



CURRICULUM VITAE

RAKESH K. SHARMA, Ph.D.

Project Staff, Glickman Urological Institute, and
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Rakesh K. Sharma

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Education:

1982, B.S. Panjab University, Chandigarh, India, (Biophysics).
1983, M.S. Panjab University, Chandigarh, India, Major: Reproductive
Physiology
1992, Ph.D. Panjab University, Chandigarh, India

Postdoctoral Training:

1994-1995 Research Fellow, Andrology Clinical and Research Laboratories,
Department of Urology, Cleveland Clinic Foundation, Cleveland, OH

Research Fellowships:

1985-1987 Junior Research Fellowship, Panjab University, Chandigarh, India.
1987-1989 Senior Research Fellowship, Panjab University, Chandigarh, India.
1990-1992 Senior Research Fellowship, Council of Scientific and Industrial
Research, New Delhi, India.
1994-1996 Andrology Research Fellowship, Cleveland Clinic Foundation,
Cleveland, OH
1999-2001 American Foundation for Urological Diseases (AFUD) Scholar.
"Role of reactive oxygen species in the pathophysiology of
varicoceles and effects of antioxidants therapy alone or in
combination with varicocele repair on sperm function and
pregnancy outcome".

Academic Appointments:

1991-1994 Research Officer, ICAR (PL-480) Project, Panjab University,
Chandigarh, India.
1997-1998 Research Associate, Department of Urology
1997-1998 Research Associate, Department of Obstetrics Urology
1999-Present Project Staff, Glickman Urological Institute, Cleveland Clinic
Foundation, Cleveland
1999-Present Project Staff and Research Coordinator, Department of Obstetrics
and Gynecology, Cleveland Clinic Foundation, Cleveland

Hospital appointments:

1999-Present Project Staff and Research Coordinator, Department of Obstetrics
and Gynecology, Cleveland Clinic Foundation, Cleveland

Membership in Professional Societies:

(Since:)

1994	American Society of Reproductive Medicine
1994	American Society of Andrology
1996	Society of Male Reproduction & Urology
1996	Society for the Study of Male Reproduction

Research Interests:

Male Infertility; Female Infertility; Epididymal and Sperm Physiology; Lipid Peroxidation and Reactive Oxygen Species; Oxidative stress, Sperm Cryopreservation; DNA damage; Apoptosis Oocyte quality, Endometriosis.

Clinical Andrology Laboratory

Trained in areas of clinical andrology testing and laboratory computer systems for reporting results, providing support for patient testing and weekend rotation responsibilities.

Awards/Honors /Moderator:

1994	Merlyn F. Bumpus Junior Investigator Award in Clinical Research (Runner up). The Cleveland Clinic Foundation.
1997	Paper nominated for poster Award, Wang, Y, Sharma, RK, Thomas, AJ, Jr, and Agarwal, A (1997): Lipid peroxidation in the semen of subfertile patients. <u>In</u> : American Urological Association, Inc., 91st Annual Meeting, New Orleans, LA, April 12-17, Abstract # 287.
2000	Paper nominated for poster Award, “Singh, M, Sharma, RK, Agarwal, A, Miller, KF, Nelson, DR, Attaran, M, Goldberg, JM, and Falcone T (2000): Effect of peritoneal fluid of infertile mild/minimal endometriosis and idiopathic infertility patients on <i>in vitro</i> mouse embryo development. <u>In</u> : American Society for Reproductive Medicine, 56 th Annual Meeting, October 21-25, San Diego, CA, Abstract #244.
2001	Paper nominated for poster Award, “Wang, X, Sharma, RK, Goldberg, J, Attaran, M, Agarwal, A, and Falcone, T (2001): Vitamin E supplementation reduces oxidative stress and improves blastocyst development rate. <u>In</u> : 57 th Annual Meeting of the American Society of Reproductive Medicine, October 20-25, Orlando, FL, Abstract #1222.

- 2001 Paper nominated for poster Award, “Bedaiwy, MA, Goldberg, J, Wang, X, Sharma, RK, Miller, K, Agarwal, A, Attaran, M, and Falcone, T (2001): Is there a relationship between cytokines and the embryotoxicity of hydrosalpinx fluid? In: 17th Annual Meeting of the European Society of Human Reproduction and Embryology, July 1-4, Lausanne, Switzerland.
- 2002 Paper nominated for oral presentation Award, “Esfandiari, N, Falcone, T, Agarwal, A, Attaran, M, Nelson, DR, and Sharma, RK (2002): Double-edged role of nitric oxide in pre-implantation embryo apoptosis. In: 59th Annual Meeting of the American Society for Reproductive Medicine, Oct 12-17, Seattle, WA, Abstract #100208.

Grants:

1. 1995 Effect of Motility Stimulants on Human Sperm after Cryopreservation, **Principal investigator**, RPC # 4925, (\$ 5,000)
2. 1995 The Effect of Peritoneal Reactive Oxygen Species on Fertility in Patients with Endometriosis, **Co-investigator**, RPC # 5090, (\$5,150)
3. 1995 Maximizing Semen Quality in Spinal Cord Injured Men, Co-investigator, **Co-investigator**, RPC #5090, (\$16,032)
4. 1995 Improving Post-Thaw Semen Quality in Cancer Patients, **Principal investigator**, RPC # 5489, (\$15,758)
5. 1996 Assessment of Human Sperm Function after Cryopreservation in Processed and Unprocessed Semen, Co-investigator, **Co-investigator**, RPC #5490, (\$7,702)
6. 1996 Seminal Reactive Oxygen Species in Men with Varicocele, and the Effect of In Vitro Antioxidant Supplementation, **Co-investigator**, RPC #5549, (\$9,866)
7. 1997 Designing an Algorithm to Predict Fertilizing Capacity of Spermatozoa Using Biochemical and Functional Assays, **Co-investigator**, RPC # 5765, (\$8,256.30)
8. 1997 The Effects of Mycoplasmas on the Semen Analysis and the Function of spermatozoa, **Co-investigator**, RPC # 5825, (\$13,530)
9. 1997 The Role of Reactive Oxygen Species and Total Antioxidant Capacity in Persistent Infertility Following Vasectomy Reversal, **Co-investigator**, RPC # 6036, (\$6,816)
10. 1998 Outcome of Pregnancy and the Role of ROS and total Antioxidant Status in the Follicular Fluid, **Co-investigator**, RPC # 6147, (\$10,000)
11. 1998 Impact of Oxidative Stress and IL-6 on Fertility in Varicocele Patients, **Co-investigator**, RPC # 6206, (\$10,868)

12. 1999 Predicting Fertilization in an IVF Program by Use of Mannose Receptor Assay, **Co-investigator**, RPC # 6238, (\$22,000)
13. 1999 Changes in Frequency of Sperm Chromosomal Anomalies after Chemotherapy for Testicular Cancer and Hodgkin's Disease: A Longitudinal Study, **Co-investigator**, RPC # 6265, (\$23,864)
14. 1999-2001 Role of Reactive Oxygen Species in the Pathophysiology of Varicoceles and Effects on Antioxidant Therapy Along or in Combination with Varicocele Repair on Sperm Function and Pregnancy Outcome, American Foundation for Urologic Disease Research Scholar Program Fellowship. IRB #3273
15. 1999 Role of Cytokines and Oxidative Stress on Fertility in Laparoscopically Retrieved Peritoneal Fluid from Patients with Endometriosis, **Co-investigator**, RPC#6362, (\$98,268)
16. 1999 The Role of Oxidative Stress in Assisted Reproduction, **Co-investigator**, RPC # 6362, (\$11,922)
17. 1999 The Role of Defective Spermiogenesis in Male Infertility: Relationship between Sperm Immaturity and Oxidative Stress, **Co-investigator**, RPC # 6509, (\$20,832)
18. 2000 Effect of Oxidative Stress on Embryo Development & Sperm Function, **Co-investigator**, RPC # 6376, (\$12,104)
19. 2000 Relevance of Leukocytes on Semen Parameters, Oxidative Stress, and DNA Damage in Semen of Infertile Patients, **Co-investigator**, RPC # 6560, (\$8,600)
20. 2001 Mechanism of Nuclear DNA Damage in Mature Sperm from Infertile Men, **Co-investigator**, RPC # 6770, (\$9,030)
21. 2001 Levocarnitine Fumerate and Acetyl-L-Carnitine Combined Supplementation in Subfertile Males with High Reactive Oxygen Species, Sigma-Tau Health Sciences, Inc. (Protocol STHS 01-01), **Co-investigator**, IRB # 4562, (\$86,000)
22. 2002 Oxidative Stress Mediated Sperm DNA Damage in Infertility Patients – Possible Role of Apoptosis, **Co-investigator**, RPC # 07025, (\$21,698.30)
23. 2002 To Develop a Non-invasive Diagnostic Aid for Endometriosis, **Co-investigator**, Endometriosis Society, (\$25,000)
24. 2002 Abortive Apoptosis and its Role in Male Infertility, **Co-investigator**, RPC # 07060, (\$25,000)
25. 2003 Hemosiderin Laden Macrophages in the Diagnosis of Endometriosis and Protective Effect of Antioxidants and Anti-TNF (alpha) Antibody on Embryo Development, **Co-investigator**, RPC#07235, (\$25,000)
26. 2004 Assessment of Fertilizing Potential of Mouse Germ Cells Matured *In vitro*, **Co-investigator**, RPC # 07531, (\$24,852)
27. 2004 Measurement of Intracellular Generation of Reactive Oxygen Species in Human Spermatozoa, **Co-investigator**, RPC # 07549, (\$24,304)

28. 2004 Characterization of Intracellular Reactive Oxygen Species in Human Spermatozoa, RPC#07549, IRB#6967 (\$23,659.50)
29. 2004 Autotransplantation of frozen-thawed whole sheep ovaries with microvascular anastomosis: assessment of oocyte maturation, fertilization and embryo development. **Co-investigator**, RPC # 07688, (\$24,916)
30. 2005 Alterations in the cytoskeleton of mouse oocyte induced by cryopreservation and oxidative stress. **Co-investigator**, RPC # 07832, (\$22,274).
31. 2005 Does peritoneal fluid of patients with endometriosis and Idiopathic infertility affect the spindle structure in metaphase II oocytes? Role of oxidative stress. **Co-investigator**, RPC # 07993, (\$24,925.23).
32. 2005 Utility of PARP alterations following apoptotic and oxidative DNA damage in human spermatozoa. **Co-investigator**, RPC # 2005-1067, (\$23,822.60).
33. 2005 A novel glutathione-S-transferase (GST5mu) knockout mouse model for studying oxidative stress induced alterations in the testis. **Principal investigator**, RPC # 2005-1066, (\$24,997.44).
34. 2006 Selection of Non-Apoptotic and Hyperactivated Sperm Using Magnetic Cell Sorting. **Coinvestigator**, R03 NIH grant.
35. 2006 Effect Of Post-Katrina Contaminants From Lake Pontchartrain on Male Reproductive System. **Coinvestigator**, RPC#1011/ARC#0810 (\$24,624.00)
36. 2006 Effect Of Heavy Metal Pollutants From Post-Katrina New Orleans on Rat Epididymal Physiology. **Coinvestigator**, RPC#1098/ARC #08180 (\$24,922.50)
37. 2006 Antioxidants Combinations to Minimize Human Sperm Apoptosis and DNA Damage During Cryopreservation. **Coinvestigator**, RPC#1097 (Submitted)
38. 2006 Ovarian Transplantation: Assessment of Vascular Injury. **Coinvestigator**, RPC # 1122 ARC# 08197 (Submitted)
39. 2006 Role of L Carnitine as Antioxidant, Anti-Apoptotic and Anti-Tumor Necrosis α in Mouse Embryo Cultures. **Coinvestigator**, RPC # 1135 (\$24,681)
40. 2006 Effect of Magnetically Selected Non-apoptotic Sperm on Fertilization and Embryo Development: an Animal Model. **Coinvestigator**, RPC #1159 (Submitted)
41. 2006 Effects of Electromagnetic Waves Exposure from Cell Phones on Semen Quality. **Coinvestigator**, IRB #: 06-423 (Submitted)
42. 2007 Relationship between oxidative stress and sperm

abnormalities in subjects exposed to environmental pesticides and metals. Indo-US project between the Indian Council of Medical Research (ICMR), India and Center for Disease Control and Prevention (CDC) and Agency for Toxic substances and Disease Registry (ATSDR), Department of Health and Human Services, USA, (\$75,000).

Collaborators in India: Dr. HN Saiyed, Principal Investigator; and Co-investigators: Drs. Sunil Kumar, VK Bhatnagar, NG Sathwara, and Doshi from the National Institute of Occupational Health, Ahmedabad, 380016, India.

Collaborators in US: Dr. Ashok Agarwal, Principal Investigator and Co-investigator Dr. Rakesh K. Sharma, Cleveland Clinic Foundation, OH (submitted).

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| 43. | 2007 | Long term effects of electromagnetic waves on human semen. Coinvestigator , IRB#1011 |
| 44. | 2007 | Effects of radiofrequency exposure from cell phone on male reproductive system. Coinvestigator , RPC# 2007-1023, \$23,375.00 |
| 45. | 2007 | Is poor sperm motility associated with defects in RhoGTPase in infertile men? Coinvestigator , RPC# 2007-1023, \$24,981.00 |

Patents: Method and Apparatus for Predicting Male Infertility, Co-investigator, Provisional U.S. Patent 10/99 (Full Patent Pending)

Ad- hoc Reviewer: Fertility & Sterility
Journal of Andrology
Human Reproduction
Asian Journal of Andrology
International Journal of Andrology
British Journal of Urology International
Biology of Reproduction
Reproductive Biomedicine Online

Grant Reviewer National Institute for Occupational Safety and Health (NIOSH) Reproduction Special Emphasis Panel.

NIH-Specialized Cooperative Centers Program in Reproduction and Infertility (SCCPRIR) (SEP ZHD1 DRG D (05)

Invited lectures at CCF conferences or local city or national meetings

1. Invited lecture on "Spermatogenesis". Reproductive Biology and Endocrinology course, First year medical students, University Hospitals, February 24, 2005.
2. Invited lecture on "Spermatogenesis". Reproductive Biology and Endocrinology course, First year medical students, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, April, 2006.

Technical Experience:

- Semen analysis
- Sperm viability and membrane integrity
- Sperm morphology (Kruger's strict criteria)
- Computer assisted semen analysis, sperm kinematics
- Capacitation and acrosome reaction (spontaneous and induced)
- Zona free hamster penetration test
- Sperm cryopreservation
- Sperm preparation techniques for IUI - swim up, density gradient
- Reactive oxygen species measurement, free radical induced damage
- Lipid peroxidation, total antioxidant and cytokine measurements
- Improvement in cryopreserved sperm in spinal cord injured and cancer patients
- Assessing functional markers of fertilization in spermatozoa by hamster sperm penetration assay
- Peritoneal fluid evaluation in endometriosis and idiopathic infertility
- Apoptosis and DNA damage by western blot, SCSA and TUNEL assay, Annexin V and caspases
- Cryopreservation of ovary and ovarian tissue

Workshops and Postgraduate Courses Attended/Organized:

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| 1986 | "Polymer Aided Reactions". National Workshop cum Symposium, Jodhpur, New Delhi, India, March 21-28. |
| 1990 | "In Vitro Systems for Measurement of Reproductive Hormones". Indo-US Workshop National Institute of Immunology, New Delhi, India, October 21-November 1. |
| 1995 | "Controversies in Andrology: What is the Role of the Andrologist in the Era of Micromanipulation?" American Society for Reproductive Medicine, Twenty-Eighth Annual Postgraduate Program Seattle, Washington, October 7-8. |

- 1996 “Advances in the Management of Infertility”. The Cleveland Clinic Foundation, Cleveland, Ohio, October 25.
- 1997 “Endometriosis: A View from Bench to Bedside”. Postgraduate course Fifty Third American Society of Reproductive Medicine Meeting, Cincinnati, Ohio, October 18-22.
- 1997 “Moving Beyond Boundaries: Clinical Andrology in the 21st Century”. Andrology Laboratory Workshop. Twenty Second Annual Meeting, Baltimore, Maryland, February 22-25.
- 1998 “Concepts and Methods in Biostatistics”. Cleveland Clinic Foundation, Cleveland, OH, October 28-29, 1998.
- 1998 “Grant seeking fundamentals”. Cleveland Clinic Foundation, Cleveland, OH, August 18, 1998.
- 1998 “In Search of the Elusive Sperm”. Andrology Laboratory Workshop, Twenty Third Annual Meeting, Long Beach, CA, March 26, 1998.
- 1999 “Semen Analysis and Basic Sperm Function Tests”. Course Faculty, First Annual course. Brazilian Society for Assisted Reproduction. Sao Paulo, Brazil, June 11-14, 1999.
- 1999 “Andrology Testing-Separating the Wheat from the Chaff”. Laboratory Workshop: Twenty Fourth Annual Meeting of American Society of Andrology, Louisville, Kentucky, April 11-13, 1999.
- 2000 “How to Write a Good Grant Application”. Presented by: Liane-Reif-Lehrer, Department of Institutional Advancement, Cleveland Clinic Foundation. Nov 2, 2000.

Papers Selected as Designated Articles for Continuing Medical Education Program:

- 1996 Esteves, SC, **Sharma, RK**, Thomas, A.J. Jr. and Agarwal, A. Suitability of the hypoosmotic swelling test for assessing the viability of cryopreserved sperm. *Fertility and Sterility* 66: 798-804.
- 1997 Padron, OP, **Sharma, RK**, Thomas, A.J. Jr. and Agarwal, A. Effects of cancer on spermatozoa quality after cryopreservation: a 12-year experience. *Fertility and Sterility* 67: 326-331.
- 1997 Wang, Y, **Sharma, RK**, and Agarwal, A. Effect of lipid peroxidation on cryopreserved semen quality in testicular and non-testicular cancer patients. *Urology* 50: 414-417.

- 1997 **Sharma, RK**, Padron, OF, Thomas, AJ, Jr. and Agarwal, A. Factors associated with the quality before freezing and after thawing of sperm obtained by microsurgical epididymal aspiration. *Fertility and Sterility* 68: 626-631.
- 2001 Hallak, J, **Sharma, RK**, Pasqualotto, F, Ranganathan, P, Thomas, AJ, Jr. and Agarwal, A. Creatine kinase as an indicator of sperm quality and maturity in men with oligospermia. *Urology* 58: 446-451.
- 2005 Gupta S, Agarwal A and **Sharma RK**, (2006) The Role of Placental Oxidative Stress and Lipid Peroxidation in Preeclampsia. *Obstetrical and Gynecological Reviews* 2005;60:807-16, CME Review Article

PUBLICATIONS**Original Peer Review Articles:****1986-1994:**

1. Kalla, NR, and **Sharma, RK** (1986): Existence of a high molecular weight factor in human semen capable of inhibiting 125I-FSH binding to rat testis receptor. Research Bulletin (Science) of Panjab University, Chandigarh, India, Vol 37: p-155-157.
2. Kalla, NR, **Sharma, RK**, and Zarabi, S (1986): Isolation and purification of receptor binding inhibitor (FSH-RBI). (Bawa S.R. ed.), *Panjab University, Chandigarh*, India, Vol 37: p 123-129.
3. Kalla, NR, Grewal, R, Ranga, A, **Sharma, RK**, and Khaira, P (1990): Spermatogenic events in rat and mice following intratesticular administration of optical isomers of gossypol. Acta Europae Fertilatis, 21: 91-94.
4. **Sharma, RK**, and Kalla, NR (1991): Effect of sulfapyridine on male fertility in the rat. Acta Europae Fertilatis, 21: 91-94.
5. Kalla, NR, Mann, A, **Sharma, RK**, Aulitzky, W, and Frick, JH (1993): Effect of human gamma interferon on mice testis- A quantitative analysis of the spermatogenic cycle. Acta Europae Fertilatis, 23: 234-236.
6. **Sharma, RK**, and Kalla, NR (1994): Effect of sulfasalazine and its metabolite sulfapyridine on rat testis. Medical Science Research, 22: 187-188.
7. **Sharma, RK**, and Kalla, NR (1994): Spermatozoal abnormalities and male infertility in the rat following sulfasalazine treatment. International Journal of Fertility and Women's Medicine 39: 347-354.

1995:

8. Shekarriz, M. **Sharma, RK**, Thomas, AJ, Jr, and Agarwal, A. (1995): Positive myeloperoxidase staining (Endtz Test) as an indicator of excessive reactive oxygen species formation in semen. J Assist Reprod Genet 12:70-74.

1996:

9. **Sharma, RK**, Tolentino, MV, Thomas, AJ, Jr, and Agarwal, A (1996): Optimal dose and duration of exposure to artificial stimulants in cryopreserved human spermatozoa. J Urol 155:568-573.

10. **Sharma, RK**, Tolentino, MV, and Agarwal, A (1996): Sperm kinematics of cryopreserved normozoospermic specimens following artificial stimulation. Urology 47:77-81.
11. **Sharma, RK**, and Agarwal, A (1996): Sperm quality improvement in cryopreserved human semen [see comments]. J Urol 156:1008-1012.
12. **Sharma, RK**, and Agarwal, A. (1996): Role of reactive oxygen species in male infertility (Review article). Urology 48:835-850.
13. Esteves, SC, **Sharma, RK**, Thomas, AJ, Jr, and Agarwal, A (1996): Suitability of the hypo-osmotic swelling test for assessing the viability of cryopreserved sperm. Fertil Steril 66:798-804.

1997:

14. **Sharma, RK**, Kohn, S, Padron, OF, and Agarwal, A. (1997): Effect of artificial stimulants on cryopreserved spermatozoa from cancer patients. J Urol 157:521-524.
15. Padron, OP, **Sharma, RK**, Thomas, A.J, Jr, and Agarwal A. (1997): Effects of cancer on spermatozoa quality after cryopreservation-a 12 year experience. Fertil Steril 67:326-331.
16. **Sharma, RK** and Agarwal, A. (1997): Influence of artificial stimulation on unprocessed and Percoll-washed cryopreserved sperm. Arch Androl 38:173-179.
17. **Sharma, RK**, Padron, OF, Thomas, AJ, Jr, and Agarwal, A (1997): Usefulness of the acrobead test in evaluating human acrosome function in fresh and cryopreserved sperm. J Urol 157:1692-1696.
18. Padron, OF, Brackett, NL, **Sharma, RK**, Kohn, S, Lynne, CM, Thomas, A.J, Jr, and Agarwal, A (1997): Seminal reactive oxygen species, sperm motility and morphology in men with spinal cord injury. Fertil Steril 67:1115-1120.
19. Sidhu, RS, **Sharma, RK**, Kachoria, S, Curtis, C, and Agarwal, A (1997): Reasons for rejecting potential donors from a sperm bank program. J Assist Reprod Genet 14:354-359.
20. **Sharma, RK**, Vemulapalli, S, Kohn, S, and Agarwal, A. (1997): Effect of centrifuge speed, refrigeration medium, and sperm washing medium on cryopreserved spermatozoa quality after thawing. Arch Androl 39:33-38.
21. Wang, Y, **Sharma, RK**, Agarwal, A. (1997): Effect of cryopreservation and sperm concentration on lipid peroxidation in human semen. Urology 50:409-413.

22. Wang, Y, **Sharma, RK**, and Agarwal, A. (1997): Effect of lipid peroxidation on cryopreserved semen quality in patients with testicular or nontesticular cancer. Urology 50:414-417.
 23. **Sharma, RK**, and Agarwal, A. (1997): Artificial stimulation of cryopreserved human spermatozoa by sodium nitroprusside, 2-chloroadenosine and 2-deoxyadenosine. Eur Urol 32:344-352.
 24. **Sharma, RK**, Padron, OF, Thomas, AJ, Jr, and Agarwal, A (1997): Factors associated with the quality before freezing and after thawing of sperm obtained by microsurgical epididymal aspiration. Fertil Steril 68:626-631.
 25. Wang, Y, **Sharma, RK**, Falcone, T, Goldberg, J, and Agarwal, A (1997): Importance of reactive oxygen species in the peritoneal fluid of women with endometriosis or idiopathic infertility. Fertil Steril 68:826-830.
 26. Sidhu, RS, **Sharma, RK**, and Agarwal, A (1997): Effects of cryopreserved semen quality and timed intrauterine insemination on pregnancy rate and gender of offspring in a donor insemination program. J Assist Reprod Genet 14:531-537.
 27. **Sharma, RK**, Seifarth, K, and Agarwal, A (1997): Comparison of single- and two-layer Percoll separation for selection of motile spermatozoa. Int J Fertil Womens Med 42:412-417.
- 1998:**
28. Sidhu, RS, **Sharma, RK**, Lee, J-C, and Agarwal, A (1998): Accuracy of computer-assisted semen analysis in pre-freeze and post-thaw specimens with high and low sperm counts and motility. Urology 51:306-312.
 29. Hallak, J, Hendin, BN, Thomas, AJ, Jr, and Agarwal, A (1998): Investigation of fertilizing capacity of cryopreserved spermatozoa from patients with cancer. J Urol 159:1217-1220.
 30. Hallak, J, **Sharma, RK**, Thomas, AJ, Jr, and Agarwal, A (1998): Why cancer patients request disposal of cryopreserved semen specimens posttherapy: a retrospective study. Fertil Steril 69:889-893.
 31. Sidhu, RS, Hallak, J, **Sharma, RK**, Thomas, AJ, Jr, and Agarwal, A (1998): Relationship between creatine kinase levels and clinical diagnosis of infertility. J Assist Reprod Genet 15:188-192.
 32. Sidhu, RS, **Sharma, RK**, and Agarwal, A (1998): Relationship between creatine kinase activity and semen characteristics in subfertile men. Int J Fertil Womens Med 43:192-197.

33. Esteves, SC, **Sharma, RK**, Thomas, AJ, Jr, and Agarwal, A (1998): The effects of sperm preparation by swim-up technique and capacitation on acrosome status of normozoospermic men. Brazilian J Assist Reprod 2:74-82.
34. Esteves, SC, **Sharma, RK**, Thomas, AJ, Jr, and Agarwal, A (1998): Cryopreservation of human spermatozoa with pentoxifylline improves the post-thaw agonist-induced acrosome reaction rate. Hum Reprod 13:3384-3389.
35. Esteves, SC, **Sharma, RK**, Thomas, AJ, Jr, and Agarwal, A (1998): Effect of in vitro incubation on spontaneous acrosome reaction in fresh and cryopreserved human spermatozoa. Int J Fertil Womens Med 43:235-242.

1999:

36. **Sharma, RK**, Wang, Y, Falcone, T, Goldberg, J, and Agarwal, A (1999): Effect of peritoneal fluid from endometriosis patients on sperm motion characteristics and acrosome reaction. Int J Fertil Womens Med 44:31-37.
37. Kolettis, P, **Sharma, RK**, Pasqualotto, F, Nelson, D, Thomas, AJ, and Agarwal, A (1999): Effects of seminal oxidative stress on fertility after vasectomy reversal. Fertil Steril 71:249-255.
38. Hendin, B, Kolettis, P, Sharma, R, Thomas, AJ, Jr, and Agarwal, A (1999): Varicocele is associated with elevated spermatozoal reactive oxygen species production and diminished seminal plasma antioxidant capacity. J Urol 161:1831-1834.
39. **Sharma, RK**, Seifarth, K, Garlak, D, and Agarwal, A (1999): Comparison of three sperm preparation media. Int J Fertil Womens Med 44:163-167.
40. **Sharma, RK**, Pasqualotto, FF, Nelson, DR, Thomas, AJ, Jr, and Agarwal, A (1999): The reactive oxygen species – total antioxidant capacity score is a new measure of oxidative stress to predict male infertility. Hum Reprod 14:2801-2807.
41. Esteves, SC, **Sharma, RK**, Thomas, AJ, Jr, and Agarwal, A (1999): Sperm viability assays – a matter of life and death! [Letter; comment]. Fertil Steril 72:184-185.

2000:

42. Hallak, J, **Sharma, RK**, Wellstead, C, and Agarwal, A (2000): Cryopreservation of human spermatozoa: comparison of TEST-yolk buffer and glycerol. Int J Fertil Womens Med 45:38-42.
43. Pasqualotto, FF, **Sharma, RK**, Nelson, DR, Thomas, AJ, Jr, and Agarwal, A (2000): Relationship between oxidative stress, semen characteristics, and clinical diagnosis in men undergoing fertility investigation. Fertil Steril 73:459-464.

44. Potts, JM, **Sharma, RK**, Pasqualotto, FF, Nelson, D.R, Hall, G, and Agarwal, A (2000): Association of *ureaplasma urealyticum* with abnormal reactive oxygen species levels and absence of leukocytospermia. J Urol 163:1775-1778.
45. Pasqualotto, FF, **Sharma, RK**, Agarwal, A, Nelson, DR, Thomas, AJ, Jr, and Potts, JM (2000): Seminal oxidative stress in chronic prostatitis patients. Urology 55:881-885.
46. Esteves, SC, **Sharma, RK**, Thomas, AJ, Jr, and Agarwal, A (2000): Improvement in motion characteristics and acrosome status in cryopreserved human spermatozoa by swim-up processing before freezing. Hum Reprod 15:2173-2179.
47. Esteves, SC, **Sharma, RK**, Thomas, AJ, Jr, and Agarwal, A (2000): Effect of swim-up sperm washing and subsequent capacitation on acrosome status and functional membrane integrity of normal sperm. Int J Fertil Womens Med 45:335-341.
48. Attaran, M, Pasqualotto, E, Falcone, T, Goldberg, J, Miller, K, Agarwal, A, and **Sharma, R** (2000): The effect of follicular fluid reactive oxygen species on the outcome of in vitro fertilization. Int J Fertil Womens Med 45:314-320.

2001:

49. Pasqualotto, FF, **Sharma, RK**, Kobayashi, H, Nelson, DR, Thomas, AJ, Jr, and Agarwal, A (2001): Oxidative stress in normospermic men undergoing infertility evaluation. J Androl 22:316-322.
50. Kobayashi, H, Larson, K, **Sharma, RK**, Nelson, DR, Evenson, DP, Toma, H, Thomas, AJ, Jr, and Agarwal, A (2001): DNA damage in patients with untreated cancer as measured by the sperm chromatin structure assay. Fertil Steril 75:469-475.
51. Kobayashi, H, Gil-Guzman, E, Mahran, AM, **Sharma, RK**, Nelson, DR, Thomas, AJ, Jr, and Agarwal, A (2001): Quality control of reactive oxygen species measurement by luminol-dependent chemiluminescence assay. J Androl 22:568-574.
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