Khurshida Begum, Ph.D.

Current Position

Research Scientist (Faculty)
University of Houston, College of Pharmacy
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Residency Status

Citizen, USA

Personal Statement

As a molecular biologist, my major role is to integrate molecular pharmacology, microbial biology, and pathophysiological aspects of *Clostridioides difficile* and other multidrug resistant organism (MDRO) which includes experimental design and execute necessary molecular and cellular techniques including DNA extraction, WGS, metagenomics, ribotyping, qPCR, Sanger sequencing and gene expression techniques for different projects. My expertise also includes development, validation, and optimization of new protocol for vitro and vivo experiments according to the requirement of specific projects. I have expertise on microscopy and am able to work with multiple research teams.

Education

INSTITUTION AND LOCATION	DEGREE (if applicable)	END DATE MM/YYYY	FIELD OF STUDY
Dhaka University, Dhaka, Bangladesh	BS	1988	Zoology
Dhaka University, Dhaka, Bangladesh	MS	1992	Zoology
Okayama University, Okayama, Japan	PHD	2003	Biopharmaceutical Sciences

Research experience

2016-present Molecular Biologist, Department of Pharmacy Practice & Translational Research, **University of Houston College of Pharmacy**, Houston, Tx-77204.
Advisor: Kevin Garey, PharmD, MS, FASHP, FIDSA, FCCP

Summary of current research

1) Developed clinical stool and bacterial DNA extraction procedures in lab (automated), whole genome sequencing and 16S rRNA sequencing
2) Developed and optimized molecular detection of multi drug resistant gene (vancomycin resistant gene, carbapenems resistant gene) from clinical and environmental bacteria and candida with culture, PCR, and sequencing
3) Designed and executed of qPCR methods for microbiome analysis from drug treated human stool samples, data analysis, manuscript writing
4) Identification of CRISPR-Cas system in *Clostridium difficile* and *Enterococcus* bacteria

5) Experiment design, execution, data analysis, data presentation, help in grant writing, manuscript writing, collaboration with research team, trained student, laboratory technician and researcher

2013-2016 Kirschstein-NRSA Post-doctoral Fellow, Department of Molecular and Cellular Biology, **Baylor College of Medicine,** Houston, TX. Advisors: Paul A. Overbeek, PhD and Bert W. O'Malley, MD.

Summary of research accomplishments:

1) Recent discoveries of sequence-specific DNA recognition systems named TALEs and CRISPR, have enabled the development of customized nucleases to edit genomic DNA in cells and model organisms with high efficiency and specificity. Both the TALEN and the CRISPR/Cas9 system use endonucleases that produce double-strand DNA breaks (DSBs) at targeted genomic sequences. During my training period I used the TALEN and CRISPR/Cas9 systems to achieve targeted gene knockouts and targeted gene repair in one cell stage mouse embryos. I have efficiently mutated *Tyrosinase* (a coat color gene), *Trp53* (a tumor suppressor gene), and *Cacna1a* (tottering, a voltage-gated ion channel gene) in mouse embryos by injection of TALEN mRNAs or Cas9 mRNA plus either a single, or a pair of, small guide RNAs (sgRNAs). My results demonstrate that the CRISPR/Cas9 (>80%) system is more reliable than TALENs (about 50%) for introducing targeted mutations.

2) Next, I compared the ability of the TALEN and CRISPR/Cas9 systems to promote targeted gene repair *in vivo*. I used a 700 base pair double-stranded DNA donor to repair a mutation causing albinism in FVB mice. Again, I found that the CRISPR/Cas9 system (>18%) was more efficient than TALENs (>2%) for gene correction *in vivo*. Therefore, used the CRISPR/Cas9 system for *in vivo* genome engineering.

3) To improve gene repair efficiency I compared 2 strategies. First, I used a single sgRNA with a single stranded antisense oligo (56 bp) or a 1.8 kb dsDNA donor to promote gene correction by homology-mediated repair. Experimental data revealed 4 to 18% efficiency of gene correction. Second, I used a new technique which combined 2 sgRNAs and 2 complementary dideoxy-oligos (capped) as donors to target a single exon. Using this strategy, I obtained highly efficient gene therapy for albinism (32%) and tottering (45%).

4) Although my dual digestion/dual donor (4D) approach facilitates targeted exon engineering *in vivo*, this technique also introduced new mutations (>80%) in genome. To minimize unwanted mutations I used sgRNAs that target intronic sequences and donor DNAs that introduce intronic and exonic sequences. My results demonstrate that targeting intron regions significantly reduced new mutations (<5%) in coding sequences with efficient correction of albinism (25%) and tottering (28%) mutations. Together my data demonstrate that gene repair with two capped complementary oligos is an efficient strategy but targeting the adjacent intron is a safer approach. My protocols are designed to allow targeted changes to be made in any gene of interest.

2011-2012 Postdoctoral Research Associate, Department of Molecular and Cellular Biology, **Baylor College of Medicine**, Houston, TX. Advisors: Sang Jun Han, PhD, and Bert W. O'Malley, MD.

Summary of research accomplishments: Hormone replacement therapy (HRT) has been used for the treatment of postmenopausal symptoms. To maximize the benefits of HRT, TSEC (Conjugated Estrogen/Bazedoxifene,Tissue-Selective

Estrogen Complex) has been developed, which is a new menopausal therapy that combines a SERM with one or more estrogens. The goal of TSEC therapy would be to reduce menopausal symptoms (e.g., hot flashes and vulvar/vaginal atrophy), prevent osteoporosis, and improve lipid parameters while it inhibits estrogenic stimulation of the breast and endometrium. Although TSEC is known to inhibit estrogenic stimulation in the breast and endometrium, the molecular mechanisms underlying this function of TSEC was not understood. I found that TSEC treatment effectively prevents ERα activity by dual synergistic effects: a) recruitment of corepressors to ERα at target gene promoters and, b) degradation of the ERα protein by a FBXO45/ubiquitin proteasome system in endometrial and breast cells**.**

2010-2011 Postdoctoral Research Associate, Department of Internal Medicine, Division of Rheumatology, **UT Health Science Center**, Houston, TX. Advisor: Xiaodong Zhou, MD.
Summary of research accomplishments: Systemic sclerosis (SSc, scleroderma) is an autoimmune disease clinically characterized by progressive fibrosis in the skin and internal organs. Up-regulation of collagen gene expression in SSc fibroblasts appears to be a critical event in the development of tissue fibrosis. I found that the growth factor TGF beta significantly induces collagen gene expression in cell line.

2008-2010 Postdoctoral Research Associate, Department of Entomology, **Texas A&M University**, College Station, TX. Advisor: Craig Coates, Ph. D.
Summary of research accomplishments: I generated GFP expressing transgenic insect (yellow mosquito, *Aedes aegypti)*, for study vector biology.

2003-2008 Postdoctoral Fellow, Department of Entomology, **Kansas State University**, Manhattan, Kansas. Advisor: Yoonseong Park, Ph. D.
Summary of research accomplishments: Ion transport peptide (ITP) and ITP-like (ITPL) are highly conserved neuropeptides in insects and crustaceans. I identified three alternatively spliced transcripts named itp, itpl-1, and itpl-2 in *T. castaneum*. Expression patterns of the splice variants were somewhat different from those previously reported in other insect species. Most importantly, I found for the first time that itpl-1 transcripts are abundantly expressed in the midgut at the late larval stage, showing an expression pattern similar to that of the crustacean hyperglycemic hormone (CHH) in the crab *Carcinus maenas*. This peptide plays very important function during molt by increasing the body volume through fluid absorption, resulting in breakage of the outer shell.

2000-2003 Ph. D. Graduate study. The Graduate School of Natural Science and Technology, **Okayama University**, Okayama, Japan. Advisor: Yusuke Wataya, Ph. D.
Dissertation: Investigations of New and Potent Antimalarial Drugs Against Malaria Parasite, *Plasmodium falciparum*.

Awards and Honors

2013-2016 Ruth L. Kirschstein-NRSA Fellowship, Department of Molecular and Cellular Biology, Baylor College of Medicine, Houston, TX

2001-2003 Rotary International Scholarship, Okayama University, Japan (PhD Study)

1990 Eden College Scholarship, University of Dhaka, Bangladesh (MSc Study)

Supervisory and Teaching Experience

2016-present Training and supervision researchers, students, and trainee

2013-2016 Hands-on training of two postdoctoral fellows in Dr. Overbeek's lab (Chun Fu and Junfeng Mao), Molecular and Cellular Biology, Baylor College of Medicine.

Supervisor for 2 SMART students, Jose Gutierrez and Karen Hernandez, Molecular and Cellular Biology, Baylor College of Medicine, Houston, TX

2011 Supervisor and mentor, Summer Undergrads Research Fellowship (SURF) Program, Laboratory of Dr. Xiaodong Zhou, UT Health Science Center, Medical School Building, Houston, TX

2011 Supervisor and mentor, Summer Program for High School Students (Science Expo), Laboratory of Dr. Xiaodong Zhou, UT Health Science Center, Medical School Building, Houston, TX

1995-1998 Lecturer of Zoology, Rajuk Uttara Model College, Dhaka, Bangladesh

Technical Skills

Microbiology: Bacteria, candida culture, able to identify cell morphology, characterization, killing curve, MICs/MBC, time course, Biofilm formation and MBEC

DNA and RNA Sequencing*:* Automated DNA and RNA extraction/purification, able to library preparation for WGS and RNA sequencing, metagenomics, and analysis

Gene Expression: In vitro gene expression, qPCR, qRT-PCR, immunoblots; luciferase reporter (firefly luciferase) assays; fluorescent protein (GFP, YFP, CFP, RFP) expression and fluorescence microscopy

Bioinformatic Analysis: Patric (BV-BRC), BLAST, Phylogenetic analysis, CLC genomic Workbench

Microscopy: Sample preparation and analysis of confocal and fluorescence microscope. Able to prepare sample for live cell imaging

Molecular Techniques: PCR, cloning in plasmid vectors and phage vectors; in vitro transcription for RNA amplification; Southern and northern blot hybridizations; qPCR, quantitative RT-PCR; in situ hybridization, FISH. Protein extraction and purification; SDS-PAGE; Western blot; Immunohistochemistry, IP, CHIP, ELISA, protein-protein interaction

Phase II level trials: We just finished a phase II level trials, and now working for phase III trial research

Tissue Culture: Human primary and cancer cell culture, gene transfection, siRNA mediated gene knock down, stable cell line generation, cell proliferation assay

In vivo: Mouse colony maintenance, genotyping, and small surgery. Fruit fly, red flour beetle, and mosquito colony maintenance

Genome editing: Experience using CRISPR/Cas9 and TALENs for genome editing, able to manipulate the mouse genome

Contributions: Project co-ordination**,** design experiments, work with the PI and co-Investigators to provide training and direct supervision to graduate research assistants working on projects, assist grants writing, data presentation in scientific meetings, paper writing, and publish research article in scientific journals

Professional Association
American Society of Microbiology (ASM**)**
Entomological Society of America (ESA)
American Society of Gene And Cell Therapy (ASGCT)
Japanese Society of Parasitology, Tokyo, Japan

Selected Presentations at Scientific Conferences

2023 **K Begum**, M J Alam, T A Eubank, K W Garey, A J Gonzales-Luna (2023) Vancomycin Inducible vanGCd Expression in Clostridioides difficile Clinical Isolates. In: ASM Microbe 2023-Submitted

2022 M Jahangir Alam, **Khurshida Begum**, Md Ekramul Karim, Chenlin Hu, Eugenie Basseres, Christopher K Lancaster, Kevin W Garey (2022) Investigating the Gram Positive Selective Spectrum of Ibezapolstat, a First-in-Class DNA Polymerase IIIC (Pol IIIC) Inhibitor. In: (IDWeek2022-Washington DC)

2021 Clive Mason, Tim Avis, Chris Coward, David Powell, Esther Duperchy, Chenlin Hu, M Jahangir Alam, **Khurshida Begum**, Kevin W Garey, Stefanie Reich, Stephen Moss (2021) Characterisation of the DNA binding properties of ridinilazole, a selective antibiotic currently in phase III trials for the treatment of Clostridioides difficile In: Open Forum Infectious Diseases, OFID 2021:8 (Suppl 1) • S615 OFID 2021:8 (Suppl 1) S615

2020 M Jahangir Alam, **Khurshida Begum**, Julie Miranda, Jacob McPherson, Chris Lancaster, Kevin W Garey (2020) Potentially Pathogenic Methicillin-Resistant Staphylococcus aureus (MRSA) Are Highly Prevalent on High Touch Surface Environs in a Large Texas Hospital**.** *In: ASMmicrobe2020*

Khurshida Begum, Farnoosh Haghighi, M Jahangir Alam, Kevin W Garey (2020) Caspofungin-Resistant Strains of Candida glabrata Are Most Commonly Colonized in CDI Patient Guts in Houston**,** Texas**.** *In: ASMmicrobe2020*

2019 **Begum K**, Alam MJ, Lancaster C, McPherson J, Miranda J, Garey KW (2019) High Incidence of Carbapenemase-Producing Enterobacteriaceae (CPE) in a Large Hospital High-Touch Environs in Houston, Texas. In: ASM microbe 2019

(June 20-24, 2019; San Francisco, CA)

2018 **Begum K**, V Kothari, M Lozano, K McPherson, J Miranda, C Lancaster, M J Alam, K W Garey (2018) TOXIGENIC CLOSTRIDIUM DIFFICILE ARE HIGHLY PREVALENT IN COMMUNITY SHOE SWABS**.** In: ANAEROBE 2018 CONGRESS July 9-12, 2018 – Las Vegas, NV.

2017 **Begum K**, M Jahangir Alam MJ, McPherson J, Poblete K, Lasco T, Garey KW (2017). Prevalence And Characteristics of Carbapenem- Resistant Enterobacteriaece (CRE) Bacteria in Stools of Clostridium difficile Infected Patients in Houston, Texas**.** In: ASMmicrobe2017 (New Orleans, LA; June 1-5, 2017).

2015 **Begum K,** O'Malley BW, DeMayo FJ, Overbeek PA. CRISPR/Cas9 mediated highly efficient genome engineering in mouse embryos.The ASGCT 18th Annual Meeting, New Orleans, Louisiana, USA.

2014 **Begum K,** Fu C, Han SJ, O'Malley BW, DeMayo FJ, Overbeek PA. TALEN and CRISPR/Cas9 mediated targeted genome engineering in mouse. Reproductive Health Research Day. Baylor College of Medicine, Houston, Texas, USA.

2012 Han SJ, Hawkins SM, **Begum K,** Jung SY, Kovanci E, Qin J Lydon JP, DeMayo FJ, O'Malley BW. The pathogenic role of novel Steroid Receptor Coactivator-1 C-terminal isoform in endometriosis. The endocrine Society's 94th Annual Meeting & Expo. Houston, TX, USA

2006 **Begum K,** and Park Y. Characterization of ion transport peptide in Drosophila and Anophelis mosquito., *The 54th Annual Meeting Of the Entomological Society of America*, Indianapolis, IN, USA

2002 **Begum K,** Kim HS, Yohei Okuda, Yukiko Nagai and Yusuke Wataya. Analysis of mefloquine-resistant Plasmodium falciparum. The 72nd Annual Meeting of the Japanese Society of Parasitology. Tokyo, Japan

1995 **Begum K**, Khatun A and D'Silva J. Nematode parasite of elasmobranch fishes in the Bay of Bengal. Annual Conference of Bangladesh Zoological Society. Dhaka, Bangladesh

Peer-Reviewd Publications

1. Endres BT, Basseres E, Citron DM, Tyrrell KL, **Begum K,** Lancaster C, Warren YA, Alam MJ, Garey KW, Goldstein EJC. Fusobacteria behaving badly: Masquerading strains of strictly anaerobic Escherichiacoli misidentified due to the deletion of the hemB gene. Anaerobe. 2022 Dec 27;79:102682. doi: 10.1016/j.anaerobe.2022.102682. [Epub ahead of print] PubMed PMID: 36580991.
2. Garey KW, McPherson J, Dinh AQ, Hu C, Jo J, Wang W, Lancaster CK, Gonzales-Luna AJ, Loveall C, **Begum K**, Jahangir Alam M, Silverman MH, Hanson BM. Efficacy, Safety, Pharmacokinetics, and Microbiome Changes of Ibezapolstat in Adults with Clostridioides difficile Infection: A Phase 2a Multicenter Clinical Trial. Clin Infect Dis. 2022 Sep 30;75(7):1164-1170. doi: 10.1093/cid/ciac096. PubMed PMID: 35134880; PubMed Central PMCID: PMC9525077.

3. McPherson J, Hu C, **Begum K**, Wang W, Lancaster C, Gonzales-Luna AJ, Loveall C, Silverman MH, Alam MJ, Garey KW. Functional and Metagenomic Evaluation of Ibezapolstat for Early Evaluation of Anti-Recurrence Effects in Clostridioides difficile Infection. Antimicrob Agents Chemother. 2022 Aug 16;66(8):e0224421. doi: 10.1128/aac.02244-21. Epub 2022 Jul 6. PubMed PMID: 35862742; PubMed Central PMCID: PMC9380534.
4. Bassères E, Endres BT, Montes-Bravo N, Pérez-Soto N, Rashid T, Lancaster C, **Begum K**, Alam MJ, Paredes-Sabja D, Garey KW. Visualization of fidaxomicin association with the exosporium layer of Clostridioides difficile spores. Anaerobe. 2021 Jun;69:102352. doi: 10.1016/j.anaerobe.2021.102352. Epub 2021 Feb 25. PubMed PMID: 33640461.
5. Garey KW, **Begum K**, Lancaster C, Gonzales-Luna A, Bui D, Mercier J, Seng Yue C, Ducharme MP, Hu M, Vince B, Silverman MH, Alam MJ, Kankam M. A randomized, double-blind, placebo-controlled, single and multiple ascending dose Phase 1 study to determine the safety, pharmacokinetics and food and faecal microbiome effects of ibezapolstat administered orally to healthy subjects. J Antimicrob Chemother. 2020 Dec 1;75(12):3635-3643. doi: 10.1093/jac/dkaa364. PubMed PMID: 32892222; PubMed Central PMCID: PMC7662179.
6. **Begum K**, Bassères E, Miranda J, Lancaster C, Gonzales-Luna AJ, Carlson TJ, Rashid T, Eyre DW, Wilcox MH, Alam MJ, Garey KW. In Vitro Activity of Omadacycline, a New Tetracycline Analog, and Comparators against Clostridioides difficile. Antimicrob Agents Chemother. 2020 Jul 22;64(8). doi: 10.1128/AAC.00522-20. Print 2020 Jul 22. PubMed PMID: 32513796; PubMed Central PMCID: PMC7526832.
7. Rainha K, Fernandes Ferreira R, Trindade CNR, Carneiro LG, Penna B, Endres BT, **Begum K**, Alam MJ, Garey KW, Domingues Regina Maria CP, Ferreira EO. 2019. Characterization of Clostridioides difficile ribotypes in domestic dogs in Rio de Janeiro, Brazil. Anaerobe. 2019 Aug;58:22-29. doi: 10.1016/j.anaerobe.2019.06.007. Epub 2019 Jun 17. Review. PMID: 31220606
8. Sofjan AK, Islam MA, Halder K, Kabir ND, Saleh AA, Miranda J, Lancaster C, **Begum K**, Alam MJ, Garey KW. 2019. Molecular epidemiology of toxigenic Clostridioides difficile isolates from hospitalized patients and the hospital environment in Dhaka, Bangladesh. Anaerobe. 2019 Jul 26:102081. doi: 10.1016/j.anaerobe.2019.102081. [Epub ahead of print] PMID: 31356958
9. Alam MJ, McPherson J, Miranda J, Thrall A, Ngo V, Kessinger R, **Begum K**, Marin M, Garey KW. 2019. Molecular epidemiology of Clostridioides difficile in domestic dogs and zoo animals. 2019 Jun 15;59:107-111. doi: 10.1016/j.anaerobe.2019.06.005. PMID: 31207298
10. Islam MA, Kabir ND, Moniruzzaman M, **Begum K**, Ahmed D, Faruque ASG, Garey KW, Alam MJ. 2019. Clostridioides difficile ribotypes isolated from domestic environment and from patients in Bangladesh. 2019 Apr;56:88-90. doi: 10.1016/j.anaerobe.2019.02.010. Epub 2019 Feb 19. PMID:30794875
11. Endres BT, **Begum K**, Sun H, Walk ST, Memariani A, Lancaster C, Gonzales-Luna AJ, Dotson KM, Bassères E, Offiong C, Tupy S, Kuper K, Septimus E, Arafat R, Alam MJ, Zhao Z, Hurdle JG, Savidge TC, Garey KW. 2019. Epidemic *Clostridioides difficile* Ribotype 027 Lineages: Comparisons of Texas Versus Worldwide Strains. MID: 30793006
12. Endres BT, Dotson KM, Poblete K, McPherson J, Lancaster C, Bassères E, Memariani A, Arnold S, Tupy S, Carlsen C, Morehead B, Anyatonwu S, Cook C, **Begum K**, Alam MJ, Garey KW.2018. Environmental transmission of Clostridioides difficile ribotype 027 at a long-term care facility; an outbreak investigation guided by whole genome sequencing. Infect Control Hosp Epidemiol. 2018 Nov;39(11):1322-1329. doi: 10.1017/ice.2018.230. Epub 2018 Sep 26. PMID: 30253813

13. Fu C, **Begum K,** Jordan PW, He Y, Overbeek PA. 2016. Dearth and Delayed Maturation of Testicular Germ Cells in Fanconi Anemia E Mutant Male Mice. 2016. PLoS One. 2016 Aug 3;11(8):e0159800. doi: 10.1371/journal.pone.0159800.
14. Fu C, **Begum K,** Overbeek PA. 2016. Primary Ovarian Insufficiency Induced by Fanconi Anemia E Mutation in a Mouse Model. PLoS One. 2016 Mar 3;11(3):e0144285. doi: 10.1371/journal.pone.0144285
15. Han SJ, **Begum K**, Foulds CE, Hamilton RA, Bailey S, Malovannaya A, Chan D, Qin J, O'Malley BW. The Dual Estrogen Receptor α Inhibitory Effects of the Tissue-Selective Estrogen Complex for Endometrial and Breast Safety. 2016. Mol Pharmacol. 2016 Jan;89(1):14-26. doi: 10.1124/mol.115.100925. Epub 2015 Oct 20. PMID:26487511
16. Agrawal S, Kelkenberg M, **Begum K**, Steinfeld L, Williams CE, Kramer KJ, Beeman RW, Park Y, Muthukrishnan S, Merzendorfer H. Two essential peritrophic matrix_proteins mediate matrix barrier functions in the insect midgut. 2014. Insect Biochem Mol Biol. 2014 Jun;49:24-34. doi: 10.1016/j.ibmb.2014.03.009. Epub 2014 Mar 26.PMID:24680676
17. Han SJ, Hawkins SM, **Begum K**, Jung SY, Kovanci E, Qin J Lydon JP, DeMayo FJ, O'Malley BW (2012). A novel isoform of steroid receptor coactivator-1 is critical for pathogenic progression of endometriosis. Nature Medicine 18(7): 1102-1111.
18. **Begum K**, Li B , Beeman RW and Y Park (2009). Functions of Ion Transport Peptide and Ion Transport Peptide-like in the red flour beetle Tribolium castaneum, *Insect Biochemistry and Molecular Biology*, 39, 717-725
19. Arakane Y, Dixit R, **Begum K**, Park Y, Specht CA, Merzendorfer H, Kramer KJ, Beeman RW, (2009) Muthukrishnan S. Analysis of functions of the chitin deacetylase gene family in Tribolium castaneum., *Insect Biochemistry and Molecular Biology.*, 39 (5-6), 355-365
20. Mutti NS, Louis J, Pappan LK, Pappan K, **Begum K**, Chen MS,Park Y, Dittmer N, Marshall J, Reese JC, and GR Reeck (2008). A protein from the salivary glands of the pea aphid, Acyrthosiphon pisum, is essential in feeding on a host plant., *Proc Natl Acad Sci U S A* ., 105 (29), 9965-9969
21. Aikins MJ, Schooley D, **Begum K**, Dupriez V, Beeman R, and Park Y. (2008). Vasopressin like peptide and its receptor function in indirect diuretic signaling pathway in red flour beetle., *Insect Biochemistry and Molecular Biology*, 38 (7), 740- 748
22. Anderson TD, Jin-Clark Y, **Begum K**, Zhu KY. (2008). Gene expression profiling reveals decreased expression of two hemoglobin genes associated with increased consumption of oxygen in Chironomus tentans exposed to atrazine: A possible mechanism for adapting to oxygen deficiency., *Aquatic Toxicology*, 86, 148-156
23. Tokuyasu T, Kunikawa S, Abe M, Masuyama A, Nojima M, Kim HS, **Begum K**, Wataya Y (Sep 2003). Synthesis of antimalarial yingzhaosu A analogues by the peroxidation of dienes with Co(II)/O2/Et3SiH, *The Journal of Organic Chemistry*, 68 (19), 7361-7
24. Hirai S, Kikuchi H, Kim HS, **Begum K**, Wataya Y, Tasaka H, Miyazawa Y, Yamamoto K, Oshima Y (Sep 2003). Metabolites of febrifugine and its synthetic analogue by mouse liver S9 and their antimalarial activity against Plasmodium malaria parasite, *Journal of Medicinal Chemistry*, 46 (20), 4351-9
25. **Begum K**, Kim HS, Kumar V, Stojiljkovic I, Wataya Y (Jun 2003). In vitro antimalarial activity of metalloporphyrins against Plasmodium falciparum, *Parasitology Research*, 90 (3), 221-4
26. Tran QL, Tezuka Y, Ueda JY, Nguyen NT, Maruyama Y, **Begum K**, Kim HS, Wataya Y, Tran QK, Kadota S (2003). In vitro antiplasmodial activity of antimalarial medicinal plants used in Vietnamese traditional medicine., *Journal of Ethnopharmacology*, 86 (2-3), 249-252
27. Kim HS, **Begum K**, Ogura N, Wataya Y, Nonami Y, Ito T, Masuyama A, Nojima M, McCullough KJ (May 2003). Antimalarial activity of novel 1,2,5,6-tetraoxacycloalkanes and 1,2,5-trioxacycloalkanes, *Journal of Medicinal Chemistry*, 46 (10), 1957-61

28. Murakami N, Sugimoto M, Kawanishi M, Tamura S, Kim HS**, Begum K**, Wataya Y, Kobayashi M (Feb 2003). New semisynthetic quassinoids with in vivo antimalarial activity, *Journal of Medicinal Chemistry*, 46 (4), 638-41
29. Kim HS, **Begum K**, Ogura N, Wataya Y, Tokuyasu T, Masuyama A, Nojima M, McCullough KJ (Oct 2002). Antimalarial activity of yingzhaosu A analogues, *Journal of Medicinal Chemistry*, 45 (21), 4732-6
30. **Begum K**, Kim HS, Okuda Y, Wataya Y, Kimura M, Huruta T (2002). Genomic analysis of mefloquine-resistant Plasmodium falciparum, *Nucleic Acids Research. Supplement (2001)* (2), 223-4
31. Kim HS, Nagai Y, Ono K, **Begum K**, Wataya Y, Hamada Y, Tsuchiya K, Masuyama A, Nojima M, McCullough KJ (Jul 2001). Synthesis and antimalarial activity of novel medium-sized 1,2,4,5-tetraoxacycloalkanes, *Journal of Medicinal Chemistry*, 44 (14), 2357-61
32. Kim HS, Okuda Y, **Begum K**, Nagai Y, Wataya Y, Kimura M, Huruta T (2001). Analysis of Pfmdr 1 gene in mefloquine-resistant Plasmodium falciparum, *Nucleic Acids Research. Supplement (2001)* (1), 231-2