# Hosoon Choi, Ph.D.

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## Current Position

**Research Scientist**, Central Texas Veterans Research Foundation
**Adjunct Assistant Professor**, College of Medicine, Texas A&M Health Science Center
**Adjunct Faculty**, College of Arts and Sciences, Texas A&M University-Central Texas

## Education

**Doctor of Philosophy in Biology** 2001
*Georgia Institute of Technology*, Atlanta, GA.
Dissertation title: Characterization of Membrane Associated Progesterone Binding Protein.
Advisor: Dr. Jung H. Choi

**Bachelor of Science in Botany** 1990
*Seoul National University*, Seoul, Korea
Thesis title: Sequencing of Potato Proteinase Inhibitor II.
Advisor: Dr. Jongseob Lee

## Grants

**AHRQ; 1R01HS025598-01A1** 6/01/19 – 3/31/24
Research funding for this grant totaled $2,199,776.
Role: Co-investigator, Principal Investigator: Dr. Chetan Jinadatha
The goal of this project is to evaluate the impact of incorporating novel self-sanitizing copper surfaces into routine healthcare space and evaluate the impact on the healthcare-associated infections.

**Earlier.org-Friends For An Earlier Breast Cancer Test Grant** 10/01/17 – 09/30/18
*Title: A Novel exosome isolation method based on ion exchange chromatography*
Research funding for this grant totaled $40,000.
Role: Principal Investigator
The goal of this study is to identify and validate reliable exosome derived biomarkers for early detection of breast cancer which would likely expedite initial clinical intervention, thus eliminating the mortality associated with the disease.

**CDMRP #130174; DoD Award W81XWH-14-1-0495** 10/01/14 – 03/31/18
*Title: Inflammation Modulatory Protein TSG-6 for Chemical Injuries to the Cornea*
Research funding for this grant totaled $1,000,000.
Role: Co-investigator, Principal Investigator: Dr. Samuel Fulcher
The goal of this study is to test the anti-inflammatory effects of tumor necrosis factor (TNF)-α stimulating gene/protein 6 (TSG-6) in a corneal alkali-burn rat model. In doing so, it is

necessary to establish a reliable and reproducible rat model for corneal alkali injury, in which the manuscript is in press for publication.

## Grant Application Invited

**CDMRP Ovarian Cancer Research Program; Pilot Award**

*Title: Discovery of Biomarkers of Ovarian Cancer Using Novel Exosome Separation Method*

Role: Principal Investigator

The goal of this study is to identify and validate reliable exosome derived biomarkers for early detection of ovarian cancer which would likely expedite initial clinical intervention, thus eliminating the mortality associated with the disease.

## Research Experience

**Research Scientist** 2018-present

*Central Texas Veterans Research Foundation*, Temple, TX

Dr. Chetan Jinadatha; Chief, *Department of Infectious Diseases, Central Texas Veterans Healthcare System*

Antibiotic-resistant organisms and healthcare-associated infections.

**Research Scientist** 2014-2018

*Central Texas Veterans Research Foundation*, Temple, TX

Dr. Samuel Fulcher; Staff Ophthalmologist, *Department of Surgery, Central Texas Veterans Healthcare System*

Examined the anti-inflammatory effects of tumor necrosis factor TSG-6 in a corneal alkali-burn rat model.

Establishing animal model for a study for countermeasure against chemical threats.

Investigated exosome isolation method for biomarker research.

**Supervisor of the Proteomics Core** 2008-2014

*Texas A&M Health Science Center, College of Medicine*, Temple TX

Dr. Darwin J Prockop; Director, *Institute for Regenerative Medicine*

Proteomics research on the therapeutic effects of human Mesenchymal Stem cells.

Investigated effects of infusion of Mesenchymal Stem cells on knee injury repair.

Investigated the role of Mesenchymal Stem cells during Cancer progression.

Production of recombinant TSG-6 protein using bioreactor.

**PostDoc Fellow** 2006-2008

*Tulane University, Health Sciences*

Dr. Darwin J Prockop; Director, *Center for Gene Therapy*, New Orleans, Louisiana

Investigated the mechanism of anti-inflammatory effects of human Mesenchymal Stem cells.

Investigated on the anti-inflammatory effects of human Mesenchymal Stem cells on peritonitis and corneal inflammation.

**Visiting Fellow** 2004-2006

*Genetics and Biochemistry Branch, NIDDK, NIH*, Bethesda, MD

Dr. Vera M. Nikodem; Chief, Mechanisms of Gene Regulation Section

Investigated role of Nurr1 on the bone and adipocyte metabolism using Nurr1 knockout mouse.

**Visiting Fellow** 2001-2004
*Genetic Disease Research Branch, NHGRI, NIH*, Bethesda, MD
Dr. Yingzi Yang; Head, Developmental Genetics Section
Investigated the Wnt pathway focus on Wnt5a and Frizzled 10

**Graduate Research Assistant** 1995-2001
*School of Biology, Georgia Institute of Technology*, Atlanta, GA
Dr. Jung H. Choi; Associate Professor
Doctoral thesis research on the role of plant membrane bound steroid receptor using yeast 2-hybrid system.

## Awards and Fellowships

- **Outstanding poster presentation**; **2nd place**, Stem Cell meeting (Moving Adult Stem Cells and the Therapeutic Proteins They Produce from the Laboratory to the Patient) November 2011
- **Teaching Assistant of the Year**, Georgia Institute of Technology, School of Biology, May 2000
- **NIH intramural Postdoctoral Research Training Awards**, National Health Institute 2001-2006
- **Competitive Graduate Research Fellowship**, Georgia Institute of Technology, 1995-2001

## Patents

**1.**. Prockop, D.J., Block, G.J., Ohkouchi, S. Choi, H., "Mesenchymal Stem Cells that Express Increased Amounts of Anti-Apoptotic Proteins" US20110223138 A1

**2.** Prockop, D.J., Kim D.K., Choi, H., Watanabe, J., Lee, R.H. "Production of TSG-6 Protein" US2013067133 A1

## Teaching and supervisory experiences

**Adjunct Faculty,** Department of Sciences and Mathematics, TAMUCT, Killeen, TX
**Molecular Biology BIOL 4471** Fall 2019
Teach basic principles of Molecular Biology with combined Lecture / Laboratory

**Graduate Teaching Assistant,** School of Biology, Georgia Tech, Atlanta, GA
**Genetics lab,** Fall 2000
Taught basic principles in genetics using software programs, graded, lab report, homework, and exams.
**Recombinant DNA Lab** – Spring 2000 (**voted TA of the year**), Spring 1999
Instruct undergraduates in recombinant DNA techniques (mini-prep, restriction enzyme analysis, gel electrophoresis, DNA purification from gel, PCR, Southern blot, Sequencing), guide individual projects.
**Biostatistics Lab** Fall 1999
Taught minitab software, problem session, graded lab report, homework.
**Immunochemistry Lab** Fall 1997
Instruct immunology techniques (ELISA, western blotting), guide individual projects.

**Graduate Teaching Assistant**, Seoul National University, Seoul, Korea
**Introduction to Biology lab** Spring 1991
Taught introductory biology lab, grade reports.

**Supervision of research associate**;
Central Texas Veterans Research Foundation
Casie Phillips; TSG-6 in a corneal alkali-burn rat model 2014-2018
Texas A&M Health Science Center College of Medicine, Institute for Regenerative Medicine
Shad Ali ; Production of recombinant TSG-6 protein using bioreactor. 2011-2012
Nrutya Madduri ; Production of recombinant TSG-6 protein using bioreactor. 2013-2014

**Supervision of summer and graduate students**
Texas Bioscience Institute 2018
NHGRI, NIH 2002-2003
School of Biology, Georgia Tech**.** 1995-2000

## Publications

1. Choi, H., Phillips, C., Oh, J.Y., Potts, L., Reger, R.L., Prockop, D.J., Fulcher, S. (2019) Absence of Therapeutic Benefit of the Anti-inflammatory Protein TSG-6 for Corneal Alkali Injury in a Rat Model. ***Current Eye Research*** in press.

2. Choi, H., Phillips, C., Oh, J.Y., Stock, E.M., Kim, DK., Won, JK., Fulcher, S. (2017) Comprehensive modeling of corneal alkali injury in the rat eye. ***Current Eye Research*** 42, 1348-1357.

3. Yun, Y.I., Park, S.Y., Lee, H.J., Ko, J.H., Kim, M.K., Wee, W.R., Reger, R.L., Gregory, C.A., Choi, H., Fulcher, S.F., Prockop, D.J., Oh, J.Y. (2017) Comparison of the anti-inflammatory effects of induced pluripotent stem cell-derived and bone marrow-derived mesenchymal stromal cells in a murine model of corneal injury. ***Cytotherapy*** 19, 28-35.

4. Labovsky, V., Martinez, L.M., Davies, K.M., Calcagno, M.L., García-Rivello, H., Wernicke, A., Feldman, L., Matas, A., Giorello, M.B., Borzone, F.R., Choi, H., Howard, S.C., Chasseing, N.A. (2017) Prognostic significance of TRAIL-R3 and CCR-2 expression in tumor epithelial cells of patients with early breast cancer. ***BMC Cancer*** 17, 280-291.

5. Ko, J.H., Lee, H.J., Jeong, H.J., Kim, M.K., Wee, W.R., Youn, S., Choi, H., Prockop, D.J., Oh, J.Y. (2016) "Mesenchymal Stem/Stromal Cells Precondition Lung Monocytes-Macrophages to Produce Tolerance against Allo- and Autoimmunity in the Eye." ***Proceedings of the National Academy of Sciences of the United States of America*** **113,** 158-163**.**

6. Kim, DK., Choi, H., Nishida, H., Oh J.Y., Gregory, C., Lee, R.H., Yu, J.M., Watanabe, J., An, S.Y., Prockop, D.J. (2015) "Scalable production of a multifunctional protein (TSG-6) that aggregates with itself and the CHO cells that synthesize it." **PlosOne** 11, e0147553.

7. Labovsky, V., M Martinez, L.M., Kevin, M.D., García-Rivello, H., Calcagno, M.L., Matas, A., Fernández-Vallone, V.B., Wernicke, A., Choi, H., Chasseing, N.A. (2015) "Association between

ligands and receptors related to the progression of early breast cancer in tumor epithelial and stromal cells." ***Clinical Breast Cancer*** **15,** e13-21.

**8.** Oh, J.Y., Ko, J.H., Lee, H.J., Yu, J.M., Choi, H., Kim, M.K., Prockop, D.J., Wee, W.R. (2014) "Mesenchymal Stem Cells Inhibit the NLRP3 Inflammasome by Decreasing Mitochondrial Reactive Oxygen Species" ***Stem Cells*** **32,** 1553-1563.

**9.** Martínez, L.M., Vallone, F.V.B., Labovsky, V., Choi, H., Hofer, E.L., Feldman, L., Bordenave, R.H., Batagelj, E., Dimase, F., Villafañe, A.R., Chasseing, N.A. (2014) "Changes in the peripheral blood and bone marrow from untreated advanced breast cancer patients that are associated with the establishment of bone metastase." ***Clinical and Experimental Metastasis*** **31**, 213-232.

**10.** Lim, J., Kwon, J.Y., Song, J., Choi, H., Shin, J.C., Park, I.Y. (2014) "Quantitative comparison of entropy analysis of fetal heart rate variability related to the different stages of labor" ***Early Human Development*** **90**, 81-85.

**11.** Vallone, F.V.B., Romaniuk, M.A., Choi, H., Labovsky, V., Otaegui, J., Chasseing, N.A. (2013) "Mesenchymal Stem Cells and Their Use in Therapy: What Has Been Achieved?" ***Differentiation*** **85**, 1-10.

**12.** Vallone, F.V.B., Hofer, E.L., Choi, H., Bordenave, R.H., Batagelj, E., Feldman, L., Russa, V.L., Caramutti, D., Dimase, F., Labovsky, V., Martínez, L.M., Chasseing, N.A. (2013) "Behaviour of Mesenchymal Stem Cells from Bone Marrow of Untreated Advanced Breast and Lung Cancer Patients without Bone Osteolytic Metastasis" ***Clinical and Experimental Metastasis*** **30**, 317-332.

**13.** Oh, J.Y., Choi, H., Lee, R.H., Roddy, G.W., Ylöstalo, J.H., Wawrousek, E., Prockop, D.J. (2012) "Identification of the HSPB4/TLR2/NF-κB axis in macrophage as a therapeutic target for sterile inflammation of the cornea." ***EMBO Molecular Medicine*** **4**, 435-448.

**14.** Horie, H., Choi, H., Lee, R.H., Reger, R.L., Ylöstalo, J.H., Muneta, T., Sekiya, I., Prockop, D.J. (2012) "Intra-articular Injection of Human Mesenchymal Stem Cells (MSCs) Promote Rat Meniscal Regeneration by Being Activated to Express Indian Hedgehog that Enhances Expression of Type II Collagen." ***Osteoarthritis and Cartilage*** **20**, 1197-1207.

**15.** Sacca, P.A., Creydt, V., Choi, H., Mazza, O.N., Fletcher, S.J., Vallone, F.V.B., Scorticati, C., Chasseing, N.A., Calvo, J.C. (2012) "Human periprostatic adipose tissue: its influence on prostate cancer cells" ***Cellular Physiology and Biochemistry*** **30**, 113-22.

**16.** Roddy, G.W., Rosa R.H. Jr., Oh, J.Y., Ylöstalo, J.H., Bartosh, T.J., Choi, H., Lee, R.H., Yasumura, D., Ahern, K., Nielsen, G., Matthes, M., LaVail, M., Prockop, D.J. (2012) "Stanniocalcin-1 rescued photoreceptor degeneration in two rat models of inherited retinal degeneration." ***Molecular Therapy*** **20**, 788-797.

**17.** Choi, H., Lee, R.H., Bazhanov, N., Oh, J.Y., Prockop D.J. (2011) "Anti-inflammatory Protein TSG-6 Secreted by Activated MSCs Attenuates Zymosan-Induced Peritonitis by Decreasing TLR2/NF-κB Signaling in Resident Macrophages." ***Blood*** 118, 330-338.

**18.** Lee, R.H., Oh, J.Y., Choi, H., Bazhanov, N. (2011) "Therapeutic factors secreted by mesenchymal stromal cells and tissue repair." ***Journal of Cellular Biochemistry*** **112**, 3073-3078.

**19.** Oh, J.Y., Roddy, G.W., Choi, H., Lee, R.H., Ylöstalo, J.H., Rosa, R.H. Jr., Prockop, D.J. (2010) "Anti-inflammatory protein TSG-6 reduces inflammatory damage to the cornea following chemical and mechanical injury." ***Proceedings of the National Academy of Sciences of the United States of America*** **107**, 16875-16880.

**20.** Bartosh, T.J., Ylöstalo, J.H., Mohammadipoor, A., Bazhanov, N., Coble, K., Claypool, K., Choi, H., Lee, R.H., Prockop, D.J. (2010) "Aggregation of human mesenchymal stromal cells (hMSCs) into 3D spheroids enhances their anti-inflammatory properties. " ***Proceedings of the National Academy of Sciences of the United States of America*** **107**, 13724-13729.

**21.** Lee, M.K., Choi, H., Gil, M., Nikodem, V.M. (2006) "Regulation of osteoblast differentiation by Nurr1 in MC3T3-E1 cell line and mouse calvarial osteoblasts" ***Journal of Cellular Biochemistry*** 99, 986-94.

**22.** Topol, L., Jiang, X., Choi, H., Garrett-Beal, L., Carolan, P., & Yang, Y. (2002) "Wnt-5a inhibits the canonical Wnt pathway by promoting GSK-3-independent β-catenin degradation." ***Journal of Cell Biology*** **162,** 899-908.

## Abstract Publications

1. Feldman, L., Fernández-Vallone, V.B., Choi, H., Labovsky, V., M Martinez, L.M., Bordenava, R.H., Milovic, V., Jaimovich, G., Batagelj, E., Dimase, F., Villafane, A.R., Chasseing, N.A. (2013) "Bone Marrow Mesenchymal Stem Cells:Pre-Metastatic Niche for Breast Cancer." ***Blood 122,*** 4859.

2. Lee, RH., Choi, H., Bazhanov, N., Kim, D.K., Prockop, D.J (2010). "MSCs and TSG-6 abort the inflammatory cascade of zymosan-induced peritonitis by binding to CD44 on resident macrophages to inhibit NF kappa B signaling." ***Cytokine 52***, 56.

## Book Chapter

1. Martinez, M., Labovsky, V., Fernández-Vallone, V.B., Choi, H., Amoros, M., Phillips, C., Chasseing, N.A. (2016) "Mesenchymal Stem Cells as Regulators of the Bone Marrow and Bone Components" In Bolontrade M. and Garcia M. (Eds.) ***Mesenchymal Stromal Cells as Tumor Stromal Modulators.*** *in press.* Amsterdam, Netherlands: Elsevier

## Presentations

1. Choi, H., Phillips, C., Prockop, D., Oh, J.Y., Reger, R., Stock, E., Fulcher, S.F.A., (2016) "Comprehensive Profiling of Alkali Injuries to the Cornea" *World Ophthalmology Congress of the International Council of Ophthalmology.*

2. Fulcher, S.F.A., Oh, J.Y., Prockop, D., Choi, H., Reger, R., Yu, J.M. (2014) "Effect of TSG-6 on Corneal Inflammation After Alkali Injury" *American Society of Cataract and Refractive Surgery Symposium.* **Best Paper of Session.**

**3.** Martinez LM, Vallone FVB, Labovsky V, Choi H, Hofer, E.L., Feldman L, Bordenave RH, Batagelj E,Dimase F, Rodriguez Villafañe A, Chasseing NA.(2013) "How Bone Marrow Microenvironment prepares the bone pre-metastic niche for Breast Cancer cells?" *13th Internacional Conference on Cancer –Induced Bone Dissease.*th *International Meeting on Cancer-Induced Bone Disease.*

**4.** Martinez LM, Vallone FVB, Labovsky V, Choi H, Feldman L, Bordenave RH, Batagelj E,Dimase F, Rodriguez Villafañe A, Chasseing NA.(2013) **"**Bone Marrow Microenvironment of Advanced Breast Cancer Patients without Bone Metastasis Favors the Cancer Cell Colonization" An AACR Special Conference on *Tumor Invasion and Metastasis*

**5.** Vallone FVB, Choi H, Bordenave RH, Batagelj E, Feldman L, Dimase F, Chasseing NA. (2012) "Galectin 3 and MMP-9 relation with spontaneous osteoclastogenesis in bone marrow from advanced breast cancer patients." *12th Internacional Conference on Cancer –Induced Bone Dissease.*

**6.** Choi, H., Lee, R.H.*, Bazhanov, N., Oh, J.Y., Prockop D.J. (2011) "Anti-inflammatory Protein TSG-6 Secreted by Activated MSCs Attenuates Zymosan-Induced Peritonitis by Decreasing TLR2/NF-κB Signaling in Resident Macrophages." *Moving Adult Stem Cells and the Therapeutic Proteins They Produce from the Laboratory to the Patient*

**7.** Kim, D. K**.,** Choi, H., Oh, J.Y., Watanabe J., Lee, R.H., Prockop, D.J. **"**Stable lines of CHO cells that allow large scale production in chemically defined medium of the anti-inflammatory protein TSG-6 and its link module. ." *Moving Adult Stem Cells and the Therapeutic Proteins They Produce from the Laboratory to the Patient*

**8.** Vallone, FVB., Choi H., Martinez. L., Bordenave, RH., Batagelj, E., Feldman, L., Labovsky, V., Chasseing, NA. (2011) "Bone marrow reserve of MSC in untreated advanced breast cancer patients: a reservoir of the disease." *Tumor Microenvironment Complexity: Emerging Roles in Cancer Therapy, Special Conference.*

**9.** Oh, J.Y., Roddy, G., Choi, H., Lee, R.H., Rosa, R.H Jr., Prockop D.J. (2011) "Defining a Therapeutic Window for Sterile Injuries of Cornea. The Anti-inflammatory Protein (TSG-6) Inhibits the Severe Second Phase of Inflammation" *The Association for Research in Vision and Ophthalmology (ARVO) annual meeting 2011*

**10.** Choi, H., Lee, RH., Bazhanov,N., Kim, D.K., Prockop, D.J (2010) Human Multipotent Mesenchymal Stromal Cells Attenuate Zymosan-induced Peritonitis in Mice by Secreting TSG-6 that Inhibits activation of Resident Macrophages. *The 8th Annual Meeting of the International Society of Stem Cell Research*

**11.** Choi, H., Lee, RH., Bazhanov,N., Prockop, D.J (2010) "Multipotent Mesenchymal Stromal Cells Attenuate Zymosan-Induced Peritonitis by Secreting the anti-inflammatory protein TSG-6." *The 5th International Conference on Mesenchymal and Non-Hematopoietic Stem Cells (MSCs).* *equal contribution.

**12.** Oh, J.Y., Choi, H., Kim, D.K., Lee, R.H., Claypool, K., Larson, B., Roddy, G., Prockop D.J.

(2010) "Soluble Factors From Adult Stem/Progenitor Cells (MSCs) Protect Corneal Epithelial Progenitors by Promoting Proliferation and Preventing Apoptosis." *The Association for Research in Vision and Ophthalmology (ARVO) annual meeting 2010*

**13.** Ylöstalo, J.H.* Bartosh, T.J., Choi, H., Bazhanov, N., Coble, K., Lee, R.H., Prockop, D.J. (2010) "Aggregation of Human Mesenchymal Stromal Cells into Three Dimensional Multicellular Spheroids Enhances their Anti-inflammatory Properties." *The 8th Annual Meeting of the International Society of Stem Cell Research* *equal contribution.

**14.** Vallone, FVB., Choi, H, Labovsky, V., Martinez, L. M., Bordenave, RH., Feldman, L., Chasseing, NA. (2010). "CD146 positive bone marrow-mesenchymal stem cells in advanced stages of untreated lung and breast cancer patients. "*Joint Metastasis Research Society-American Association for Cancer research ACR Conference: Metastasis and the Tumor Microenvironment*

**15.** Vallone, FVB., Choi, H., Martinez, LM., Labovsky, V., Batagelj, E., Dimase, F., Feldman, L., Bordenave, RH., Chasseing, NA. (2010). "Osteoclastogenesis process in bone marrow of untreated advanced breast cancer patients." *Joint Metastasis Research Society-American Association for Cancer research ACR Conference: Metastasis and the Tumor Microenvironment*

**16.** Choi, H., Nikodem, V. (2006) "A role of Zn-finger transcription factor, nurr1, in obesity." *IBC's 4th Annual Targeting Metabolic syndrome.*

**17.** Choi, H., Day, T., & Yang, Y. (2002) "Cloning and Characterization of Mouse Frizzled-10." *Keystone Symposia; Wnt and β-Catenin Signaling in Development and Disease*

**18.** Choi, J. H., Farmer, P., Choi, H., & Gray, P. (1999) "Calmodulin-Domain Protein Kinases in Carrot." *Plant Phosphorylation Workshop 1999.*

**19.** Choi, J. H., Farmer, P., Choi, H., & Lala, H. (1997) "Diverse Plant Protein Kinases with Calmodulin-Like Domains." *9th Annual Meeting of the Korean Society for Molecular Biology.*

**20.** Farmer, P., Lindzen, E., Choi, H., Artman, C., & Choi, J. H. (1996) "Calcium -Dependent Protein Kinases in Carrot Somatic Embryos." *15th Annual Symposium Current Topics in Plant Biochemistry, Physiology and Molecular Biology.*

## Editorial Review

**Article reviewer, *"International Journal of Ophthalmology"*** July 2019
reviewed an article on Accelerated Growth of Uveal Melanoma Related to Pregnancy: A case report and literature review

**Article reviewer, *"International Journal of Ophthalmology"*** June 2019
reviewed an article on Identification of differentially expressed genes related with metastasis and signature to predict overall survival in uveal melanoma by bioinformatics analysis

**Article reviewer, *"International Journal of Ophthalmology"*** May 2019
reviewed an article on Parthenolide Inhibits the Proliferation and Induces the Apoptosis of Human Uveal Melanoma Cells

**Article reviewer, *"International Journal of Ophthalmology"*** May 2019
reviewed an article on Calpastatin Participates in the Regulation of Cell Migration in BAP1-Deficient Uveal Melanoma Cells

**Article reviewer, *"BioMed Research International"*** January 2019
reviewed an article on Bone marrow derived mesenchymal stem cells ameliorate ischemia/reperfusion injury-induced acute kidney injury in rats via tumor necrosis factor-a-stimulated protein 6

**Article reviewer, *"Journal of Infectious Diseases and Immunity"*** September 2015
reviewed an article on Spatial Distribution and Insecticide Susceptibility status of Aedes aegypti and Aedes albopictus in Dengue affected Urban Areas of Rawalpindi, Pakistan.

**Article reviewer, *"Journal of Infectious Diseases and Immunity"*** August 2015.
reviewed an article on Comparison of Susceptibility Status of laboratory and field populations of *Aedes aegypti* against Temephos in Rawalpindi.

**Article reviewer, *"Journal of Trauma and Treatment"*** June 2015
reviewed an article on Enigmatic Biomolecules from the Mitochondrial Genome.

**Article reviewer, *"Air & Water Borne Diseases"*** November 2014
reviewed an article on Dickkopf-1 has an inhibitory effect on mesenchymal stem cells to fibroblast differentiation.

**Article reviewer, "*Journal of Cell Biology and Genetics*"** November 2014
reviewed article on review article on Production Approach and Therapeutic Application of Stem Cells in Various Human and Animal Diseases.

**Article reviewer, *"Cellular Physiology and Biochemistry"*** April 2014
reviewed an article on human fetal bone marrow derived mesenchymal stem cells.

**Article reviewer, *"Cellular Oncology"*** March 2014
reviewed an article on cross-talk between breast cancer cells and bone marrow mesenchymal stem cells.

**Article reviewer, *"Recent Patents on Anti-Cancer Drug Discovery"*** March 2013
reviewed an article on anti-cancer drug delivery.