  and EGFR expression in human preimplantation embryos. *Development* 121, 299-307.
- Geber, S., Winston, R.M.L., and **Handyside, A.H.** (1995). Proliferation of blastomeres from biopsied cleavage stage human embryos in vitro. An alternative to blastocyst biopsy for preimplantation diagnosis. *Hum. Reprod.* 10, 1492-1496.
- Harper, J.C., Coonen, E., **Handyside, A.H.**, Winston, R.M.L., Hopman, A.H.N., and Delhanty, J.D.A. (1995). Mosaicism of autosomes and sex chromosomes in morphologically normal, monospermic preimplantation human embryos. *Prenat. Diagn.* 15, 41-49.
- Ray, P., Conaghan, J., Winston, R.M.L., and **Handyside, A.H.** (1995). Increased cell number and metabolic activity in male human preimplantation embryos following in vitro fertilization (IVF). *J. Reprod. Fert.* 104, 165-171.
- 1996:*
- Ao, A., Ray, P., Lesko, J., Harper, J.C., **Handyside, A.H.**, Hughes, M.R., and Winston, R.M.L. (1996). Clinical experience with preimplantation diagnosis of the  $\Delta F508$  deletion causing cystic fibrosis. *Prenat. Diagn.* 16, 137-142.
- Hardy, K. and **Handyside, A.H.** (1996). Metabolism and cell allocation during parthenogenetic preimplantation mouse development. *Mol Reprod Dev.* 43, 313-322.
- Nikas, G., Ao, A., Winston, R.M.L. and **Handyside, A.H.** (1996) Compaction and surface polarity in the human embryo in vitro. *Biol. Reprod. Biol. Reprod* 55, 32-37.
- Ray, P.F. and **Handyside, A.H.** (1996). Increased denaturing temperature during the first few cycles of amplification from single cells reduces allele dropout. *Molecular Human Reproduction Mol. Hum. Reprod.* 2 (3), 213-218.
- Ray, P.F., Kaeda, J.S., Bingham, J., Vulliamy, T., Dokal, I., Roberts, I., Winston, R.M.L. and **Handyside, A.H.** (1996) Preimplantation genetic diagnosis of beta-thalassaemia major: accurate detection of mutations in a compound heterozygote

- following single cell amplification. *Lancet* 347, 1696.
- Soussis, I., Harper, J.C., **Handyside, A.H.**, and Winston, R.M.L. (1996). Obstetric outcome of pregnancies resulting from biopsied embryos for genetic disease. *Br. J. Obstet. Gynaecol.* 103, 784-788.
- Soussis, I., Harper, J.C., Kontogianni, E., Paraschos, T., Packham, D., **Handyside, A.H.**, and Winston, R.M.L. (1996). Pregnancies resulting from embryos biopsied for preimplantation diagnosis of genetic disease. Biochemical and ultrasonic studies in the first trimester of pregnancy. *J. Assist. Reprod Genet.* 13, 254-258.
- 1997:
- Delhanty, J.D.A., Harper, J.C., Ao, A., **Handyside, A.H.** and Winston, R.M.L. (1997) Multicolour FISH detects frequent chromosomal mosaicism and chaotic division in normal preimplantation embryos from fertile patients. *Hum. Genet.* 99, 755-760.
- Ray, P.F., Winston, R.M.L. and **Handyside, A.H.** (1997) XIST expression from the maternal X chromosome in human male preimplantation embryos at the blastocyst stage. *Hum. Mol. Genet.* 6, 1323-1327.
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