***Curriculum Vitae***

**Sushil Kumar, Ph.D.**

Research Associate

School of Medicine

University of Colorado Denver

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**PROFESSIONAL PROFILE**

**Research Experience**

2015-Present: Research Associate, School of Medicine, University of Colorado Denver, Colorado.

2011 -2015: Visiting Research Associate, Skaggs School of Pharmacy and Pharmaceutical Sciences, University of Colorado Denver, Colorado.

2010-2011: Research Associate, Molecular biology and Immunology, University of North Texas Health Science Center, USA.

**Academic Qualifications**

2004-2009: Ph.D. in Biotechnology (Molecular Biology, Microbiology) from School of Biotechnology, Banaras Hindu University, Varanasi, India.

Thesis Title: “Genetic Variations and Status of Pathogenicity Genes in *Helicobacter pylori* in Patients of North and South India”.

Supervisor: Prof. Ashok Kumar; Co-supervisor: Dr. Vinod Kumar Dixit.

2001-2003: Master’s Degree (M.Sc.) in Biotechnology from School of Biotechnology, Banaras Hindu University, Varanasi, India.

Dissertation title: “UV-B Mediated Effects on DNA: PCR Assay as a Molecular Tool. (1 Year)”.

**FELLOWSHIP/AWARDS**

* Qualified Senior Research Fellowship: University Grant Commission, New Delhi (Jan. 2006 – Jan, 2009).
* Qualified Joint CSIR-UGC Test for Junior Research Fellowship (Jan. 2004 – Jan. 2006).
* Qualified Joint CSIR-UGC Test for Eligibility for Lectureship (2003).
* Qualified Graduate Aptitude Test in Engineering (GATE) 2003, with 97.6 percentile in Life Science.
* Awarded studentship for pursuing Master’s Degree in Biotechnology by Department of Biotechnology, Ministry of Science and Technology, New Delhi (Government of India), All India rank 18th (2001-2003).

# PUBLICATIONS (21 published)

1. Dhar D, Deep G, **Kumar S**, Wempe MF, Raina K, Agarwal C, Agarwal R. Bitter melon juice exerts its efficacy against pancreatic cancer via targeting both bulk and cancer stem cells. Mol Carcinog. 2018 Sep;57(9):1166-1180. doi: 10.1002/mc.22833. Epub 2018 May 18. PubMed PMID: 29727019; PubMed Central PMCID: PMC6118209.
2. Nedumaran1 B, Rudra P, Gaydos J, **Kumar S**, Meacham1 RB, Burnham EL, Malykhina AP, (2017). Impact of Regular Cannabis Use on Biomarkers of Lower Urinary Tract Function. **Urology (**Published).
3. Zhang H, Wang D, Li M, Plecita-Hlavata L, D'Alessandro A, Tauber J, Riddle S, **Kumar S**, Flockton A, McKeon BA, Frid M, Haines J, Caruso P, Kasmi KE, Petr Jezek, Morrell N, Hu C-J, and Stenmark KR, (2017). The Metabolic and Proliferative State of Vascular Adventitial Fibroblasts in Pulmonary Hypertension is Regulated through a MiR-124/PTBP1/PKM Axis. **Circulation**, (Published).
4. Pugliese SC, **Kumar S**, Janssen WJ, Graham BB, Frid MG, Riddle SR, El Kasmi KC, and Stenmark KR. (2017) A Time and Compartment-Specific Activation of Lung Macrophages in Hypoxic Pulmonary Hypertension, **The Journal of Immunology**, 198: 4802–4812.
5. Li M, Riddle S, Zhang H, D'Alessandro A, Flockton A, Serkova NJ, Hansen KC, Moldvan R, McKeon BA, Frid M, **Kumar S,** Li H, Liu H, Cánovas A, Medrano JF, Thomas MG, Iloska D, Plecita-Hlavata L, Jezek P, Pullamsetti S, Fini MA, El Kasmi KC, Zhang Q, Stenmark KR. (2016). Metabolic Reprogramming Regulates the Proliferative and Inflammatory Phenotype of Adventitial Fibroblasts in Pulmonary Hypertension Through the Transcriptional Co-Repressor C-terminal Binding Protein-1. **Circulation,** 134: 1105-1121.
6. Ting H, Deep G, **Kumar S,** Jain AK, Agarwal C, Agarwal R. (2016) Beneficial effects of the naturally occurring flavonoid silibinin on the prostate cancer microenvironment: role of monocyte chemotactic protein-1 and immune cell recruitment. **Carcinogenesis**. 37:589-99.
7. Raina K, **Kumar S,** Dhar D and Agarwal R (2015). Silibinin and colorectal cancer chemoprevention: a comprehensive review on mechanisms and efficacy. **Journal of Biomedical Research** (Manuscript ID JBR-2015-0111, Published).
8. **Kumar S,** Kumar D, Raina K, Agarwal R, Agarwal C. (2014) Functional modification of adipocytes by grape seed extract impairs their pro-tumorigenic signaling on colon cancer stem cells and the daughter cancer cells. **Oncotarget.** 5:10151-69.
9. **Kumar S,** Raina K, Agarwal C and Agarwal R. (2014) Silibinin strongly inhibits the growth kinetics of colon cancer stem cell-enriched spheroids by modulating interleukin 4/6-mediated survival signals. **Oncotarget**. 5:4972-89.
10. Derry MM, Somasagara RR, Raina K, **Kumar S,** Gomez J, Patel M, Agarwal R and Agarwal C. (2014) Target identification of grape seed extract in colorectal cancer using drug affinity responsive target stability (DARTS) technique: role of endoplasmic reticulum stress response proteins. **Current Cancer Drug Targets**. 14:323-36.
11. **Kumar S,** Raina K and Agarwal R (2014). Chemopreventive and anticancer efficacy of Silibinin against colorectal cancer In: Multi-targeted approach to treatment of cancer (Eds. Gandhi V, Mehta K, Grover R, Pathak S and Agarwal BB), Springer Cham Heidelberg New York Dordrecht London, ISBN 978-3-319-12252-6, P no. 339-350.
12. Forster GM, Raina K, Kumar A, **Kumar S,** Agarwal R, Chen MH, Bauer JE, McClung AM and Ryan EP. (2013). Rice varietal differences in bioactive bran components for inhibition of colorectal cancer cell growth. **Food Chemistry**. 141:1545-52.
13. Chaturvedy V, **Kumar S,** Shahi SK, Tyagi MB, Kumar A. (2012). Sodium dodecyl sulfate (SDS): Applications, toxicity and biodegradation. In: Plant Genome; Conservation, Manipulation and diversity (Eds. Roy BK, Chaudhary BR, Sinha RP). Narosa Publishing House Pvt. Ltd. New Delhi, ISBN 978-81-8487-133-5, p no. 113-126.
14. Vatsyayan R, Lelsani PC, Chaudhary P, **Kumar S,** Awasthi S, Awasthi YC. (2012). The expression and function of vascular endothelial growth factor in retinal pigment epithelial (RPE) cells is regulated by 4-hydroxynonenal (HNE) and glutathione S-transferaseA4-4. **Biochem Biophys Research Communications**.417:346-51.
15. Shahi SK, Kumar A, **Kumar S,** Singh SK, Gupta SK, Singh TB. (2012) Prevalence of diabetic foot ulcer and associated risk factors in diabetic patients from north India. The **Journal of Diabetic foot complications**. 3: 83-91.
16. **Kumar S,** Kokate RA, Sahu M, Chaudhary P, Sharma R, Awasthi S and Awasthi YC. (2011). Inhibition of mercapturic acid pathway-mediated disposal of 4- hydroxynonenal causes complete and sustained remission of human cancer xenografts in nude mice. **Indian Journal of Experimental Biology, Journal Cover Page Coverage**. 49 : 817-25.
17. **Kumar S**, Shahi SK, Kumar A and Dixit VK. (2011). The enigma of *Helicobacter pylori* infection and gastrointestinal diseases. In: **Current topics in biotechnology and microbiology** (Eds. Dhingra HK, Jha PN, Chandary PB). LAP Lambert Academic Publishing AG & Co. KG, Dudweller Dandstr, Germany, ISBN 978-3-8443-2975-9, p no. 237-267.
18. **Kumar S**, Kumar A and Dixit VK. (2011). Genetic diversity in strains of *Helicobacter pylori* from India and their relatedness to strains from other parts of the world. **Infection Genetics and Evolution.** 11**:** 242-47.
19. **Kumar S**, Kumar A and Dixit VK. (2010). Diversity in *cag* pathogenicity island (*cag* PAI) of *Helicobacter pylori* isolates from North and South Indian populations. **Journal of Medical Microbiology**. 59: 32-40.
20. Sinha R P, Tyagi MB, **Kumar S** and Kumar A. (2010) UV-B radiation – induced stress and protection strategies in cyanobacteria. In: New Vistas in Algal Biotechnology (Ed. Das MK). Daya Publishing House 1123/74, Deva Ram Park Tri Nagar, Delhi, ISBN 81-7035-647-4, p no. 93-110.
21. **Kumar S**, Kumar A and Dixit VK. (2009). Evidences showing association of interleukin- 1B polymorphisms with increased risk of gastric cancer in an Indian population. **Biochemical and Biophysical Research Communications**. 387(3): 456–60.
22. Singh SK, Gupta K, Tiwari S, Shahi SK, **Kumar S,** Kumar A, Gupta SK. Detecting aerobic bacterial diversity in patients with diabetic foot wounds using ERIC-PCR: a preliminary communication. **The** **International Journal of Lower Extremity Wounds**. 2009 Dec;8 (4): 203-8.
23. **Kumar S**, Kumar A and Dixit V K. (2008). Direct detection and analysis of *vacA* genotypes and *cagA* gene of *Helicobacter pylori* from gastric biopsies by a novel multiplex polymerase chain reaction assay. **Diagnostic Microbiology and Infectious Disease** **62** (4): 366–73.

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| **ABSTRACTS/PROCEEDINGS (17)** |
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1. Ostaff MJ, Riddle S, Flockton A, Frid M, **Kumar S**, McKeon BA, Li M, Moldovan R, Zhang H, El Kasmi AK, D'Alessandro and Stenmark KR. Targeting Metabolic Reprogramming In Macrophages Activated By Adventitial Fibroblasts In Pulmonary Hypertension As A New Potential Therapy Approach. Am J Respir Crit Care Med. 2017;195:A2266.
2. Li M, Plecita L, Mckeon AB, Frid M, Zhang H, **Kumar S**, Flockton A, and Stenmark KR. Ros Production And DNA Instability of Adventitial Fibroblasts Are Regulated By Ctbp1 In Pulmonary Hypertension. Am J Respir Crit Care Med. 2017;195:A2262.
3. Deepanshi Dhar, Gagan Deep, **Kumar S**, Chapla Agarwal, Natalie Serkova, Michael Wempe, Komal Raina, Rajesh Agarwal. Bitter melon efficacy against human pancreatic cancer cells: possible involvement of cellular stemness and metabolome targets. Annual Meeting of the AACR; 2017
4. M Li, BA McKeon, **S Kumar**, M Frid, A Flockton, S Riddle, A D’Alessandro, et al. 4-Methylthio-2-Oxobutyric Acid (MTOB), A Novel Small Molecule And Inhibitor Of CtBP1, Inhibits The Proliferative And Pro-inflammatory Phenotype Of Adventitial Fibroblast In Pulmonary Hypertension. D26. I'M ON FIRE-INFLAMMATION IN PULMONARY VASCULAR DISEASE, American Thoracic Society, 2016A6588-A6588
5. **Kumar S,** Kumar D, Raina K, Serkova NJ, Agarwal C and Agarwal R. Oral silibinin inhibits tumorigenic potential of colon cancer stem cells. In: Proceedings of the 106th Annual Meeting of the AACR; 2015 Apr 18-22; Philadelphia, PA. **Cancer Research** 2015;75(15 Suppl):Abstract nr 2807.
6. Raina K, **Kumar S,** Kumar D, Somasagara RR, Punia R, Kant R, Agarwal R and Agarwal C. Grape seed extract decreases visceral adiposity and impairs the pro-tumorigenic adipose tissue secretions affecting colorectal cancer growth and progression. In: Proceedings of the 106th Annual Meeting of AACR; 2015 Apr 18-22; Philadelphia, PA. **Cancer Research** 2015;75(15 Suppl):Abstract nr 901.
7. **Kumar S,** Kumar D, Raina K, Agarwal R, Agarwal C**.** Grape seed extract impairs adipocyte-colorectal cancer cell interaction and decreases adipocyte-driven colon cancer stem colonosphere formation. In: Proceedings of the 105th Annual Meeting of the American Association for Cancer Research; 2014 Apr 5-9; San Diego (CA). **Cancer Research** 2014; 74(19 Suppl): Abstract nr 4116.
8. Tyagi A, Somasagara R, **Kumar S,** Raina K, Agarwal C and Agarwal R. Silibinin modulates the inflammatory signals on colon cancer stem cells and provides protective effect against colitis-associated colon tumorigenesis. In: Proceedings of the 105th Annual Meeting of the AACR; 2014 Apr 5-9; San Diego, CA. **Cancer Research** 2014;74(19 Suppl): Abstract nr 2127.
9. **Kumar S,** Raina K, Agarwal C and Agarwal R. Silibinin strongly modulates the cytokine interleukin-4/6 survival signals in colon cancer stem cells. In: Proceedings of the 104th Annual Meeting of the American Association for **Cancer Research**; 2013 Apr 6-10; Washington, DC. **Cancer Research** 2013; 73 (8 Suppl): Abstract nr 4877.
10. Tyagi A, Raina K, **Kumar S,** Agarwal R and Agarwal C. Procyanidin B2 3,3″-di-O-gallate causes strong efficacy towards prostate cancer stem cells via targeting Notch1 signaling. In: Proceedings of the 104th Annual Meeting of the American Association for Cancer Research; 2013 Apr 6-10; Washington, DC. **Cancer Research** 2013; 73(8 Suppl): Abstract nr 2593.
11. **Kumar S,** Raina K, Agarwal C and Agarwal R. Effect of silibinin on the growth kinetics of 3D tumor spheroids: Colorectal cancer cells enriched for cancer stem cell phenotype. In: Proceedings of the AACR 103rd Annual Meeting 2012 Mar 31-Apr 4, 2012; Chicago, IL. **Cancer Research** 2012;72(8 Suppl):Abstract nr LB-179.
12. Raina K, **Kumar S,** Tyagi A, Agarwal C, and Agarwal R. Silibinin causes strong efficacy towards colon cancer stem cells by modulating IL-4 caused CD44 expression. In: Proceedings of the 103rd Annual Meeting of the American Association for Cancer Research; 2012 Mar 31-Apr 4; Chicago, IL. **Cancer Research** 2012;72(8 Suppl):Abstract nr 1637.
13. **Kumar S,** Sharma R, Chaudhary P, Vatsyayan R, Sharma A, Awasthi S and Awasthi YC. (2011). Development of a novel competitive PCR for genotyping and quantitative estimation of RLIP76 and GSTA4-4 mRNA of transgenic mice. In: “Research Apreciation Day” University of North Texas Health Science Center, Fort Worth, TX, USA.
14. Shahi SK, Kumar A, **Kumar** **S**, Singh, SK and Gupta SK. (2009). Evidence Showing Polymicrobial Nature of Diabetic foot Infection. In: International Conference on “Emerging Trends in Biotechnology & 6th Annual Convention of The Biotech Research Society, India. Banaras Hindu University, and Indian Institute of Vegetable Research, Varanasi, Uttar Pradesh, India.
15. Shahi SK, Kumar A, **Kumar S**, Singh S K, and Gupta SK. (2009). Microbial Diversity and Polymorphisms of Suproxide Dismutase and Catalase Gene in Diabetic Foot Infection. In: “8th Annual Conference of Diabetic Foot Society of India”. Hotel “The Lalit” Barakhamba Road, New Delhi, India.
16. **Kumar S**, Kumar A and Dixit VK. (2007). Genetic Diversity in *Helicobacter pylori* in North India. In: National Conference on “Microbial Diversity Avenues and Application”, Division of Life Science, Sardar Bhagwan Singh Post Graduate Institute of Biomedical Science and Research, Dehradun, Utrakhand, India.
17. Shahi SK, Gupta K, **Kumar** **S**, Singh SK, Gupta, SK and Kumar A. (2007). Assessment of Bacterial Diversity in the Diabetic foot Infection. In: National Conference on “Microbial Diversity Avenues and Application”, Division of Life Science, Sardar Bhagwan Singh Post Graduate Institute of Biomedical Science and Research, Dehradun, Utrakhand, India.

**TECHNICAL SKILLS/ EXPERTISE**

* Molecular Biological Technique: Isolation of genomic and plasmid DNA, Extraction of RNA, Agarose gel electrophoresis and Protein/peptide separations using 1D and two-dimensional gel electrophoresis, PCR-based techniques such as standard PCR, multiplex PCR, competitive-PCR, custom real-time qPCR and array PCR. Gene cloning, DNA Sequencing, and Transformation. ELISA, Western blotting, Protein array, decent exposure to Microarray technique.

# Microbiology: Routine microbiological techniques related to isolation and characterization of bacteria.

# Biochemical techniques: Performed assay for urease enzymes, Chromatography techniques such as paper chromatography, TLC and GLC.

# Immunological techniques: Animal cell culture, Colony formation assay, Isolation of stem cell by FACS and MACS, characterization of stem cell by sphere formation assay, 3D differentiation assay, Co-culture study, BrdU chase and pulse, and Immunofluorescence study, Symmetric and asymmetric study.

* Animal handling: Handled mice for breeding, genotyping by PCR assay, xenograft study, Immunohistochemistry and Immunofluorescence study.
* Imaging: Use of phase contrast, fluorescence microscopy and confocal microscope (Nikon, Olympus) imaging. Use of imaging instruments like Gel-Doc (Bio-Rad).
* Biostatistics: Worked with SigmaStat, SPSS and EXCEL program for calculation of χ2, p value, Odds ratio and confidence interval. Estimation of linkage disequilibrium and haplotypes frequencies by SNP Analyzer.

**COMPUTER AND BIOINFORMATICS SKILLS**

* Working experience of Windows OS, Linux (Ubuntu) and Macintosh.
* Knowledge of using MS-Office (Word, Excel, Power-point, Coral draw, Photoshop)
* Image analysis: Quantity one (Bio-rad), ImageJ (NIH).
* Biological Databases:DNA sequence analysis and use of NCBI public Sequence database, sequence retrieval, sequence submission.
* BLAST and sequence Alignment:Pairwise sequence alignment, BLAST, database searches, assessing homology, Sea View, ClustalW2, MEGA4-4, normal and qRT-PCR primer designing.
* RNA-seq data analysis; functional annotation.

**TEACHING/MENTORING SKILL**

* Guided and trained postgraduate and graduate students in several techniques including RNA isolation, cDNA preparation, Real Time qPCR, Real time primer assay, primer design, array PCR, FACS/MACS, spheroid formation and their immunofluorescence staining, and confocal microscopy.
* Taught Bioinformatics at University of Patna, Bihar, India (2009).
* Guided **7** students M. Sc. Students in project design and execution as well as dissertationwriting, Banaras Hindu University, Varanasi, India (2004-2009).

**SPECIALIZED TRAININGS**

* Participated in a workshop on “Computational Genome Analysis & Symposium on *In-Silico Biology*” held at Centre for Development of Advanced Computing, Pune (India) from February 6-9, 2007.
* Participated in a short–term course on “Bioinformatics Basics: Sequence, Tool and their Potential” held at Department of Biochemical Engineering & Technology, IIT, New Delhi, during March 28-29, 2006.
* Participated in a short training course on “LATEX” held at School of Biotechnology, Banaras Hindu University, Varanasi, from January 17 to 22, 2005.
* Participated in a training program on “Bioinformatics in Drug Development” held at Biotech Park, Lucknow, from December 6-11, 2004.

**Nucleotide sequence submitted to GenBank : 43**

**News Highlights**

* Milk Thistle Extract, Silibinin, Reduces Self-Renewal of Colorectal Cancer Stem Cells.
* <http://www.coloradocancerblogs.org/milk-thistle-extract-silibinin-reduces-self-renewal-colorectal-cancer-stem-cells/>
* <https://www.youtube.com/watch?v=IBEQoFzVFpc>
* <http://medicalxpress.com/news/2014-04-thistle-silibinin-self-renewal-colorectal-cancer.html>
* <http://www.sciencedaily.com/releases/2015/04/150420144350.htm>
* <http://coloncancernewstoday.com/2015/04/27/silibinin-milk-thistle-extract-halts-colon-cancer-stem-cells/>
* <http://www.blackmoresinstitute.org/login/news-and-insights/oral-milkthistle-colorectal-cancer>
* <http://www.caringforcarcinoid.org/milk-thistle-extract-stops-colorectal-cancer-stem-cells-growing-tumors-epoch-times>
* Oral milk thistle extract stops colorectal cancer stem cells from growing tumors.
* <http://www.coloradocancerblogs.org/oral-milk-thistle-extract-stops-colorectal-cancer-stem-cells-from-growing-tumors/>
* <http://www.sciencedaily.com/releases/2015/04/150420144350.htm>
* <http://medicalxpress.com/news/2015-04-oral-thistle-colorectal-cancer-stem.html>
* <https://www.youtube.com/watch?v=Ue0xlVqJ7w0>
* <http://www.zentrum-der-gesundheit.de/pdf/darmkrebs-mariendistel-15000039-02.pdf>
* <http://firstwordpharma.com/node/1276986?tsid=4#axzz3pPXLVyyl>
* <http://www.blackmoresinstitute.org/login/news-and-insights/oral-milkthistle-colorectal-cancer>

**JOURNAL EDITOR (1)**

International Journal of Graduate Research and Review (IJGRR)

http://ijgrr.org/editorial-board.html

**JOURNAL REFEREE**

1. Food Chemistry: 9 articles
2. PLOS ONE: 3 articles
3. Molecular Carcinogenesis: 1 article
4. Pharmaceutical Research: 16 articles
5. Experimental and molecular pathology journal, Elsevier: 1 article
6. BioMed Research International: 1 article
7. Oxidative Medicine and Cellular Longevity: 1 article
8. OncoTargets and Therapy: 5 articles
9. Therapeutics and Clinical Risk Management: 6 articles
10. BMC Complementary & Alternative Medicine: 2 articles
11. International Journal of Applied Sciences and Biotechnology: 1 article

**Number of articles reviewed/judged (46)**