

Biodata

1. Name in Full: **Dr. Aruna Mittal**
2. Designation: **Scientist F/ Deputy Director (Sr. Grade)**
3. Date of Birth: **15 / 10 / 1948**
4. Nationality: **Indian**
5. Educational Qualifications:

Degree/Diploma	University/Institution	Year
B.Sc (Hons)	Delhi University	1969
M.Sc.	Delhi University	1971
Ph.D.	V.P. Chest Institute, Delhi University	1977

6. Address: **Institute of Pathology (ICMR)**
Safdarjung Hospital campus
New Delhi-110029

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7. Specialization: **Immunology**
Area(s) of Research **Chlamydia**

8. Awards/Special recognitions.

- **‘Shakuntala Amir Chand Prize for Young Scientists’ by ICMR for miniaturizing radiometric assay for *M.Leprae* viability and drug resistance in 1984.**
- **ICMR Kshanika award for research work on Immunobiology of *Chlamydia trachomatis* for the year 2003**
- **ICMR Lala Ram Chand Khandari award for her research work” *Chlamydia trachomatis* infection in India : Newer approaches for development of diagnostic assay, treatment & Identification of novel Biomarkers for the year 2006**
- **Won ‘D.N. Ranganathan Award’ for the best scientific paper presentation in the Annual Conference of Sexually Transmitted Diseases, 1990.**
- **Title of ‘*Chlamydia* Farmer’ by Center for Disease Control, Atlanta, USA, 1989.**
- **Awarded ‘Biotechnology Overseas *long-term* Associate ship’ by Department of Biotechnology, Ministry of Science & Technology and worked at Center for Disease Control, Atlanta, USA, 1988-89.**
- **Selected for taking advance training at Rockefeller University, New York, USA under ‘Indo-US SSP Program’, 1984.**

9. (a) Fellowship (Past):

- ◆ **‘Fellow Indian College of Allergy and Applied Immunology’ in recognition of original contribution to subject of allergy, applied immunology, 1976.**
- ◆ **Fellow Indian Immunology Society, 1990.**

9. (b) Fellowship (Present):

- ◆ **Applied for Fellowship of Indian National Academy of Sciences, Allahabad**
- ◆ **Applied for Fellowship of National Academy of Medical Sciences**

10. Professional Career:

Details of employment

Deputy Director (Sr. Grade)	2002-contd	Institute of Pathology (ICMR)
Deputy Director	1997-02	Institute of Pathology (ICMR)
Assistant Director	1992-97	Institute of Pathology (ICMR)
Sr. Research Officer	1986-91	Institute of Pathology (ICMR)
Sr. Research Officer	1981-86	All India Institute of Medical Sciences
Research Associate	1980-81	All India Institute of Medical Sciences
Research Associate	1979-80	R.M.R. Institute of Medical Sciences
Research Officer	1978-79	National Institute of Allergy
Sr. Research Fellow	1977-78	Lady Harding Medical College
Research Assistant	1971-76	V.P. Chest Institute

Assignments abroad:

Guest Scientist	Sep-Nov 1984	Rockefeller University, New York USA
Guest Scientist	Mar-1988-89	Center for Disease Control Atlanta, USA
Visiting Scientist	May-2001	BD Biosciences, San Jose, California, USA
Visiting Scientist	June-2005	Roswell Park Cancer Institute Buffalo, USA
Visiting Scientist	Aug-2005	Dartmouth Medical School

Visiting Scientist

July-2007

Hanover, USA

Roswell Park Cancer Institute

Buffalo, USA

11. (a) Extramural Projects awarded:

1. **Chief Investigator**–‘Collection of well characterized isolates and development of for diagnostic assay for *Chlamydia. trachomatis*’, project **funded by DBT**, May2000-Oct 2003.
2. **Chief Investigator**-‘Cytokine regulation in the immunopathogenesis of salpingitis/infertility due to *Chlamydia trachomatis* infection in women. Project **funded by DST**, July2002-Dec2005.
3. **Chief Investigator**- ‘Effect of sex hormones on induction of immunity by dendritic cells in female reproductive tract during *Chlamydia trachomatis* infection’-Indo-US (CRRH) Programme, **funded by DBT**, 2005-2009.
4. **Chief Investigator**-Role of chlamydial heat shock protein in the pathogenesis of genital tract infection in women- **funded by Defense Research and Development Organization (DRDO)**-Nov 2003-Nov 2007.
5. **Chief Investigator**-Study of virulence genes in Indian strains of *Chlamydia trachomatis*- **funded by DBT March**, 2005-2009.
6. **Chief Investigator**-Role of *Chlamydia pneumoniae* in coronary artery disease patients- **funded by DST** ,**Jan 2007-May 2009**
7. **Co-Investigator**-Immune response to *Chlamydia trachomatis* in spontaneous aborters--- **funded by DRDO**, July 2004-2007.
8. **Co-Investigator**–‘A new approach to the management of superficial bladder Cancer: *In vitro* cytotoxicity and enhancement of immunological cytokines’, **funded by DST**, 2001-2004.

9. **Co-Investigator**-Flow cytometric assays to evaluate prognosis and patients response to chemotherapy in acute leukemia- **funded by ICMR**, 2003-2005.
10. **Officer Incharge**-Zonal blood testing center at Institute of Pathology, funded by **NACO**, 2002-2008.
11. **Lab co-ordinator**-Integrated Biological and Behavioral Assessment (**IBBA**)-funded by **Bill and Melinda Gates foundation**-2006 onwards.

Membership of National/International bodies:

- i) **Member- International Union against sexually transmitted infections(Asia-Pacific)**
- ii) **Fellow**-Indian college of Allergy & Applied Immunology
- ii) **Life member**- Indian Immunology society
- iii) **Member**- Indian Association of Pathologists and Microbiologists

12. (b) International Collaboration(Grants):

1. Diagnostic - r-RNA Probes for detection of *C. trachomatis* - Indo German with Dr. G. Krupp, Director, Artus Biotech 2001-2004

2. Effect of Sex Hormones on Induction of Immunity by Dendritic cells in Female Genital Tract during *Chlamydia trachomatis* infection- Indo-US (Contraceptive Research and Reproductive Health) funded by DBT-2005-09

US Collaborators: Dr. Paul Wallace , Director, Flow cytometry Laboratory, Roswell Park Cancer Institute, Buffalo, USA and Dr. Charles Wira, Dartmouth medical school, Lebanon, Hanover, USA

3. Indo US collaborative platform for vaccine development against Chlamydia-RO3 Grant.

US Collaborators: Dr. Bernard Arulnandam , University of Texas at San Antonio,
USA

12. (c) Collaborative projects/Program with the Indian Scientists:

(Inter-Institutional)

1. Cell mediated immunity in skin tuberculosis with Dr. V. Ramesh, Dermatologist, **Safdarjung Hospital**, 1990-92.
2. **Co-Investigator**–‘Effect of polyherbal cream on pathogens causing lower genital tract infections in female patients’ **National Institute of Immunology**, 1993-94.
3. Effect of antigen presenting cells on T helper Cell phenotype in human leprosy with Professor Indira Nath at **All India Institute of Medical Sciences**, New Delhi, 1996-97.
4. Nominated member for monitoring of surveillance activities for HIV infection in India, **National Institute of Health and Family Welfare**, **1997-98**.
5. In-charge Validity testing for *C. trachomatis* by PCR for a study entitled, ‘An epidemiological and sociological study of asymptomatic reproductive tract infections / sexually transmitted infections amongst women in an urban slum of Delhi’ under SEARO initiative on reproductive health, **Maulana Azad Medical College, New Delhi, 2000**.
6. **Consultancy project** -On training for culture of *Chlamydia trachomatis* in cell line and studying MIC of drugs used for treatment of chlamydial infection. **Ranbaxy**, 2001-02
7. Etiology of recurrent pregnancy loss with special reference to males- **National Institute of Health and Family Welfare**,**2003-07**
8. Role of *Chlamydia trachomatis* in HPV associated cervical cancer- **Institute of Cytology and Preventive Oncology**.**2001-03**
9. Development of multiplex PCR for detection of *C. trachomatis*-**Dr. Ambedkar center for Biomedical Research, Delhi University. 2002-06**

12. (d) Institutional:

1. Endothelial cell culture from umbilical cord with **Dr. Ashok Mukherjee, Deputy Director**, Institute of Pathology-ICMR, 1987-88.

2. Patterns of interleukins in minimal change nephrotic syndrome with **Dr. Sunita Saxena, Assistant Director**-Institute of Pathology-ICMR 1989-92.
3. A new approach to the management of superficial bladder Cancer: *In vitro* cytotoxicity and enhancement of immunological cytokines with **Dr Sunita Saxena, Director**, Institute of Pathology-ICMR.2001-2004
4. Flow cytometric assays to evaluate prognosis and patients response to chemotherapy in acute leukemia- with **Dr Sujala Kapur, Deputy Director**, Institute of Pathology- ICMR, 2003.

13. Reviewer (In the area of infectious diseases and reproductive health) for:

1. **Manuscripts submitted to:**

- i) **National:** Indian Journal Medical Research, Journal of Biological Sciences, Current Science.
- ii) **International:** Clinical Microbiology & Infection, Medical Science Monitor, BMC pregnancy Health, Clinical Experimental Immunology, Journal Infectious Disease, Scan. Journal Immunology, Journal. Infectious Disease, Scan Journal Lab Investigation, Reproductive Biology & Endocrinology, Antimicrobial agents Chemotherapy.

2. **Projects** submitted to funding agencies namely Department of Biotechnology, Department of Science and Technology, Indian council of Medical Research WHO, **in the area of infectious diseases and Reproductive health.**

14. Contribution towards developing a specialty

I am heading research on *Chlamydia trachomatis* in Microbiology/Tissue culture labs at the Institute of Pathology, New Delhi. I was awarded the **‘Biotechnology Overseas long-term Associateship’** by Department of Biotechnology, Ministry of Science and technology in 1988 during which I worked on Chlamydia at Centre for Disease Control, Atlanta, USA and was awarded title of **“Chlamydia Farmer”**. After coming to India in 1990, I noted that except for scanty report on prevalence of female genital chlamydial infection by ELISA, **there were no studies on genital Chlamydia from India and that for improving reproductive health of women** there is need for studies on genital chlamydial infections particularly in females as untreated chlamydial infections lead to chronic inflammatory sequelae such as pelvic inflammatory disease, ectopic pregnancy and often result in infertility. Also there is

growing evidence that chlamydial infections may predispose the genital epithelium to acquiring other STDs such as HIV. In view of these issues, I initiated **in-depth studies on genital *Chlamydia trachomatis* in 1990, an important sexually transmitted microorganism** that was ignored in India till then and since then I have been consistently carrying out research in female genital chlamydial infection. My research work on *Chlamydia trachomatis* involved i) **Finding a reliable prevalence of *C. trachomatis* in female genital tract of patients with complaints of discharge, cervicitis and infertility using gold standard method for diagnosis viz; culture. I was the first one in India to establish culture for *Chlamydia* from endocervical swabs of female patients. Also a repository of *C. trachomatis* isolates obtained from Indian patients is being maintained at Institute of Pathology. ii) Development of monoclonal antibody based indigenous diagnostic assay which is sensitive and cost effective for screening of women chlamydial infection. Further, we have identified a unique chlamydial heat shock protein (cHSP60) for which my lab is trying to develop a prognostic marker to be used for prediction of women at higher risk of developing sequelae to *C. trachomatis* infection iii) Considering that identification of sensitive and specific biomarkers is urgently needed which may serve as the basis for diagnosis, prognosis, drug discovery and monitoring of diseases related to chlamydial infection, our lab has been actively involved in the identification of novel biomarkers both pathogen and host biomarkers that will be important in controlling the infection and help in improving the reproductive health of women in developing countries like India. **Our in vitro study on primary and secondary immune response in cervical lymphocytes of *Chlamydia* infected women showed that mucosal responses are more helpful in understanding the cytokine responses in female genital tract and are more reliable in understanding mechanism of the disease as well as identification of biomarkers . We also studied the role of chlamydial heat shock proteins (cHSPs) and chlamydial inclusion proteins in induction of pathogenic responses. Our studies with cervical lymphocytes revealed various mechanisms involved in the pathogenesis of chlamydial infections including the role of cHSPs and interferon-gamma (IFN- γ). These studies showed that IFN- γ could be involved in modulation of immune response during chlamydial infection directly by causing acute inflammation or indirectly through modulation of cHSP60****

expression . We also **defined combination of local and systemic immune biomarkers IFN- γ , C-reactive protein (CRP) and cHSP60 antibodies that can be used for the prediction of women at higher risk of developing fertility disorders due to chlamydial infections.** . Additionally our study suggested that *C trachomatis* infection in the female genital tract may be regulated by both the synergistic action of the cytokines and the sex hormones β -estradiol and progesterone **which can again be considered as a predictive biomarker for chlamydial pathogenesis** .

Till date only limited information is available on the interaction of human Dendritic cells (DCs) with *Chlamydial* antigens and its implication in the development of vaccine. **We are the first ones ever to study various subsets of Dendritic cells in the cervix of chlamydia infected women, which may modulate the type of immune response and our study showed that both myeloid and plasmacytoid DC are mobilized to the cervix during chlamydial infection and that plasmacytoid DC are up-regulated in pathologic conditions** .

Another focus of our laboratory has been to test newly developed microbicides with the ability to prevent sexual transmission of *C. trachomatis* . We evaluated the **antimicrobial activity of novel polyherbal formulation BASANT against *C. trachomatis*** and our results suggested its potential clinical utility for the prevention of *C. trachomatis* infection by the sexual route .

iv) In addition, since treatment (Doxycycline, Azithromycin) failures and recurrent chlamydial infections are common in India (Unpublished reports from our Lab), **there is a need for vaccine to limit *Chlamydia* induced morbidity. Therefore, we initiated studies on mucosal host immune responses to *C. trachomatis* infection and identification of candidate proteins which could be used for developing a vaccine for *Chlamydia*.** For my research work on Chlamydia I was given ICMR Kshanika Oration award for the year 2003. I have to my credit more than 55 publications in peer reviewed journals of high impact and of which 35 are on *Chlamydia* alone. In brief my research work involves:

- **Improving diagnosis of genital *Chlamydia trachomatis* infection.** Finding **reliable prevalence** of *C. trachomatis* in our country by **using various gold standard** diagnostic assays, chiefly, culture and later on molecular methods like PCR.
- Genotyping of *C. trachomatis* by PCR and RFLP to **know the prevalent serovar** in our region and to identify serovars of high pathogenicity.
- Development of indigenous diagnostic assays for improving diagnosis of *C. trachomatis* from Indian strains of *C. trachomatis*. We developed **cost effective diagnostic assays for diagnosis of *C. trachomatis*, i.e. serovar specific and species-specific monoclonal antibodies [for which an Indian patent has been filed] and molecular probes that is currently being used for detection of *C. trachomatis* in clinical** samples from female patients. The developed monoclonal antibody based diagnostic assay is going to the Industry for developing of a diagnostic kit. Further, development of Dot Elisa for detection of antibodies **to chlamydial heat shock protein 60 (a unique protein that has been identified in Indian strains)** is in **progress** which will help in prognosis of sequelae to *C. trachomatis* in women.
- In addition to establishing culture technique for growing *C. trachomatis*, we were the **first ones in India to determine and publish the morphological criteria for localization of intracellular *C. trachomatis* inclusions in cervical smears stained with Giemsa in 1993.** We referred this technique for diagnosis of *C. trachomatis* to clinicians and researchers as this has the additional advantage of being a **rapid method for mass screening a large number of women in field settings in our country where sophisticated methods like culture and morphology techniques cannot be used for obvious reasons.**
- **Many doctors from hospitals, Scientists and researchers from R & D institutes, pharmaceuticals like Ranbaxy, etc. and technicians have also been trained by us in Chlamydia research which included culture methodology and evaluation of slides for morphological assessment of *C. trachomatis* infection.**

In addition, my group is the first one in India who has made considerable efforts to understand mucosal host immune responses locally in persistent and recurrent *C. trachomatis* infection in order to have a mechanistic understanding of immunopathogenesis of *C. trachomatis* infection which will help in vaccine development against *Chlamydia*. We are the only ones in India carrying out extensive research on chlamydial pathogenesis and the first ones worldwide to publish reports on responses of mucosal (cervical) immune responses to chlamydial infection. Our main emphasis is on complete understanding of the innate and adaptive immune arms in the female genital tract. By defining the potentiation and induction of immunity in general, and within the reproductive tract specifically, new protocols may be devised to effectively treat venereal diseases and human infertility. Strategies and protocols to induce immune protection against chlamydial infections have been slow to develop because of the paucity of information on reproductive tract immunobiology. Understanding the immunology of female reproductive tract during chlamydial infection, with a focus on dendritic cells, epithelial cells, innate immune responses (DCs) and the potential for vaccine development will help in control of this infection. **Our ultimate goal is to develop a vaccine which could induce protective a mucosal immune response in female reproductive tract.**

15. Patent filed: Three

1. Patent for Development of serovar specific monoclonal antibody to *Chlamydia trachomatis*----- file no. 792/DEL/2003 and is in the process of going to the industry.
2. Patent filed for development of primary cervical epithelial cell line from cervical lavage.
3. Patent filed for Development of Novel primers and method for amplification chlamydial heat shock protein 60.-----file no.186/DEL/2008

16. Technologies for commercialization:

Development of serovar specific monoclonal antibody to *Chlamydia trachomatis* to *BCIL*.----- In process

17. Supervisor for Ph. D students =10, Supervisor for MSc. Students

Dissertation done/completed=11, MD Thesis=1

Joint supervisor for Ph. D student 1

Completed: (3) , at present (8) PhD Students are working with me.

Special invitation received:

1. Invited to speak at “Symposium on Human Chlamydial Infection’ organized during IAPM at Bangalore at VIMHANS on 27th July 2002. Topic of my lecture was ‘**New approaches in diagnosis of chlamydial infection.**
2. Invited to speak at Indo-US Workshop on ‘The role of reproductive tract health in prevention and treatment of sexually transmitted disease’ at National Institute of Immunology from 22-25th Feb, 2002. Topic of my lecture was ‘**Th-1/Th-2 cytokine regulation in genital tract of Chlamydia trachomatis infected women**
3. Invited to attend meeting of **Technical Committee of NACO** on formulation of technical specifications for HIV and HCV kits on 11th July, 2006.
4. Nominated to attend 19th meeting of **screening committee for registration of Public Funded Research Institutions /Universities etc. of DSIR** on 25th July, 2006 at DST, New Delhi.
5. Invited to attend advance training program on **management of Intellectual property Rights in Biotechnology** for small and medium sized enterprises at hotel Metropolitan, Nikko, New Delhi from Oct 9-11, 2006 organized by World

- Intellectual Property Organization (WIPO) and Biotech Consortium India Limited (BCIL).
6. Nominated to attend interactive session On **Biodefence” Preparing for next Pandemic”** with Dr. Rajiv Venkayya MD, Special assistant to the President, White House Homeland Security Council, USA on 8th Jan,2007 Organized by Corporation of Indian Industry at CII, Lodhi Road, New Delhi.
 7. Nominated to attend a meeting on Developing protocol for a **Cochrane Systematic Review at Christian Medical college**, Vellore from June25-25,2007.
 8. Invited speaker at Joint working group committee meeting **Indo-US Contraceptive Research Reproductive Health** in Delhi on 19th September 2007 on ‘**Effect of Sex Hormones on Induction of Immunity by Dendritic cells in Female Genital Tract during Chlamydial Infection**’.
 9. Invited speaker during the **workshop on Opportunities and limitations in developing diagnostics** jointly organized by Department of Biotechnology and Yashraj Biotechnology at Mumbai, Nov 2007. The title of my talk was **Diagnosis of *Chlamydia in India: Limitations and need for development of new technologies***.
 10. Invited speaker at CME Update on Community acquired multidrug resistance infections organized by Department of Microbiology, Safdarjung hospital on 18th Jan, 2008. The title of my talk was **Emerging Resistance in *Chlamydia trachomatis* -Global Scenario**.
 11. Invited speaker at Indo-Finnish meeting organized by DBT in Manesar from 23-24th Jan 2008. The topic of my talk was **Chlamydial Diagnosis: Biomarkers and New opportunities for rapid tests**.
 12. Nominated to attend International meeting **on Microbicides at Hotel Ashok**, New Delhi from24th -27 th Feb,2008.

Special assignment received:

- 1) Examiner -Molecular characterization of Indian isolates of *C. trachomatis*'---
Ph.D. thesis, 2003.
- 2) Appointed examiner at Institute of Pathology for Ph.D. qualifying examination
BITS, 2002--2007.
- 3) Nominated member for 5th meeting of Screening Committee for registration of
public funded research Institutions, universities, IIT's, REC's, etc. held in DSIR,
DST, 2002-2003.
- 4) Paper setter for Ph.D. qualifying examination, BITS at Institute of Pathology,
2003-7.
- 5) Appointed examiner for M.S(Biotechnology) AIIMS Fas and Fas ligand
expression on major lymphocytes subsets in elderly humans .2003
- 6) Identified expert for training course on AIDS Surveillance and awareness from
14-22nd April2003-2007
- 7) Member steering committee of Ministry of food and processing industries on
2003-2005
- 8) Nominated as expert to attend Technical assessment committee meeting for
purchase of Flow Cytometer at Dr. B.Borooan Cancer Institute ,Guwahati, on 20-
12-07
- 9) Lab Co0ordinator - IBBA Project 2006.
- 10) Officer In charge - Zonal Blood Testing Centre (2002-2007).

- 11) In charge- Immunology course for Ph.D students registered with Birla Institute of Science and Technology at Institute of Pathology, New Delhi, 2002 -07
- 12) Expert for technical committee for purchase of Flow Cytometer at National Institute of Immunology on 10-9-2008.

19. List of Papers Published in peer reviewed journals:

1. **Mittal A**, Agarwal MK, Shivpuri DN. Respiratory allergy to algae-Clinical Aspects. **Annals Allergy**. 1979;42:253-256.
2. **Mittal A**, Agarwal MK, Shivpuri DN. Studies on allergenic algae of Delhi area-Botanical Aspects. **Annals Allergy**. 1979;42:248-252.
3. Malik G, Bazaz Sehgal H, **Mittal A**, Yadav RB. T and B cells in health and acute infective diarrhoeal diseases of children. **Indian Journal Medical Research**. 1979;69:972.
4. Satish M, Prasad HK, **Mittal A**, Nath I. Lack of correlation between morphological index and viability as assessed by the uptake of ³H thymidine by macrophage resident *M. leprae*. **Leprosy in India**. 1982;54:420-427.
5. **Mittal A**, Satish M, Seshadri PS, Nath I. Rapid radiolabelled microculture method that uses macrophages for *in vitro* evaluation of *M. leprae* viability. **Journal Clinical Microbiology**. 1983;17:704-707.
6. **Mittal A**, Satish M, Seshadri PS, Prasad HK, Nath I. Radiometric macrophage assay for the evaluation of the antileprosy activity of rifampin. **Antimicrobiol Agents and Chemotherapy**. 1983;24:579-585.
7. **Mittal A**, Conalty ML, Sullivan JFO, Nath I. Rapid Radiometric macrophage assay for the evaluation of anti-leprosy activity of clofazimine and its analogues. **Leprosy Review**. 1985;56:99.

8. **Mittal A**, Nath I. Human T-cell proliferative response to microbial antigens are supported by populations enriched in dendritic cells. **Clinical Experimental Immunology**. 1987;69:611-617.
9. **Mittal A**, Mishra RS, Nath I. Accessory cell heterogeneity in lepromatous leprosy, dendritic cells and not monocytes support T-cell responses. **Clinical Experimental Immunology**. 1989;76:233-239.
10. Harshan KV, **Mittal A**, Nath I. 3H hypoxanthine incorporation in *M. leprae* resident macrophage culture as an alternate radiolabel. **International Journal Leprosy**. 1990;58:526-533.
11. Kapur S, **Mittal A**. Cytological detection of chlamydial inclusions in cervical smears. **Acta Cytologica**. 1993;37:108-109.
12. **Mittal A**, Sachdeva KG. Monoclonal antibodies for the diagnosis of lymphogranuloma venereum (LGV). **British Journal of Biomedical Sciences**. 1993;50:3-7.
13. **Mittal A**, Kapur, S. and Gupta, S.: Chlamydial cervicitis: Role of culture, enzyme immunoassay and Giemsa cytology in diagnosis. **Acta Pathologica Immunologica Microbiologica Scanda**. 101: 37-40, 1993
14. **Mittal A**, Kapur S, Gupta S. Screening for genital chlamydial infection in symptomatic women. **Indian Journal Medical Research**. 1993;98:119-123.
15. Saxena S, **Mittal A**, Andal A. Pattern of interleukin in minimal change nephrotic syndrome of childhood. **Nephron**. 1993;65:56-61.
16. Gupta S, Kapur S, **Mittal A**. A study on incidence of *Chlamydia trachomatis* infections in symptomatic women. **Indian Journal STD**. 1994;15:15-18
17. **Mittal A**, Kapur S, Gupta S. Host immune response in chlamydial cervicitis. **British Journal Biomedical Sciences**. 1996;153:214-220.
18. **Mittal A**, Kapur S, Garg S, Upadhyay SN, Suri S, Dua SK, Gupta S, Talwar GP. Clinical trials with praneeem polyherbal cream in abnormal vaginal discharge. **Australian Journal Obstetrics Gynecology**. 1995;35:190.
19. Ramesh V, Saxena U, **Mittal A**. Cell mediated Immunity in skin tuberculosis. **International Journal Leprosy**. 1995;63:293-295.
20. **Mittal A**, Kapur S, Gupta S. Infertility due to *Chlamydia trachomatis* infection. What is the appropriate site for obtaining sample? **Sexually Transmitted Infection**. 1995;71:267-268.

21. **Mittal A.** Serovar determination of *Chlamydia trachomatis* isolates collected from cervix by restriction endonuclease digestion. **British Journal Biomedical Sciences.** 1998;108:45-50.
22. Vermuri N, Jain S, **Mittal A**, Misra RS, Nath I. Dendritic cell enhancement of gamma interferon in lepromatous leprosy. **Immunology.** 1998;1:28.
23. Rastogi S, Kapur S, Salhan S, **Mittal A.** *Chlamydia trachomatis* infection in pregnancy: risk factor for an adverse outcome. **British Journal Biomedical Sciences.** 1999;56:94-98.
24. Kapur S, **Mittal A.** Incidence of HIV infection and its predictors in blood donors in Delhi. **Indian Journal Medical Research.** 1998;198:45-50.
25. Krishnan G, Aggarwal N, Malhotra VL, Karonne RV, Mohan V, **Mittal A**, Das BC. *Chlamydia trachomatis* and HIV infection in India with sexually transmitted diseases and cervical precancerous and cancerous lesions. **Clinical Microbiology and Infection.** 1999;61:1-5.
26. Rastogi S, Salhan S, **Mittal A.** Detection of *Chlamydia trachomatis* antigen in spontaneous abortions. Is this organism a primary or secondary indicator of risk? **British Journal Biomedical Sciences.** 2000;57:126-129.
27. Singh V, Rastogi S, Garg S, Kapur S, Kumar A, Salhan S, **Mittal A.** Polymerase chain reaction for detection of endocervical *Chlamydia trachomatis* infection in Indian women attending Gynecology outpatient department. **Acta Cytologia.** 2002;46:540-544.
28. Rastogi S, Das B, **Mittal A.** Serum immunoglobulin M to *Chlamydia trachomatis* in pregnancy: its usefulness for screening. **British Journal Biomedical Sciences.** 2002;59:30-34.
29. Rastogi S, Das B, Salhan S, **Mittal A.** Effect of treatment for *Chlamydia trachomatis* during pregnancy. **International Journal Gynecology Obstetrics.** 2003;80:129-137.
30. **Mittal A.** High frequency of antibodies to syphilis and human immunodeficiency virus in hepatitis-C virus positive blood donors may reflect its sexual transmission in this region. **Sexually Transmitted Infection.** 2003;79, 5-7.
31. Singh V, Salhan S, Das BC, **Mittal A.** Predominance of *Chlamydia trachomatis* serovars associated with urogenital infections in females in New Delhi, India. **Journal of Clinical Microbiology.** 2003;41: 2700-2702.

32. **Mittal A**, Rastogi S, Salhan S, Verma S, Gupta S. Enhanced immunocompetent cells in chlamydial cervicitis . **Journal of Reproductive Medicine**. 2004;8:671-677.
33. Reddy BS, Rastogi S, Verma S, Das B, Salhan S, **Mittal A**. Cytokine expression pattern in the genital tract of *C. trachomatis* women-implication for T cell responses. **Clinical and Experimental Immunology**. 2004;137:552-558.
34. Vats V, Rastogi S, Kumar A, Ahmed M, Singh V, **Mittal A**. Detection of *Chlamydia trachomatis* by polymerase chain reaction in male patients with non gonococcal urethritis attending STD clinic. **Sexually Transmitted Infection**. 2004;80:327-328.
35. Kapur S, Ahmed M, Singh V, Krupp G, **Mittal A**. Fluorescence *in situ* hybridization can reliably detect r-RNA sequences of *C. trachomatis* without amplification. **Acta Cytologia**. 2006;56: 277-283.
36. Singh A, **Mittal A**. High seropositivity of HCV infection in HIV positive blood donors. Is HCV predictor of HIV infection. **AIDS and Hepatitis Digest**. 2006;115:4-6.
37. Kumar A, **Mittal A**. Production and characterization of monoclonal antibody to *Chlamydia trachomatis*. **Hybridoma**. 2006;25:293-299.
38. Agrawal T, Vats V, Salhan S, **Mittal A**. Local markers for prediction of women at higher risk of developing sequelae to *C. trachomatis* infection. **American Journal of Reproductive Immunology**. 2007;57:153-159.
39. Agrawal T, Vats V, Wallace PK, Salhan S, **Mittal A**. Cervical cytokine responses in women with primary or recurrent chlamydial infection. **Journal of Interferon and Cytokine Research**. 2007; 27:221-226.
40. Vats V, Agarwal T, Salhan S, **Mittal A**. Primary and secondary immune response of mucosal and peripheral lymphocytes during *Chlamydia trachomatis* infection. **FEMS Immunology and Medical Microbiology**. 2007; 49:280-287.
41. Agrawal T, Vats V, Salhan S, **Mittal A**. Mucosal and peripheral immune responses to chlamydial heat shock proteins in women infected with *Chlamydia trachomatis*. **Clinical Experimental Immunology**. 2007; 148:461-467.
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