# CURRICULUM VITAE

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## *Current position:*

- **FAPESP Post-Doctoral Fellow** (from September 2015- till now) at the Department of Medicine-InCor/HC-FMUSP, University of Sao Paulo, School of Medicine, Brazil. Working on New therapies for Chagas disease: Using repurposing of drugs acting on the Cell invasion and Autophagy progression of host cells and Potentiation of drug effect using Biopolymeric nanoparticulate Drug Delivery Systems against *Trypanosoma cruzi*.

## *Future Research Plan:*

- Currently one-third of the world's population is infected with *Mycobacterium tuberculosis*, in between 2002 and 2020, around one billion people are likely to be newly infected, over 150 million people would get sick and 36 million would die of tuberculosis. This really motivated me to take up the academic and research challenges in the field of immunology and to contribute towards academics and ongoing research in the concerned fields. We have published some of our research works where we have challenged the mice with intra-peritoneal injection of some secreted purified *M. tb.* proteins-CFP-10 and CFP-21 proteins. When stimulated with the CFP 10 and CFP 21 proteins, there was up regulation of IFN-γ and down regulation of IL-4, indicating a Th1 bias in T cell response. Since $CD4^+$ T cells are important for initial control of infection, *M. tb* culture filtrate proteins are known to induce preferentially a Th1 type of immune response. The higher levels of IFN-γ and low level of IL-4 indicate that we have been able to stimulate immune responses in a manner like natural infection. This is very encouraging as we will be able to understand the interactions among Cytokines in the immune response to mycobacterium infection, induction of long lasting memory cell formation and that can induce high level cytokine producing cells. These early findings encourage me to write a research proposal to the Department of Science and Technology, and Indian Council of Medical Research, to get a research grant to carry out my research on immunology of tuberculosis. Biopolymeric nanoparticles are safer delivery vehicles due to their non-immunogenic, nontoxic and biodegradable nature *in vivo*. Therefore, I will use biopolymeric formulations that induce the production of enduring Th1 responses are probably an essential element of a successful vaccine. Th1-inducing properties, in conjunction with a polyprotein Ag was recently demonstrated as a safe and effective vaccine against Leishmania infection. I want to elucidate the induction of a local immune response in the upper respiratory nasal-

associated lymphoid tissue whether this plays a role in protection against aerosol *M. tb.* challenge, to confirm the importance of lung resident memory T cells and to propose the route of immunization that can induce long lasting lung resident memory cells.

## ***Teaching Interest:***

- In my academic and research journey, so far, I am moving on the right track, thanks to the initial guidance during B. Sc (Hons.) Biotechnology, which provided a strong foundation in the field of Modern Biological Sciences (Immunology, and Molecular biology). This background helped me to move to the next step, i.e. qualifying national exam for the post-graduation in the relevant field (M. Sc Biotechnology, Jawaharlal Nehru University, New-Delhi, India). Fortunately, my post-graduation at JNU provided me an opportunity to get streamlined specifically towards Immunology, and Molecular biology. As far as my perception towards research/academics are concerned, academics and research are integral components and are supplemented by each other. During my Ph.D., I was teaching Immunology and Molecular biology in University of Delhi. After my Ph.D. thesis submission, I was teaching immunology in the University of Delhi. Currently, during my post-doctoral fellowship, I got the opportunity to lead team of people working on Immunology. My role is to teach them immunology, and supervise them to design, execution of scientific experiments and progress of research work.

## ***Education:***

- **Research Associate (from September 2013-August 2015) at the Translational Health Science and Technology Institute, Faridabad-Gurgaon Expressway, Faridabad Gurgaon, India.** We have identified Foxo1, a forkhead family transcription factor, predominantly required for the induction of IL-9 in Th9 and Th17 cells. We further identified AKT, an upstream kinase that regulates IL-9 induction in Th1, Th9 and Th17 cells via Foxo1. In addition, c-Jun N-terminal kinase (JNK), a MAPK (Mitogen Activated Protein kinase) enhanced IL-9 induction in Th9 cells via Foxo1. Chromatin Immuno- precipitation (Chip) identified a direct physical association of Foxo1 with IL-9 and IRF4 promoters. In addition, Foxo1 trans activates both IL-9 and IRF4 genes in Th9 and Tc9 cells and together with IRF-4 synergistically enhanced IL-9 induction. Furthermore, loss of Foxo1 suppressed IL-9 production in Th9 and Th17 cells. In fact, Foxo1 act as a transcriptional switch, which exclusively suppresses IL-9 induction in Th17 cells while enhancing IL-17 and Th17 cells development. In Th9 mediated asthma model, Foxo1 inhibition substantially ameliorated allergic inflammation and IL-9 induction. Our findings thus identify Foxo1 as a master transcription factor in controlling the development of Th9 and IL-9-producing Th cells. Our study revealed an association of Foxo1 with IL-9-producing T cells. These data thus support that Foxo1 as a master transcription factor for IL-9-producing T cells. Inhibition of Foxo1 not only suppressed IL-9 induction in IL-9 producing T helper cells but also ameliorated development of asthma.

- **Doctorate Degree (2014)** from **University of Delhi and TACF (Tuberculosis Aerosol Challenge Facility) at the International Centre for Genetic Engineering and Biotechnology), New Delhi, India.** We have developed nanoparticles carrying two secretory proteins of *Mycobacterium tuberculosis* - CFP-10 and CFP-21 and evaluating their potential to invoke an immune response coupled with the oxidative stress when encapsulated in nanoparticles. The cytokine levels of IFN-γ, TNF-α, IL-12, IL-17, IL-2, IL-10 and IL-4 were observed to be significantly increased for CHNP CFP-10 and CHNP CFP-21. CFP-10 and CFP-21 *per se* primed cells demonstrated a Th1 biased T cell response in an *ex vivo* assay. The ability of the CFPs to provide protection against *M. tb.* challenge was further assessed. CHNP CFP-10 and CHNP CFP-21 clearly showed enhanced protection against *M. tb*. as analyzed by the Colony Forming Unit. The Th1 response is characterized by production of IL-12 and IFN-γ and the enhancement of delayed hypersensitivity response; Th2 by IL-4 and IL-10 production and up-regulation of several antibody responses. The enhanced levels of IFN-γ and IL- 12 clearly indicate a Th1 response coupled with low levels of GSH. Therefore, interplay of immune response, ROS and RNS created by our secretory proteins encapsulated in nanoparticles indicated interesting results which warrant detailed evaluation on the signaling pathways to ascertain the extent of interdependence.

- **M.Sc. in "Biotechnology" (2006)- from the School of Biotechnology, Jawaharlal Nehru University (JNU), New Delhi, India.** Worked on "Differential Immunomodulation of *Mycobacterium tuberculosis* Culture Filtrate Proteins on the human PBMCs.

- **Research Assistant at the National Science Council (NSC), Taiwan at the Chang Gung Memorial Hospital and Chang Gung University for Two years from March 2007 to March 2009**.Studied using a HA transgenic murine model, we demonstrated that cognate $CD4^+$ T cells have significant impact on tolerance induction of $CD8^+$ T cells. Effector $CD4^+$ T cells bolster the initial activation and delay the tolerance induction of $CD8^+$ T cells. Tolerized $CD4^+$ T cells also modify cognate $CD8^+$ T cell tolerance with a unique mechanism. Under suppression by tolerized $CD4^+$ T cells, $CD8^+$ T cells still proliferate well but their initial IFN-γ response and cytolytic activity are impaired. In addition, the "help" from effector $CD4^+$ T cells for cognate $CD8^+$ T cells is kinetically limited. It is most remarkable during the early phases of $CD8^+$ tolerance induction and is negligible for the later stages. With a variety of mechanisms compared side- by-side in a single antigen-specific system, it is then clear that $CD8^+$ T cell activity may be impaired in different ways. Different manifestations of $CD8^+$ T cell tolerance imply that unique strategies will be required for restoring $CD8^+$ immune response.

- **Senior Research Fellow** at the Indian Council of Medical Research, New Delhi, India. Studied Bio-polymeric stimuli sensitive, nanoparticulate targeted delivery for cancer therapeutics.

## ***Honors and Distinctions:***

- Post-Graduate Scholarship from the **Department of Biotechnology, India**. Given to scholars selected to do master's in biotechnology through Nation-wide entrance examination. 7th rank in All India Biotechnology entrance examination conducted by **Department of Biotechnology Government of India** in 2003 and selected for Jawaharlal Nehru University, India.
- Participated in **Indo-German collaborative meeting on Immunology** in New-Delhi from 5 - 7 Feb. 2005.
- Participated in International Conference on Clinical Immunology in AIIMS, New-Delhi India on 2-5 March 2006.
- Presentation in **NHRI Conference on Immunology** in Taiwan from 9th to 10th Nov. 2008.
- Presentation in **FIMSA (The Federation of Immunological Societies of Asia-Oceania)** Taipei, Taiwan. 17-20 October 2008.
- Poster Presentation in the **14th International Congress of Immunology** Kobe, Japan, 22- 27 August 2010.
- GP Talwar travel grant to attend the **14th International Congress of Immunology** Kobe, Japan, 22-27 August 2010.
- Department of Science and Technology, Government of India **Young Scientist Award** to attend the **14th International Congress of Immunology** in Kobe, Japan, 22-27 August 2010.
- Presentation at the **International Symposium on Tuberculosis Diagnostics**: Innovating to make an Impact at the International Centre for Genetic Engineering and Biotechnology, New-Delhi from 16-17 December 2010.
- Presentation at the **International Conference on Nanotechnology**, Bhubaneswar, India 8 - 10 December 2011.
- Presentation in **FIMSA (The Federation of Immunological Societies of Asia-Oceania)**, All India Institute of Medical Sciences (AIIMS), New- Delhi, India from 14 - 17 March 2012.
- FIMSA (The Federation of Immunological Societies of Asia-Oceania) **Young Scientist Award 2012.**
- **Bharat Jyoti Award** from the India- International Friendship Society 2012.
- Presentation in the **European Congress of Immunology**, Glasgow, UK, 5-8 Sept. 2012.
- **British Society of Immunology travel award** to attend the 3rd European Congress of Immunology, Glasgow, Scotland, U.K., from 5-8 Sept.2012.
- **European Federation of Immunological Societies travel grant** to attend the 3rd European Congress of Immunology, Glasgow, Scotland, U.K., from 5-8 Sept.2012.
- **International Union of Immunological Societies travel award** to attend the Introductory Course in Immunology, University of Pennsylvania, USA from 13-18 July 2013.
- **American Association of Immunologists travel award** to attend the Introductory Course in Immunology, University of Pennsylvania, USA from 13-18 July 2013.
- **Indian Immunological Society travel Award** to attend the Immunocon 2013, Delhi from 15-17 Nov. 2013.
- Presentation at the **Congress of Ayush**, Government of India, Feb. 2014.
- Elected as an **Executive Council Member of the Indian Immunology Society** (2014- 2016).

- **FAPESP Post-doctoral Fellowship** (A Prestigious Fellowship of the Latin America), 2014.
- Presentation in the **FIMSA (The Federation of Immunological Societies of Asia- Oceania)**, Singapore from 30 June to 3 July 2015.
- **FIMSA (The Federation of Immunological Societies of Asia-Oceania) travel award** 2015.
- Presentation in the **International Congress of Immunology Melbourne**, Australia, 21- 26 August 2016.
- Presentation in the **Brazilian Congress of Immunology Campos do Jordao, Brazil** Oct. 29- 2nd November 2016.
- **FOCIS (The Federation of Clinical Immunology Societies)** travel grant 2017.

➢ ***Patent:***

➢ **Therapeutic evaluation of Compound 1 for the possible treatment of typhoid. Submitted for USA Patent. (Application Number-(E-5/1022/2016).**

## ➢ *Publications Abstracts and Presentations:*

### *Book Chapter:*

- **A Book** on the **Liver Transplantation** from Chang Gung Memorial Hospital, Taiwan Liver Research Unit, CGMH, Taiwan, 2009.

### *Peer Reviewed Journal Articles:*

1. **Quality control of vaccines-A journey from classical approach to 3Rs.** Suresh Kumar, Mahendra Pal Singh, Vijay K. Bharti, **Ramendra Pati Pandey** ***Microbiol Curr. Res. 2018 2 (2), 14-30.***

2. **Proposed Deletion of Abnormal Toxicity Test And 3Rs Initiatives for Other Safety Test of Biologicals.** Suresh Kumar, Vijay K. Bharti, Prdeep Kumar and **Ramendra Pati Pandey.** ***Source Journals, 1(1), 2018, 2-16.***

3. **Vimentin and Anti- Vimentin Antibodies in American Trypanosomiasis**. **Ramendra Pati Pandey *et al.***

   ***Arq Bras Cardiol. 2018 Mar, 12; 110(4):348-353.***

4. **Clinical Applications of Nanoparticles Drug Delivery Vehicles. Ramendra Pati Pandey, *Indian Journal of Hospital Infection, 2018 (Accepted).***

5. **Protective Immune Response induced by Antigenic Proteins of *Mycobacterium tuberculosis* encapsulated in biopolymeric nanoparticles. Ramendra Pati Pandey,** Santosh Kumar, Pawan Sharma, Anita Kamra Verma. ***European Journal of Immunology****, 2018,* ***(Submitted).***

6. **Nanoparticulate Drug Delivery Systems for Cancer Therapy. Ramendra Pati Pandey *et al. Journal of Immunology and Regenerative Medicine, 2018, (Submitted).***

7. **Therapeutic Evaluation of Nanoparticulate Drug Delivery Systems for Cancer. Ramendra Pati Pandey *et al. PLOS ONE,2018, (Submitted).***

8. **Disease tolerance and pathogen resistance genes may underlie *Trypanosoma cruzi* evasion, parasite persistence and differential progression to Chagas disease cardiomyopathy.** Christophe Chevillard, João Paulo Silva Nunes, Amanda Farage Frade, Rafael Ribeiro Almeida, **Ramendra Pati Pandey**, Marilda Savóia Nascimento, Jorge Kalil, Edecio Cunha-Neto.
   ***Frontiers in Immunology,2018, (Submitted).***

9. **A role of Hypoxia-Inducible Factor- 1 alpha (HIF-1α) in Salmonella infection. Ramendra Pati Pandey et al. *(Manuscript prepared for submission).***

10. **Integration of miRNA and gene expression profiles suggest a role for miRNAs in the pathobiological processes of acute *Trypanosoma cruzi* infection.** Ferreira LRP, Ferreira FM, Laugier L, Cabantous S, Navarro IC, da Silva, Cândido D, Rigaud VC, Real JM, Pereira GV, Pereira IR, Ruivo L, **Pandey RP**, Savoia M, Kalil J, Lannes-Vieira J, Nakaya H, Chevillard C, Cunha-Neto E.
    ***Scientific Reports, 2017 Dec 21; 7(1):17990.***

11. **Transcription factor Foxo1 directs the differentiation of IL-9$^{+}$ T helper cells. Ramendra Pati Pandey *et al,***
    ***Nature Commun. 2017 Oct 9; 8(1):815.***

12. **Evaluation of Nanoparticles Pyrogenicity. Ramendra Pati Pandey *et al European Journal of Biomedical and Pharmaceutical Sciences, 2017, 4 (3) 168-183.***

13. **Nanomedicine and Immune Response. Ramendra Pati Pandey,** Suresh Kumar
    ***Indian Journal of Hospital Infection, 1(1), 2017.***

14. **Immune Response of Biopolymeric nanoparticulate systems.**
    **Ramendra Pati Pandey,** Abhishek Chanchal, Richa Vohra, Md. Najmul Islam, Santosh Kumar, Lokesh Bhushan, Suresh Kumar, Pawan Sharma
    ***Journal of Pharma Research 2015, 4(8) 304-306.***

15. **Gelatin Biopolymer: A Journey from Micro to Nano,** Abhishek Chanchal, Richa Vohra, Srikanth Elesela, Lokesh Bhushan, Santosh Kumar, Suresh Kumar, Saheem Ahmad, **Ramendra Pati Pandey.** ***Journal of Pharmacy Research 2014, 8(10), 1387-1397.***

16. **Glycoxidation of biological macromolecules: A critical approach to halt the menace of glycation**. S. Ahmad, Khan MS, Akhter F, **Pandey RP**
    ***Glycobiology, 2014, 24(11):979-90.***

17. **Pharmacokinetics and Biodistribution of Paclitaxel–Gelatin Nanoparticles**
Anita K. Verma, A. Chanchal, **R. P. Pandey**, R. Vohra, N. Islam & A. K. Misra
***International Journal of Green Nanotechnology, 2012, 4, 500-510.***

18. **Biopolymeric vectors for enhancing Gene delivery-A Comparative evaluation.** Anita K. Verma, N. Islam, A. Chanchal, **Pandey, R. P.**
***IEEE, 2011, 1-7.***

19. **Assessment of the multifaceted immunomodulatory potential of the aqueous extract of *Tinospora cordifolia.***
Upadhya R., **Pandey R.P.**, Sharma V., & Verma Anita K
***Research Journal of Chemical Sciences, 2011, 1(6), 1-7.***

20. **Hyperthermophilic asparaginase mutants with enhanced substrate affinity and antineoplastic activity: Structural insights on their mechanism of action**
S. Bansal, Srivastava A, **R. P.Pandey**, Anita Verma, P. Mishra and B. Kundu
***FASEB Journal, 2012, 26(3):1161-71.***

21. **Immuno-potentiating role of encapsulated proteins of infectious diseases in biopolymeric nanoparticles as a potential delivery system.**
Verma AK, **Pandey RP**, Chanchal A, Sharma P.
***J Biomed Nanotechnol. 2011 Feb;7(1):63-4.***

22. **Encapsulation of Antigenic Secretory proteins of Mycobacterium tuberculosis in Biopolymeric Nanoparticles for possible aerosol delivery system.** A. K. Verma,**R. P. Pandey**, A.Chanchal , I. Siddiqui , P. Sharma
***J. Bionanosciences, 2011,5, 88-95.***

23. **Structural and functional studies on Ribonuclease S, retro S and retroinverso S peptides.**
Ipsita Pal-Bhowmick, **R.P. Pandey**, Gotam K. Jarori, Santosh Kar, Dinkar Sahal.
***BBRC***, 2007 Dec 21; 364(3):608-13. Epub 2007 Oct 18.

***Abstracts and Presentations:***

**1. Protective Efficacy induced by Antigenic Proteins of *Mycobacterium tuberculosis* encapsulated in biopolymeric nanoparticles in Balb/c mice infected with *M. tb.***
**R.P. Pandey,** Santosh Kumar, Anita K. Verma**,** Pawan Sharma**.**
***Immunology, 137, 2012.***

**2. Therapeutic evaluation of drug combination against *Trypanosoma cruzi*.**
**Ramendra Pati Pandey**, Andréia Kuramoto, Jorge Kalil, Edecio Cunha-Neto
***European Journal of Immunology, 2016.***

**3. New therapies for Chagas disease: repurposing of drugs acting on the invasion of host cells by T. cruzi, and potentiation of Benznidazole effect.**
**Ramendra Pati Pandey**, Marilda Savoia, Jorge Kalil, and Edecio Cunha-Neto
***Presentation in the Federation of Clinical Immunology Societies, Santiago, 2017.***

- ***Member, Editorial Board:***

  - PLOS ONE
  - PLOS Neglected Tropical Diseases
  - BMC Immunology
  - International Journal of Biotechnology Applications
  - Red Flower Publication- Editor-in-Chief
  - European Journal of Biomedical and Pharmaceutical Sciences
  - Life Member of the Indian Immunology Society

***References:***

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