

CURRICULUM VITAE

Douglas T. Carrell, Ph.D., H.C.L.D.

I. PERSONAL DATA

Birth date: 3-20-60
Citizenship: USA

II. EDUCATION AND BOARD CERTIFICATION

Undergraduate: Bachelor of Science (Zoology) - April 1985, Brigham Young University

Graduate: Master of Science (Cellular and Developmental Biology) - August 1989, Brigham Young University

Doctor of Philosophy (Physiology) - August 1995, University of Utah

Board Certification: High Complexity Laboratory Director (Andrology)- American Board of Bioanalysis, 1998.

Board Certification: High Complexity Laboratory Director (Embryology)- American Board of Bioanalysis, 1998.

III. PROFESSIONAL EXPERIENCE

Positions: Associate Professor of Surgery (Urology), Obstetrics and Gynecology, and Physiology, University of Utah School of Medicine, February 2002-Present.

Assistant Professor of Surgery (Division of Urology), Univ. of Utah School of Medicine, May 1996-February 2002.

Adjunct Assistant Professor of Physiology, Univ. of Utah School of Medicine, October 1996-2006

Adjunct Associate Professor of Physiology, Univ. of Utah School of Medicine, October 2006 - Present

Adjunct Assistant Professor of OB-GYN, Univ. of Utah School of Medicine, October 1997-Present

Laboratory (IVF and Andrology) Manager, University of Utah School of Medicine, Division of Urology, 1988-May 1996

Laboratory Supervisor, University of Utah School of Medicine, Division of Urology, 1987-1988

Laboratory Manager, Reproductive Medical Technologies, Inc., 1983-1987

Laboratory Technician, University of Utah School of Medicine, Division of Urology, 1981-1986

Consulting: Laboratory Consultant, Specialized Biotechnology Services, 1986-present

Editorial: Editorial Board, Archives of Andrology/ Journal of Reproductive Systems, 2006-Present

Editorial Board, Archives of Andrology, 1999- 2003

Editorial Board, Journal of Experimental and Clinical Assisted Reproduction, 2003-Present

Editorial Board (Ad Hoc), Fertility and Sterility, 1998-Present

Editorial Board, Advances in Andrology, 2000-2003

Ad Hoc Reviewer:

Journal of the Society of Gynecological Investigation, Human Reproduction, Journal of Urology, Archives of Physiology and Biochemistry, Biology of Reproduction, Journal of Andrology, Int J Andrology, Human Reproduction Update, Fertility and Sterility, Asian J Andrology, New England Journal of Medicine, Journal of Reproductive Immunology, Obstetrics and Gynecology, Human Molecular Genetics,

Research Awards:

Prize Journal Paper, Assisted Reproductive Technologies/Andrology, Presented at Annual Meeting, 1997.

Honorary Lectureship, ARTA Annual Meeting, Cairo, Egypt, 1997.

Finalist, Prize Poster Presentation, American Society of Reproductive Medicine Annual Meeting, 1997.

Royen Institute Andrology Research Prize 2001, Carrell DT, Liu L (2001): Altered protamine 2 expression is uncommon in donors of known fertility, but common among men with poor fertilizing capacity and may reflect other abnormalities of spermiogenesis. *J Andrology* 22:604-610.

In-Training Research Award Paper (YEAR): Chohan KR, Griffin JT, LaFromboise M, De Jonge CJ, Carrell DT. "Sperm DNA damage relationship with embryo quality and pregnancy outcome in IVF patients." American Society for Reproductive Medicine Annual Meeting, Philadelphia, PA

IV. ADMINISTRATIVE DUTIES

Co-Director, University of Utah Andrology and IVF Laboratories, 1996-1997

Director, University of Utah Andrology and IVF Laboratories, 1997-Present

Director, Abbott Northwestern Hospital, Center for Reproductive Medicine, IVF and Andrology Laboratories (1997-Present)

Director, Andrology Laboratory, St. Paul Center of Reproductive Medicine (1999-Present)

V. PROFESSIONAL AND SCIENTIFIC COMMITTEES

Co-chairman, Travel Committee, 1997 AUA Western Section Annual Meeting.

Co-chairman, 1997 Partus Medical Clinic Symposium on Advanced Reproductive Techniques.

Co-chairman, 2001 Partus Symposium on Intracytoplasmic Sperm Injection and IVF.

Member, Allina Health Systems Committee on Reproductive Ethics (1997-Present)

Member, Congressional Liaison Committee, American Society of Cell Biology (2001-Present)

Member, Publicity Committee, American Society of Reproductive Medicine (2002-Present)

Member, Clinical Outreach Committee, Society for the Study of Reproduction (2004-Present)

Chairman, Organizing Committee, Utah International Symposium on the Genetics of Male Infertility (2005-2006)

Chairman, Local Arrangements Committee, Utah International Symposium on the Genetics of Male Infertility (2005-2006)

Co-Chairman, Organizing Committee, International Symposium on the Genetics of Male Infertility, Florence Italy, Sept 20-23, 2007.

Member, Publications Committee, American Society of Andrology (2006-Present)

Member, Development Committee, American Society of Andrology (2006-2007)

VI. UNIVERSITY COMMITTEES

Member, Univ. of Utah Biosafety Committee, 1997-2000.

Member, Univ of Utah School of Medicine Academic Nominating Committee for Academic Senate, 2001-2002.

Member, Department of Surgery Research Committee, 2002-2004

Member, Institutional Review Board for Research With Human Subjects (IRB), 2002-2005

VII. MEMBERSHIP IN PROFESSIONAL SOCIETIES

American Society of Andrology (1986-present)

American Society of Reproductive Medicine (1988-present)

Society for the Study of Reproduction (1989-present)

Society for Developmental Biology (1991-present)

Endocrine Society (1993-present)

American Society of Cell Biology (1994-present)

International Embryo Transfer Society (1996-present)

American Urology Association (1997-present)

Pacific Coast Fertility Society (1998-present)

European Society of Human Reproduction and Embryology (1996-present)

American Association for the History of Medicine (2003-present)

International Society of Preimplantation Genetic Diagnosis (2003-present)

American Society of Human Genetics (2004-present)

VIII. TEACHING RESPONSIBILITIES

Courses: Sophomore Organ Systems Course, (Medical Students), Male
Reproduction and Infertility (1996-Present)

 Sophomore Organ Systems Course, (Med Students), Sexual
Determination and Differentiation (1998-Present)

 Bioengineering 6010, Physiology for Biology and Engineering
Graduate Students, Endocrinology Section, (2001-2003)

 Physiology Proseminar, (Grad Students),
Reproductive Biology Laboratory Techniques, (1996-Present)

 Ad hoc Lectures, (Residents), Dept. of Ob-Gyn and Division of
Urology (1996-Present)

 Reproductive Endocrinology (Phys 7930), Course Director,
(Graduate Students) 2003-Present

 Principles of Physiology (Phys 5200), Endocrine Section Lecturer,
2004-Present.

Graduate Students:

Vincent Aoki, Ph.D. (2002-2005)
Ph.D., Completed November 2005,
Dept. of Physiology, University of Utah School of Medicine
(Graduate Advisor, Committee Chairman)
Thesis: Characterization of Human Sperm Protamine Deficiency
and the Implications for Human Male Infertility

Gregory Christensen, Ph.D. (1998-2006)
Ph.D. Completed December 2006
Dept. of Physiology, University of Utah School of Medicine
(Graduate Advisor, Committee Chairman)
Thesis: Genetic Determinants of Male Infertility: The Role of
Antizyme 3.

Benjamin Emery
Ph.D. Candidate (Expected 2007)
Dept. of Physiology, University of Utah School of Medicine
(Graduate Advisor, Committee Chairman)
Thesis: Protein interactions in abnormal protamine expression.

Matthew Sanderson

Ph.D. Candidate (Expected 2009)
Dept. of Physiology, University of Utah School of Medicine
(Graduate Advisor, Committee Chairman)
Thesis: Abnormal meiotic recombination in infertile males.

Saher (Sue) El-Khechen Hammoud
Ph.D. Candidate (Expected 2010)
Dept. of Physiology, University of Utah School of Medicine
(Graduate Advisor, Committee Chairman)
Thesis: Etiology of abnormal protamine expression in male infertility.

C. Anthony Peterson
Ph.D. Candidate (Expected 2010)
Dept. of Physiology, University of Utah School of Medicine
(Graduate Advisor, Committee Chairman)

Charles Cornwell (Committee Member)
M.Sc. Embryology (2001), Danube Univ. of Krems
Thesis: Influence of hCG on Granulosa Cell Apoptosis.

Post-Doctoral Fellows:

Ji Wu, M.D., (1999-2001)
Research Topic: In vitro Maturation of Porcine Preantral
Follicles.
Current Employment: Shanghai University, China

Sergey Moskovtsev, M.D., (2000-2002)
Research Topic: In vitro Maturation of Human Preantral
Follicles.
Current Employment: Mt. Sinai Hospital, Toronto Ontario

Kazim Chohan, Ph.D., (2001-2004)
Research Topic: The Role of Chromatin Abnormalities in Male
Infertility.
Current Employment: SUNY Upstate Medical University,
Syracuse, New York

Reproductive Endocrine Fellows:

Ivan Huang, M.D. (2003-2006) (Research Advisor)

Ahmad Omar Hammoud, M.D. (2005-2008) (Research Adviser)

Visiting Trainees:

Yong Ding, M.D., China, Oct-Dec 2001.

Blazej Meczekalski, M.D., Poland, Dec 2001- March 2002.

Nickolai Kuznetsov, M.D., Russia, May 2006

IX. PEER-REVIEWED PUBLICATIONS

1. Urry RL, **Carrell DT**, Hull DB, Middleton RG, Wiltbank MC (1983) Penetration of zona-free hamster ova and bovine cervical mucus by fresh and frozen human spermatozoa. *Fertil Steril* 39:690.
2. Yang HT, Hammer RL, Sellers TL, **Carrell DT**, Winder WW (1988) Adrenomedullation affects endurance but not hepatic fructose 2,6-bisphosphate. *Am J Physiol* 254 (Regulatory Integrative Comp. Physiol.) 572-577.
3. **Carrell DT**, Bradshaw WS, Jones KP, Middleton RG, Peterson CM, Urry RL (1992) An evaluation of various treatments to increase sperm penetration capacity for potential use in an in vitro fertilization program. *Fertil Steril* 57:134.
4. **Carrell DT**, Odell WD (1992) A bacterial binding site which binds human chorionic gonadotropin but not human luteinizing hormone. *Endocrine Research* 18:51.
5. Odell WD, Griffin J, Grover S, **Carrell DT**: Human chorionic gonadotropin-like proteins: secretion in nonpregnant humans and production by bacteria. In: Jackson DP (ed), *Trans Am Clin Clim Assoc*, Waverly Press, Baltimore, 1992, 238-254.
6. **Carrell DT**, Hammond E, Odell WD (1993) Evidence for an autocrine/paracrine function of chorionic gonadotropin in *Xanthomonas maltophilia*. *Endocrinology* 132:1085-1089.
7. Grover S, Woodward SR, Caticha O, **Carrell DT**, Odell WD (1993) Partial nucleotide sequence of the *Xanthomonas maltophilia* chorionic gonadotropin-like receptor. *Biochem Biophys Res Comm* 190:371-376.
8. **Carrell DT**, Middleton RG, Peterson CM, Jones KP, Urry RL (1993) The role of the cumulus in the selection of morphologically normal sperm and induction of the acrosome reaction during human in vitro fertilization. *Arch Androl* 31:133-137.
9. Yanagimachi R, Katayose H, Killian G, Lee CN, **Carrell DT**, Huang TTF (1993) Moderate heat treatment increases the penetrability of zonae pellucidae of salt-stored eggs by sperm. *Zygote* 1:345-351.
10. **Carrell DT**, Zobel RL, Middleton RG, Urry RL (1994) A functional analysis and the potential clinical significance of seven categories of sperm morphology. *J Urol* 151:376-380.
11. Urry RL, **Carrell DT**, Starr NT, Snow BW, Middleton RG (1994) The incidence of antisperm antibodies in infertility patients with a history of cryptorchidism. *J Urol* 151:381-383.

12. Blackburn CW, Peterson CA, Hales HA, Peterson CM, **Carrell DT**, Jones KP, Urry RL (1994) Nicotine, but not cotinine, has a direct toxic effect on ovarian function in the immature gonadotropin-stimulated rat. *Reprod Toxic* 8:325-331.
13. Peterson CM, Jolles CJ, **Carrell DT**, Straight RC, Jones KP, Poulson AM, Hatasaka HH (1994) GnRH agonist therapy in human ovarian epithelial carcinoma (OVCAR-3) heterotransplanted in the nude mouse is characterized by latency and transience. *Gynecologic Oncology* 52:26-30.
14. Peterson CM, Hatasaka HH, Jones KP, Poulson AM, **Carrell DT** (1994) Ovulation induction with gonadotropins and intrauterine insemination compared with in vitro fertilization and no therapy: a prospective, nonrandomized, cohort study and meta-analysis. *Fertil Steril* 62:535-544.
15. **Carrell DT**, Peterson CM, Urry RL (1995) The binding of recombinant human relaxin to human spermatozoa. *Endocrine Res* 21:697-707.
16. **Carrell DT**, Wilcox AL, Urry RL (1996) Effect of fluctuations in temperature encountered during handling and shipping of human cryopreserved semen. *Andrologia* 28:315-319.
17. **Carrell DT**, Urry RL (1996) A review of the use of modified sperm penetration assay to predict fertilization ability. *Assisted Reprod Rev* 6:170-174.
18. **Carrell DT**, Griffin J, Woods ME, Odell WD (1997) The production of a CG-like protein and binding to a specific receptor in *Mycoplasma vaccae*. *Endocrine Res.* 23:59-68.
19. **Carrell DT**, Peterson CM, Hatasaka HH, Jones KP, Urry RL (1997) Abnormal sperm morphology affects embryo quality and pregnancy rates during IVF, but not during ICSI. *J Assisted Reproduction and Technology/Andrology* 9:182-192.
20. **Carrell DT**, Kuneck P, Peterson CM, Hatasaka HH, Jones KP, Campbell B, Thorp C, Urry RL (1998) A randomized, prospective analysis of five sperm preparation techniques prior to artificial insemination. *Fertil Steril* 69:122-126.
21. **Carrell DT**, Emery BR, Peterson CM (1998) The correlation of sperm chromatin decondensation following in vitro exposure to heparin and sperm penetration rates. *J Assisted Reprod Genet* 15: 560-564.
22. **Carrell DT**, Emery B, Liu L (1999) Characterization of chromosome aneuploidy rates, decondensation ability, nuclear protamines, and functional ability of round-headed sperm from siblings, and implications for intracytoplasmic sperm injection (ICSI). *Fertil Steril* 71(3):511-516.

23. **Carrell DT**, Erickson LE, Baldinger S, Smith S, Court H, Tucker MJ (1999) Potential causes of multi-pronuclear development and cleavage arrest during in vitro fertilization with intracytoplasmic sperm injection. *Advances in Reproduction* 3:211-218.
24. **Carrell DT**, Peterson CM, Jones KP, Hatasaka HH, Udoff LC, Cornwell CE, Thorp C, Kuneck P, Erickson L, Campbell B (1999) A simplified coculture system using autologous, attached cumulus tissue results in improved embryo morphology and pregnancy rates during in vitro fertilization. *J Assisted Reprod and Genetics* 16:344-349.
25. **Carrell DT** (1999): Semen Analysis at the turn of the Century: An Evaluation of Potential Uses of New Sperm Function Assays. *Arch Androl* 44:65-75.
26. **Carrell DT**, Peterson CM, Jones KP, Hatasaka HH (1999) Autologous cumulus cell co-culture improves embryo quality and blastocyst growth in ICSI-derived embryos. *Advances in Reproduction* 5:89-94
27. Wu J, Emery BR, **Carrell DT** (2000): In vitro growth, maturation, fertilization, and embryonic development of oocytes from porcine preantral follicles. *Biol Reprod.* 64:375-381.
29. **Carrell DT**, Liu L (2001): Altered protamine 2 expression is uncommon in donors of known fertility, but common among men with poor fertilizing capacity and may reflect other abnormalities of spermiogenesis. *J Andrology* 22:604-610.
30. Pryor JL, Blatz SM, Cornwell CE, Kuneck PH, **Carrell DT** (2001): Delayed timing of intrauterine insemination results in a significantly improved pregnancy rate in female partners of the spinal cord injured male. *Fertil Steril* 76:1130-5.
31. **Carrell DT**, Wilcox AL, Udoff LC, Thorp C, Campbell B (2001): Chromosome 15 aneuploidy in the sperm and conceptus of a sibling with variable familial expression of round-headed sperm syndrome. *Fertil Steril* 76:1258-60.
32. **Carrell DT**, Jones KP, Peterson CM, Aoki V, Emery BR, Campbell BR (2001): Body mass index (BMI) is inversely related to intra-follicular hCG levels, embryo quality, and IVF outcome. *Reproductive Biomed* 3:109-11.
33. Emery BR, Miller RL, **Carrell DT** (2001): Hamster oocyte resting membrane potential and ion permeability vary with preantral cumulus cell attachment and developmental stage. *BMC Devel Biol* 1:14-19.
34. Wu J, Wilcox A, **Carrell DT** (2001): Development of in vitro matured oocytes from porcine preantral follicles following Intracytoplasmic sperm injection. *Biol Reprod* 65:1579-85.
35. **Carrell DT**, Liu L (2002): Heparin binding sites are present at a higher concentration on sperm of sub-fertile men than donors of known fertility. *Arch Androl* 48:175-182.

36. **Carrell DT**, Cartmill D, Jones KP, Hatasaka HH, Peterson CM(2002): Prospective, randomized, blind evaluation of donor semen quality provided by seven commercial sperm banks. *Fertil Steril* 78:16-21.
37. Moskovtsev SI, Griffin JT, Peterson CM, **Carrell DT** (2002): Primordial and preantral follicles are not commonly observed in IVF aspirates. *Hum Reprod* 17:1783-7.
38. Christensen G, **Carrell DT** (2002): Animal models of genetic causes of male infertility. *Asian J Androl* 4:213-219.
39. **Carrell DT**, Cartmill D (2002): A brief review of current and proposed federal government regulation of assisted reproduction laboratories in the United States. *J Androl* 23:610-7.
40. **Carrell DT**, Wilcox AL, Peterson CM, Jones, KP, Erickson L, Campbell B, Branch DW, Hatasaka HH (2003): Elevated sperm chromosome aneuploidy and apoptosis in patients with unexplained recurrent pregnancy loss. *Obstet Gynecol* 101(6):1229-35.
41. **Carrell DT**, Moskovtsev S, Chohan KR, Peterson, CM. (2003): Ovarian folliculogenesis: The emerging role of in vitro maturation of oocytes follicles and follicles in clinical practice. *Clinical Obstetrics and Gynecology* 46:239-53.
42. **Carrell DT**, Emery BR, Hamilton B (2003): Seminal infection with *Ralstonia picketti* and cytolysosomal spermophagy in a previously fertile man. *Fertil Steril* 79(Supp3):1665-7.
43. **Carrell DT**, Pryor JL, Kuneck PH (2003): Timing of intrauterine insemination. *Fertil Steril* 78:1347-1348.
44. Aoki V, **Carrell DT** (2003): Human protamines and the developing spermatid: their structure, function, expression, and relationship with male infertility. *AJA* 5:315-24.
45. **Carrell DT**, Liu L, Peterson CM, Hatasaka HH, Jones KP, Erickson L, Campbell B (2003): Sperm DNA fragmentation is increased in couples with unexplained recurrent pregnancy loss. *Arch Androl* 49:65-71.
46. Peterson CM, Reading JC, Hatasaka HH, Jones KP, Udoff LC, Adashi EY, Kuneck P, Erickson L, Malo JW, Campbell B, **Carrell DT** (2004): The use of outcomes-based data in reducing high order multiple pregnancies: the role of age, embryo score. *Fertil Steril* 81:1534-41.
47. **Carrell DT**, Emery BR, Willcox AL, Campbell B, Erickson L, Hatasaka HH, Jones KP, Peterson CM (2004): Sperm chromosome aneuploidy as related to male factor infertility and some ultrastructure defects. *Arch Androl* 50:181-5

48. Chohan KR, Griffin JT, **Carrell DT** (2004): Evaluation of chromatin integrity in human sperm using acridine orange staining with different fixatives and after cryopreservation. *Andrologia* 36:321-6.
49. Emery BR, Thorp C, Malo JW, **Carrell DT** (2004): Pregnancy from intracytoplasmic sperm injection of a sperm head and detached tail. *Fertil Steril* 81:686-688.
50. Aoki VW, Wilcox AL, Thorp C, **Carrell DT** (2004): Improved in vitro fertilization embryo quality and pregnancy rates with intracytoplasmic sperm injection of sperm from fresh testicular biopsy samples vs. frozen biopsy samples. *Fertil Steril* 82(6):1532-5.
51. Tanaka M, Kihara M, Hennebold JD, Eppig JJ, Viveiros MM, Emery BR, **Carrell, DT**, Kirkman NJ, Meczekalski B, Zhou J, Bondy CA, Becker M, Schultz RM, Misteli T, De La Fuente R, King GJ, Adashi EY (2005): H1FOO is coupled to the initiation of oocytic growth. *Biol Reprod* 72:135-
52. Aoki VW, Peterson CM, Jones KP, Hatasaka HH, Gibson M, Huang I, **Carrell DT** (2005): Correlation of sperm penetration assay score with polyspermy rate in in-vitro fertilization. *J Emb Clin Assis Reprod*, 2(1):3-7.
53. Aoki VW, Liu L, **Carrell DT** (2005): Identification and evaluation of a novel sperm protamine abnormality in a population of infertile males. *Hum Reprod* 20:1298-1306.
54. **Carrell DT**, Liu L, Huang I, Peterson CM (2005). Comparison of maturation, meiotic competence, and chromosome aneuploidy of oocytes derived from two protocols for in vitro culture of mouse secondary follicles. *J Assist Reprod Genet*;22(9-10):347-54.
55. Emery BR, Wilcox AL, Aoki VW, Peterson CM, **Carrell DT** (2005). In vitro oocyte maturation and subsequent delayed fertilization is associated with increased embryo aneuploidy. *Fertil Steril*;84(4):1027-1029.
56. Aoki VW, Moskovtsev S, Willis J, Liu L, Mullen JBM, **Carrell DT** (2005). DNA integrity is compromised in protamine-deficient sperm. *J Androl*;26(6):741-748.
57. Mizukami A, Peterson CM, Huang I, Cook C, Boyak LM, Emery BR, **Carrell DT** (2005): The acceptability of posthumous human ovarian tissue donation in Utah. *Human Reprod*, 20:3560-3565.
58. Christensen GL, Ivanov IP, Atkins JF, Mielnik A, Schlegal PN, **Carrell DT** (2005): Screening the SPO11 and EIF5A2 genes in a population of infertile males. *Fertil Steril*; 84(3):758-760.
59. Aoki VW, Wilcox AL, Peterson CM, Parker-Jones K, Hatasaka HH, Gibson M, Huang I, **Carrell DT** (2005). Comparison of four media types during 3-day human IVF embryo culture. *Reprod Biomed Online* 2005;10(5):600-6.

60. Chohan KR, Griffin JT, LaFramboise M, De Jonge CJ, **Carrell DT** (2006): Comparison of chromatin assays for DNA Fragmentation evaluation in human sperm. *J Androl*, 27:53-59.
61. Christensen GL, Ivanov IP, Atkins JF, **Carrell DT** (2006): Identification of polymorphisms in the Hrb, GOPC, and Csnk2a2 genes in two men with globozoospermia. *J Androl*; 27(1): 11-15.
62. Aoki VW, Liu L, **Carrell DT** (2006). A novel mechanism of protamine expression deregulation highlighted by abnormal protamine transcript retention in infertile human males with sperm protamine deficiency. *Mol Hum Reprod*.12:41-50.
63. Emery BR, **Carrell DT** (2006): The effect of epigenetic sperm abnormalities on early embryogenesis. *Asian J Androl*; 8(2):131-142.
64. Griffin J, Emery BR, Huang I, Peterson CM, **Carrell DT** (2006): Comparative analysis of follicle morphology and oocyte diameter in four mammalian species (mouse, hamster, pig, and human). *J Exp & Clin Assist Reprod*; 3(1): 2.
65. Christensen GL, Ivanov IP, Wooding SP, Atkins JF, Mielnik A, Schlegel PH, **Carrell DT** (2006): Identification of polymorphisms and balancing selection in the male infertility candidate gene, ornithine decarboxylase antizyme 3. *BMC Med Genet*; 7(1): 27.
66. Christensen G, Wooding SP, Ivanov IP, Atkins JF, **Carrell DT** (2006): Sequencing and haplotype analysis of the Activator of CREM in the Testis (ACT) gene in populations of fertile and infertile males. *Molec Hum Reprod* 12:257-262.
67. **Carrell DT**, DeJonge C, Lamb D (2006): The genetics of male infertility: a field of study whose time is now. *Arch Androl* 52:269-274.
68. Aoki VW, Emery BR, Liu L, Griffin J, **Carrell DT** (2006): Protamine levels vary between individual sperm cells of infertile human males and correlate with DNA integrity. *J Androl* 27(6):890-898.
69. Aoki VW, Liu L, Jones KP, Hatasaka HH, Gibson M, Peterson CM, **Carrell DT** (2006): Sperm protamine 1/protamine 2 ratios are related to IVF pregnancy rates and predictive of fertilization ability. *Fertil Steril* 86(5):1408-1415.
70. Aoki VW, Christensen GL, Atkins JF, **Carrell DT** (2006): Identification of novel polymorphisms in the nuclear protein genes and their relationship with human sperm protamine deficiency and severe male infertility. *Fertil Steril* 86(5):1416-1422.
71. Aoki VW, Liu L **Carrell DT** (2006): Global deoxyribonucleic acid methylation is unaffected in protamine-deficient infertile males. *Fertil Steril* 86(5):1541-1543.
72. Hammoud AO, Gibson M, Peterson CM, Hamilton BH, **Carrell DT** (2006): Obesity and male reproductive potential. *J Androl* 27(5):619-626.

73. **Carrell DT**, Liu L, Christensen GL (2006): Polyploidy in mouse embryos derived from in vivo and in vitro fertilization is dependent on the timing of pregnant mare serum gonadotropin (PMSG) injection. *Fertil Steril* 87:1470-2.
74. **Carrell DT**, Emery BR, Hammoud S (2007): Altered protamine expression and diminished spermatogenesis: What is the link? *Hum Reprod Update* 13:313-27.
75. **Carrell DT** and Emery BR (2007): Use of automated FISH technology to evaluate sperm chromosome aneuploidy. *Fertil Steril*, Accepted for Publication.
76. Christensen G.L., Griffin J. and **Carrell DT** (2007) Sequence analysis of the X-linked USP26 gene in severe male factor infertility patients and fertile controls. *Fertil Steril*, Accepted for Publication.
77. Hammoud S, Emery BR, Aoki VW, **Carrell DT** (2007): Identification of genetic variation in the 5' and 3' non-coding regions of the protamine genes in patients with protamine deregulation. *Arch Andrology/J Repro Systems*. Accepted for publication.
78. Hammoud A, Gibson M, Huang I, Hammoud S, Peterson CM, **Carrell DT** (2007): Effect of sperm preparation techniques on intra-individual variation of sperm motility and pregnancy rates. Accepted for Publication. *A J A*.
79. **Carrell DT** (2007): Clinical Sperm Aneuploidy Analysis: Pitfalls and Promises. *J Androl*, Submitted for Review.
80. Hammoud S, Liu L, **Carrell DT** (2007): Evaluation of protamine and histone expression in sperm populations isolated by density gradient centrifugation. *Asian J Andrology*, Submitted for Review.

In Writing Stage

80. **Carrell DT** (2007): The use of laboratory assays to determine the genetic fitness of sperm. *RBM Online*, In Preparation.
81. **Carrell DT** (2007): Sperm Chromatin Abnormalities. *Int J Androl*, In Preparation
82. **Carrell DT**, Wilcox AW, Peterson TP (In Preparation): Comparison of a sequential and non-sequential IVF embryo culture media.
83. Sanderson M, Smith JF, Griffin J, **Carrell DT** (In Preparation): Evaluation of recombination frequency, splits, and gaps in meiotic chromosomes of patients with nonobstructive azoospermia. *Andrologia*

84. Christensen G, Ivanov I, Howard M, Atkins J, **Carrell DT** (In preparation): Identification of novel protein interactions for antizyme 3 in the testis. *J Biochem*
85. Christensen G, Griffin J, **Carrell DT** (In Preparation): Polymorphism analysis of the Rec 8 gene in infertile males and controls. *Mole Hum Reprod*
86. **Carrell DT**, Liu L, Aoki VW (In Preparation): Evaluation of blastomere aneuploidy in embryos derived from follicular maturation of pre-antral follicles. *J Assist Reprod Genet*
87. Sanderson M, Carrell DT (In preparation): Meiotic recombination in spermatocytes. *J Androl*

X. BOOKS/GUEST EDITORSHIPS

1. **Carrell DT** (ed.) *The Genetics of Male Infertility*. Humana Press, 2006.
2. **Carrell DT** and Peterson CM (eds.) *Clinical and Laboratory Aspects of a Reproductive Endocrinology and Infertility Practice*. In Progress. Springer/Humana Press. To be published in 2008.
3. **Carrell DT**, Racowsky C, Schlegel PN, Van Voorhis B (eds.) *Annual Review of Infertility*. In preparation. Wiley/Blackwell Press (Annual publication, first volume to be published in 2008).
4. **Carrell DT** and Krausz C (eds.) *Genetic and Epigenetic Aspects of Assisted Reproductive Technologies*, RBM Online Special Issue, 2007.

XI. INVITED CHAPTERS:

1. Mizukami A, **Carrell DT**, Peterson CM, 1998: Embryo Cryopreservation. *Encyclopedia of Reproduction*. Knobil E, Neill JD (Eds) Academic Press.
2. **Carrell DT** and Cartmill D, 1998: Artificial Insemination in the Human. *Encyclopedia of Reproduction*. Knobil E, Neill JD (Eds) Academic Press.
3. **Carrell DT**, 1999: Male Infertility: Diagnosis and Treatment. *Encyclopedia of Reproductive Technologies*, Burfoot A (Ed), Westview Press, p 171-179.
4. **Carrell DT**, 2001: Embryo Morphology. *Atlas of Embryology*. Gianaroli L, Plachot M, Magli, MC (Eds) Oxford University Press.

5. **Carrell DT**, Emery BR, 2002: Fertilization. In: Encyclopedia of Endocrine Diseases. Martini L (Ed.) Academic Press (p 58-62).
6. Hammoud A and **Carrell DT**, 2006: Obesity and Male Infertility. In: Experimental Endocrinology and Reproductive Biology, Haldar C and Singaravel M (eds),
7. **Carrell DT**, 2006: The Genetics of Male Infertility in the Era of Genomics: Tools for Progress. In: The Genetics of Male Infertility, Carrell DT (ed.), Humana Press.
8. Aoki VW and **Carrell DT**, 2006: The Genetics of Abnormal Protamine Levels in Human Sperm. In: The Genetics of Male Infertility, Carrell DT (ed.), Humana Press.