

## CURRICULAM VITAE

### *Suvasmita Rath*

RUSA POSTDOCTORAL FELLOW, UTKAL UNIVERSITY



#### **Address for Correspondence:**

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Utkal University  
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#### **Academic Credentials**

##### **Post-doctoral experiences:**

□ **Postdoctoral Fellow:** (Rashtriya Uchchar Shiksha Abhiyan (RUSA), Ministry of human resource development (MHRD), India): Department of Biotechnology, Utkal University, VaniVihar, Bhubaneswar, Odisha.

**Time Period:** 17<sup>th</sup> December 2020-Continuing

**Area of Work:** Epigenetic modulation in stress induced cellular senescence and intervention by phytochemicals.

**Mentor:** Prof. Jagneshwar Dandapat, P.G. Dept of Biotechnology, Utkal University

□ **Visiting Scientist:** Department of Dermatology, University of Wisconsin-Madison, USA

Time Period: 1<sup>st</sup> April 2016 to 1<sup>st</sup> October 2016 (**6 Months**)

Area of Work: Epigenetic modifications in prostate cancer cells

Mentor: Prof. Hasan Mukhtar, Dept of Dermatology, UW-Madison, USA

##### **Jan 2011 – Dec 2016:**

Ph. D.:

Thesis Title:

Thesis supervisor:

Ph. D. (Molecular signaling and cancer biology)

NISER, Bhubaneswar, INDIA

**Factors Regulating Epithelial-Mesenchymal Transition (EMT) and Metastasis of Gastric Cancer**

Dr. Asima Bhattacharyya, NISER, Bhubaneswar

##### **July 2008-June 2010:**

M. Sc. (Biotechnology)

Masters in Science

School of Biotechnology, KIIT University,

Bhubaneswar, Odisha, India

**July 2005-June 2008:**  
B. Sc. (Biotechnology)

Bachelors in Science  
College of Basic Sciences and Humanities,  
Orissa University of Agriculture and Technology  
(OUAT), Bhubaneswar, India

### **Awards/ fellowships/ scholarships:**

- Best oral presentation award in 22nd Odisha Bigyan “O” Paribesh Congress, National Seminar on Overcoming the Challenges: Role of Science and Technology. Ravenshaw University, Cuttack, Odisha
- 2011: UGC-JRF:** Qualified joint CSIR-UGC-test for Junior Research Fellow and Eligibility for Lectureship (NET), examination conducted by Scientific and Industrial Research (CSIR), New Delhi, India
- 2010: ICMR-JRF:** Qualified ICMR-JRF examination conducted by Indian Council of Medical Research (ICMR), New Delhi, India
- 2010: NET-LS:** Qualified joint CSIR-UGC-test for Junior Research Fellow and Eligibility for Lectureship (NET), examination conducted by Scientific and Industrial Research, New Delhi, India
- 2010:** Qualified Graduate Aptitude Test in Engineering (GATE)
- 2008:** Dr. Aswini Kumar Mohapatra Memorial award for best graduate in the year 2008.
- 2008:** Guru Prasad Ray memorial prize for the best graduate in the year 2008 in B.Sc. Hons.
- 2008:** University Gold Medal in B.Sc. Hons for the first position in first class in the B.Sc. final exam for year 2008
- Life time member of Indian Society of Cell Biology (ISCB) (<http://www.iscb.org.in/homepage.htm>), India
- Member of Indian

### **Technical skills:**

- Expertise in animal cell culture based experiments
- Expertise in all protein based works such as protein isolation, SDS PAGE, western blotting, immunoprecipitation
- Cloning, expression and mutagenesis studies
- Familiar with maintenance of bacterial cultures including *Helicobacter pylori*
- Fluorescence activated cell sorting (FACS)
- Familiar with confocal microscopy, fluorescence microscopy
- Sectioning and staining of gastric biopsy tissue samples

### **Research activities:**

**Utkal University, Bhubaneswar, Odisha (RUSA-PDF):** My work mainly focused on the epigenetic modulation of stressed-induced mechanism behind cellular senescence and interventions by various phytochemicals.

### **Post Ph. D. research work at University of Wisconsin-Madison, USA**

In University of Wisconsin-Madison, my work mainly based on comprehensive profiling of drug affected epigenome.

Genetic as well as epigenetic changes play a very crucial role during cancer progression. Various oncogenic and tumor suppressor genes are altered during onset of cancer. Among the tumor suppressors, phosphatase and tensin homologue (PTEN), a lipid phosphatase, is one of the major gene found to be mutated in a wide variety of cancers including breast, colon, prostate and lung. PTEN also plays a crucial role in phosphoinositide 3-kinase (PI3K)–AKT pathway which further affects cell growth and survival process. Correlation between histone modifications (acetylation as well as methylation) and AKT activation are previously studied. Unbiased and comprehensive profiling of histone modifications are studied in PTEN null and AKT inhibitor treated prostate cancer cells. Our results confirmed a correlation between AKT inhibition and repression of histone demethylases in vivo experimental conditions.

Apart from this, the status and functional impact of growth factor receptor binding protein 10 (GRB10), is also studied in prostate cancer cell lines.

### **Ph.D. work at NISER, Bhubaneswar, India**

My Ph. D. thesis work mainly focused on identifying the molecular mechanism of apoptosis induction in hypoxic and *H. pylori*-infected GECs by modulating p300 HAT and Hif1 $\alpha$  activity in gastric epithelial cancer cells (GECs).

Aggressiveness of gastric cancer is mainly achieved through Epithelial to mesenchymal transition (EMT), by which the primary tumor mass leaves its origin and migrates to the distant organs and attains more aggressive metastatic properties. EMT is modulated by hypoxia and *Helicobacter pylori* infection in gastric epithelial cancer cells (GECs). Hypoxia-inducible factor 1 $\alpha$  (Hif1 $\alpha$ ), which is induced by hypoxia as well as *H. pylori* infection, plays a major role in the EMT and metastasis. *H. pylori* infection induces reactive oxygen species (ROS) generation which stabilizes Hif1 $\alpha$  in normoxic condition. *H. pylori* infection also enhances expression of an antiapoptotic and tumorigenic protein, myeloid cell leukemia 1 (Mcl1), and a proapoptotic and tumor-suppressor protein Noxa. Maintenance of Mcl1 and Noxa balance is a very crucial parameter for cell survival and apoptosis. p300 is a transcriptional cofactor for Hif1 $\alpha$  which has histone acetyltransferase (HAT) activity and can function as a tumor-suppressor as well as a proto-oncogene. Most of the metastatic cells are resistant to the existing therapeutic strategies and apoptosis induction in these cells is an absolute requirement to treat metastatic cancers. Few of the highlights of my thesis works are mentioned below.

- ❑ HAT inhibition induces hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>)-mediated p38 MAPK activation followed by Noxa upregulation and induction of mitochondria-mediated cell death in hypoxic GECs.

- ❑ HAT inhibition reduces EMT marker expression and suppression of metastatic properties in hypoxic GECs.
- ❑ Noxa phosphorylation at S<sup>13</sup> residue by c-Jun N-terminal kinases (JNKs) induces survival of *H. pylori*-infected GECs by protecting Mcl1 from Noxa-mediated degradation.
- ❑ HAT inhibition suppressed metastatic property and results in apoptosis induction selectively in the *H. pylori*-infected GECs.

Apart from that I have also studied Protein kinase c alpha (PKC $\alpha$ ) mediated carcinogenesis in hypoxic GECs.

### **Research Interest:**

- ❑ Cell culture based techniques and experiments
- ❑ Molecular biology techniques and signaling studies
- ❑ All the protein based studies includes SDS PAGE, western blotting, immunoprecipitation
- ❑ Imaging (Fluorescence microscopy and Confocal microscopy)
- ❑ Tissue sectioning and immune-staining
- ❑ *Helicobacter pylori* mediated experiments
- ❑ Cloning, expression and mutagenesis experiments

### **List of publications:**

- 1) Regulation of Noxa-mediated apoptosis in *Helicobacter pylori*-infected gastric epithelial cells.  
**S Rath**, L. Das, S. B. Kokate, B. M. Pratheek, S. Chattopadhyay, C. Goswami, R. Chattopadhyay, S. E. Crowe, A. Bhattacharyya.  
*FASEB J.* 2015 Mar; 29 (3):796-806  
<https://doi.org/10.1096/fj.14-257501>
- 2) Cobalt chloride-mediated protein kinase C  $\alpha$  (PKC  $\alpha$ ) phosphorylation induces hypoxia-inducible factor 1 $\alpha$  (HIF1 $\alpha$ ) in the nucleus of gastric cancer cell.  
**S. Rath**, A. Anand, N. Ghosh, L. Das, S. B. Kokate, P. Dixit, S. Majhi, N. Rout, S. P. Singh, A. Bhattacharyya.  
*Biochem Biophys Res Commun.* 2016 Feb 26; 471(1):205-12  
<https://doi.org/10.1016/j.bbrc.2016.01.140>
- 3) Inhibition of histone/lysine acetyltransferase activity kills CoCl<sub>2</sub>-treated and hypoxia-exposed gastric cancer cells and reduces their invasiveness.  
**S. Rath**, L. Das, S. B. Kokate, N. Ghosh, P. Dixit, N. Rout, S. P. Singh, S. Chattopadhyay, H. Ashktorab, D. T. Smoot, M. M. Swamy, T. K. Kundu, S. E. Crowe, A. Bhattacharyya.  
*International Journal of Biochemistry & Cell Biology*, 82, 2017, 28-40  
<https://doi.org/10.1016/j.biocel.2016.11.014>
- 4) ETS2 and Twist1 promote invasiveness of *Helicobacter pylori*-infected gastric cancer cells by inducing Siah2.  
L. Das, S. B. Kokate, **S. Rath**, N. Rout, S. P. Singh, S. E. Crowe, A. K. Mukhopadhyay, A. Bhattacharyya.  
*Biochemical Journal* 473 (11), 1629-1640 (2016)  
<https://doi.org/10.1042/BCJ20160187>

- 5) Membrane-bound  $\beta$ -catenin degradation is enhanced by ETS2-mediated Siah1 induction in *Helicobacter pylori*-infected gastric cancer cells.  
L. Das, S. B. Kokate, P. Dixit, **S. Rath**, N. Rout, S. P. Singh, S. E. Crowe, A. Bhattacharyya.  
*Oncogenesis* 6 (5), e327, Published online 8 May 2017  
[doi:10.1038/oncsis.2017.26](https://doi.org/10.1038/oncsis.2017.26)
  
- 6) Hypoxia Driven Glycation: Mechanisms and Therapeutic Opportunities.  
M. I. Khan\*, **S. Rath**\*, V. M. Adhami, H. Mukhtar (\* equal contribution)  
*Seminars in Cancer Biol.* 2018 Apr; 49:75-82.  
<https://doi.org/10.1016/j.semcancer.2017.05.008>
  
- 7) Targeting Epigenome with Dietary Nutrients in Cancer: Current Advances and Future Challenges.  
Khan MI, **Rath S**, Adhami VM, Mukhtar H.  
*Pharmacol Res.* 2018 Mar; 129: 375-387.  
<https://doi.org/10.1016/j.phrs.2017.12.008>
  
- 8) Acetylation-mediated Siah2 stabilization enhances PHD3 degradation in *Helicobacter pylori*-infected gastric epithelial cancer cells.  
Kokate SB, Dixit P, Das L, **Rath S**, Roy AD, Poirah I, Chakraborty D, Rout N, Singh SP, Bhattacharyya A.  
*FASEB J.* 2018 Oct;32(10):5378-5389.  
<https://doi.org/10.1096/fj.201701344RRR>
  
- 9) Pro-proliferative role of adaptor protein GRB10 in prostate carcinoma.  
M. I. Khan, A. A. Johani, A. Hamid, B. Ateeq, V. M. Adhami, R. K. Lall, **S. Rath**, M. Secchi, I. A. Siddiqui, B. B. Hafeez, A. K. Verma, T. C. Havighurst, W. Huang, J. M. Ntambi, H. Mukhtar  
*FASEB J.* 2019 Mar;33(3):3198-3211.  
<https://doi.org/10.1096/fj.201800265RR>
  
- 10) AKT Inhibition Modulates H3K4 Demethylase Levels in PTEN-Null Prostate Cancer.  
Khan MI, Hamid A, **Rath S**, Ateeq B, Khan Q, Siddiqui IA, Adhami VM, Choudhry H, Zamzami MA, Mukhtar H.  
*Mol Cancer Ther.* 2019 Feb;18(2):356-363.  
[10.1158/1535-7163.MCT-18-0141](https://doi.org/10.1158/1535-7163.MCT-18-0141)
  
- 11) Nutritive vitamins as epidrugs.  
Nur SM, **Rath S**, Ahmad V, Ahmad A, Ateeq B, Khan MI.  
*Crit Rev Food Sci Nutr.* 2020 Feb 5:1-13.  
<https://doi.org/10.1080/10408398.2020.1712674>
  
- 12) Factors regulating dynamics of angiotensin- converting enzyme-2 (ACE2), the gateway of SARS-CoV-2: Epigenetic modifications and Therapeutic interventions by epidrugs.  
**S Rath**, V Perikala, AB Jena, J Dandapat  
*Biomedicine & Pharmacotherapy*, 112095  
<https://doi.org/10.1016/j.biopha.2021.112095>

## Workshops:

- ❑ International Conference on Advancement in Biomedical Research (2009), KIIT University, Odisha on 13<sup>th</sup>-14<sup>th</sup> November 2009.
- ❑ International Conference on “Emerging trends in biological sciences” organized by School of Biotechnology, KIIT University, Odisha on 24<sup>th</sup>-25<sup>th</sup> October 2008.
- ❑ A national workshop on “Environmental and biosafety related issues in the field of biotechnology” held at KIIT University on 29<sup>th</sup>-30<sup>th</sup> September 2007.
- ❑ A seven days work shop on “DNA cloning” held at biotechnotric laboratories, Bhubaneswar, and Orissa (2007).

## Conference presentations:

- 1) The potential of targeting p300/HIF-1 $\alpha$  complex by CTK7A in gastric cancer.  
**S. Rath**, A. B. Jena, A. Bhattacharyya, J. Dandapat  
22nd Odisha Bigyan “O” Paribesh Congress, National Seminar on Overcoming the Challenges: Role of Science and Technology.  
P 76-77- 2021, Ravenshaw University, Cuttack, Odisha
- 2) Regulation of mitochondria-mediated apoptosis induction in hypoxic gastric epithelial cancer cells.  
**S. Rath**, S.B. Kokate, L. Das, T.K. Kundu, S.P. Singh, A. Bhattacharyya  
Cell Symposia: Multifaceted Mitochondria, P 1.088, 2015 – Chicago, IL, USA
- 3) Regulation of apoptosis induction in hypoxic gastric epithelial cancer cells with metastatic property.  
**S. Rath**, L. Das, S. B. Kokate, T. K Kundu, S. P. Singh, A. Bhattacharyya.  
2<sup>nd</sup> international conference on frontiers in Biological Sciences (InCoFIBS-2015), NIT Rourkela, India.
- 4) Selective killing of hypoxic gastric epithelial cancer cells showing metastatic properties.  
**S. Rath**, L. Das, S. B. Kokate, T. K Kundu, S. P. Singh, A. Bhattacharyya.  
2<sup>nd</sup> International meet on advanced studies on cell signaling network (CeSiN-2014, IL-20) IICB, Kolkata, India.
- 5) Regulation of *Helicobacter pylori*-mediated gastric cancer: a prospective on Siah2  
L. Das, S. B. Kokate, **S. Rath**, S. P. Singh, A. Bhattacharyya  
2<sup>nd</sup> International meet on advanced studies on cell signaling network (CeSiN-2014,OP-7), IICB, Kolkata, India.
- 6) Regulation and role of the E3 ubiquitin ligase SIAH1 in *Helicobacter pylori*-mediated gastric cancer  
L. Das, S. B. Kokate, **S. Rath**, S. P. Singh, A. Bhattacharyya  
2nd International meet on advanced studies on cell signaling network (CeSiN-2014, PP-1), IICB, Kolkata, India.
- 7) *Helicobacter pylori* Protect Gastric Epithelial Cancer Cells from Apoptosis.

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**S. Rath**, L. Das, R. Chattopadhyaya, S. E Crowe, A. Bhattacharyya

*81st Annual Meeting of the Society of Biological Chemists (SBC: 2012) and Symposium on Chemistry and Biology, Kolkata, India.*

8) Regulation of hypoxia-inducible factor 1 $\alpha$  in gastric cancer metastasis.

**S. Rath**, L. Das, T. K. Kundu, A. Bhattacharyya

PP: CBC16,

81st Annual Meeting of the Society of Biological Chemists (SBC: 2012) and Symposium on Chemistry and Biology, Kolkata, India.