

Curriculum Vitae

Name: Ramy Karam Aziz
Title: Associate Professor Dr.
Department: Microbiology & Immunology
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Education

• Academic Degrees

PhD

University of Tennessee Health Science Center (UTHSC), Memphis, TN. PhD in Microbiology and Immunology, Department of Molecular Sciences. Advisor: Dr. Malak Y. Kotb, PhD

Bachelor

Faculty of Pharmacy, Cairo University (FOPCU), Cairo, Egypt. BSc in Pharmaceutical Sciences, Jun. 1995. GPA: 3.84 (Excellent with Highest Honors), ranked seventh out of 500 students

• Research interest

- Human microbiome research and the impact of human microbiome on drugs (pharmacomicrobiomics)
- Antimicrobial resistome analysis or environmental screening for antimicrobial resistance genes
- Systems biology of microbial pathogens.
- Microbial and bacteriophages genomics
- Bioinformatics, genomics, and pathway analysis of microbial and viral genomes and metagenomes
- Microbial pathogenesis, host-parasite interactions, and the molecular basis of infectious diseases
- Immunogenetics of host-pathogen interactions
- Computational analysis of proteins and genomes, genome annotation, and comparative genomics and metagenomics

Teaching

	Course Title
Undergraduate Courses (General Program)	Micro402: General Microbiology and Immunology Micro405: Public Health Micro406: Biotechnology
Undergraduate Courses (Clinical Program)	MD406: Parasitology PM401: General Microbiology and Immunology MD710: Public Health PM703: Biotechnology
Postgraduate Courses	Bioinformatics for Biotechnology Diploma Students and for Drug Design Diploma.

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Career History and Professional Experience

Titles	<p>2011-2014: Visiting Scientist, Systems Biology Research Group, University of California, San Diego, La Jolla, CA, USA</p> <p>2008-2012: Adjunct Faculty Member, College of Sciences, San Diego State University (SDSU), San Diego, CA, USA</p> <p>2009-2011: Research Scientist, College of Sciences, SDSU, San Diego, CA, USA</p> <p>2006-2011: Lecturer, Department of Microbiology and Immunology, FOPCU, Cairo, Egypt</p> <p>2008-2010: Research Scientist (Streptococcal Genomics Specialist), Computation Institute, University of Chicago, IL, USA</p> <p>2005-2006: Genome Analyst, The Fellowship for Interpretation of Genomes (FIG), University of Chicago, IL, and the Argonne National Laboratory, Argonne, IL, USA</p> <p>2004-2006: Postdoctoral Trainee, Department of Surgery, UTHSC, Memphis, TN, USA</p> <p>1999-2004: Graduate Teaching Assistant, Department of Molecular Sciences, UTHSC, Memphis, TN, USA</p> <p>1999-2000: Doctoral rotation. UTHSC and the VA Medical Center, Memphis, TN. Analysis of T cell receptor V-beta repertoire by quantitative RT Real time PCR. Advisor: Dr. Malak Y. Kotb</p> <p>1995-1999: Graduate Teaching Assistant, Department of Microbiology and Immunology, FOPCU, Cairo, Egypt</p> <p>1996-1998: Predoctoral project, Department of Microbiology and Immunology, FOPCU, Cairo, Egypt: Using a yeast model to study the effect of surfactants on the eukaryotic membrane.</p> <p>1993: Undergraduate intern at the R&D department in Amoun Pharmaceutical Industries Company (APIC), Salam City, Egypt. The two-months project was to develop and optimize HPLC assays for various drug active constituents and final products.</p>
Awards	<ul style="list-style-type: none"> • Cairo University Scientific Excellence Award. 2015 • TWAS/ARO regional award for developing educational material. Dec. 2015. • Cairo University Junior Faculty Award (The University Incentive Award). Aug. 2012 • The Egyptian National Academy of Sciences Incentive Award in Medical Sciences (Monetary value of 50,000 EGP). Jun. 2012 • TWAS/ARO Young Arab Scientist (YAS) award for research on biodiversity and informatics. Dec. 2010. • Cairo University Excellence in Publication awards every year between 2006-2015 • ASM student travel award, ASM conference for functional genomics and bioinformatics, Portland-OR. Grant awarded on Sep. 2004 • ASM student travel award, 43rd ICAAC meeting, Chicago- IL., Sep. 2003 • ASM student travel award, 103rd General Meeting, Washington- D.C., May 2003
Projects	<ul style="list-style-type: none"> • Pharmacometric, Microbiological and Pharmacogenetic Monitoring of Voriconazole-treated Pediatric Cancer Patients: A Step Towards Personalized Therapeutics • UTHSC Center of Excellence in Genomics and Bioinformatics grant to Malak Kotb, Ramy Aziz, and Robert A. Edwards. 2002

Publications and Presentations

Publication Metrics:

Summary: 48 peer-reviewed full articles and 3 editorials/ 1 genome announcement article/ 5 book sections/ 1 book/ 10 published peer-reviewed conference abstracts

Citation metrics: ISI, Web of Science: h-index **23**; total citations 2,863, of which 115 are self citations;
Scopus: h-index **23**; total citations: 3,115 (119 are self-citations); Google Scholar: h-index **27**; total citations 5,319

Journal Articles (in reverse chronological order):

Key: Name underlined: primary author; double underline: principal investigator; * corresponding author; # equal contribution

In revision:

Bosi E, Monk JM, Aziz RK et al. Comparative genome-scale modelling of multiple *Staphylococcus aureus* strains identifies strain-specific metabolic capabilities linked to pathogenicity"

In Press:

El Behery A, **Aziz RK**, Siam R. Antibiotic resistome: improving detection and quantification accuracy for comparative metagenomics. **OMICS 2016. In Press.**

2011-present:

53. **Aziz RK**, Monk JM, Lewis RM, In Loh S, Mishra A, Abhay Nagle A, Satyanarayana C, Dhakshinamoorthy S, Luche M, Kitchen DB, Andrews KA, Fong NL, Li HJ, Palsson BØ, Charusanti P. Systems biology-guided identification of synthetic lethal gene pairs and its potential use to discover antibiotic combinations. **Sci Rep.** **2015** Nov 4;5:16025. doi: 10.1038/srep16025. PubMed PMID: 26531810.
52. **Aziz RK**, Khaw VL, Monk JM, Brunk E, Lewis R, Loh SI, Mishra A, Nagle AA, Satyanarayana C, Dhakshinamoorthy S, Luche M, Kitchen DB, Andrews KA, Palsson BØ, Charusanti P. Model-driven discovery of synergistic inhibitors against E. coli and S. enterica serovar Typhimurium targeting a novel synthetic lethal pair, aldA and prpC. **Front Microbiol.** **2015** Sep 23;6:958. doi: 10.3389/fmicb.2015.00958. eCollection 2015. PubMed PMID: 26441892.
51. **Aziz RK***, Dwivedi B, Akhter S, Breitbart M, Edwards RA. Multidimensional metrics for estimating phage abundance, distribution, gene density, and sequence coverage in metagenomes. **Front Microbiol.** **2015** May 8;6:381. doi:10.3389/fmicb.2015.00381. eCollection **2015**. PubMed PMID: 26005436..
50. **Aziz RK***, Khalifa MM, Sharaf RR. Contaminated water as a source of *Helicobacter pylori* infection. **J. Advanced Res.** 2015 Jul;6(4):539-47. doi: 10.1016/j.jare.2013.07.007. Epub 2013 Jul 21. Review. PubMed PMID: 26199743
49. Henningham A, Yamaguchi M, **Aziz RK**, Kuipers K, Buffalo CZ, Dahesh S, Choudhury B, Van Vleet J, Yamaguchi Y, Seymour LM, Ben Zakour NL, He L, Smith HV, Grimwood K, Beatson SA, Ghosh P, Walker MJ, Nizet V, Cole JN. Mutual Exclusivity of Hyaluronan and Hyaluronidase in Invasive Group A Streptococcus. **J Biol Chem.** **2014** Nov 14;289(46):32303-15. doi: 10.1074/jbc.M114.602847. Epub 2014 Sep 29PubMed PMID: 25266727.
48. Latif H, Li HJ, Charusanti P, Palsson BØ, **Aziz RK***. A Gapless, Unambiguous Genome Sequence of the Enterohemorrhagic Escherichia coli O157:H7 Strain EDL933. **Genome Announc.** **2014** Aug 14;2(4). pii:

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e00821-14. doi: 10.1128/genomeA.00821-14

47. Dutilh BE, Cassman N, McNair K, Sanchez SE, Silva GG, Boling L, Barr JJ, Speth DR, Seguritan V, **Aziz RK**, Felts B, Dinsdale EA, Mokili JL, Edwards RA. A highly abundant bacteriophage discovered in the unknown sequences of human faecal metagenomes. **Nat Commun.** **2014** Jul 24;5:4498. doi: 10.1038/ncomms5498
46. van Sorge NM, Cole JN, Kuipers K, Henningham A, **Aziz RK**, Kasirer-Friede A, Lin L, Berends ET, Davies MR, Dougan G, Zhang F, Dahesh S, Shaw L, Gin J, Cunningham M, Merriman JA, Hütter J, Lepenies B, Rooijackers SH, Malley R, Walker MJ, Shattil SJ, Schlievert PM, Choudhury B, Nizet V. The classical lancefield antigen of group a Streptococcus is a virulence determinant with implications for vaccine design. **Cell Host Microbe.** **2014** Jun 11;15(6):729-40. doi: 10.1016/j.chom.2014.05.009
45. ElRakaiby M, Dutilh BE, Rizkallah MR, Boleij A, Cole JN, **Aziz RK***. Pharmacomicrobiomics: the impact of human microbiome variations on systems pharmacology and personalized therapeutics. **OMICS.** **2014** Jul;18(7):402-14. doi: 10.1089/omi.2014.0018. Epub 2014 May 2
44. Monk JM, Charusanti P, **Aziz RK**, Lerman JA, Premyodhin N, Orth JD, Feist AM, Palsson BØ. Genome-scale metabolic reconstructions of multiple *Escherichia coli* strains highlight strain-specific adaptations to nutritional environments. **Proc Natl Acad Sci USA.** **2013** Dec 10;110(50):20338-43. doi: 10.1073/pnas.1307797110. Epub 2013 Nov 25
43. Akhter S, Bailey BA, Salamon P, **Aziz RK**, Edwards RA. Applying Shannon's information theory to bacterial and phage genomes and metagenomes. **Sci Rep.** **2013**; 3, 1033. doi: 10.1038/srep01033
42. Saad R, Rizkallah MR, **Aziz RK***. Gut Pharmacomicrobiomics: the tip of an iceberg of complex interactions between drugs and gut-associated microbes. **Gut Pathog.** **2012** Nov 30;4(1):16. doi: 10.1186/1757-4749-4-16
41. **Aziz RK***. Rethinking pharmacogenomics in an ecosystem: drug-microbiome interactions, pharmacomicrobiomics, and personalized medicine for the human supraorganism (Editorial). **Curr Pharmacogenomics Person Med.** **2012** Sep 1;10(4):258-261
40. **Aziz RK***, Devoid S, Disz T, Edwards RA, Henry CS, Olsen GJ, Olson R, Overbeek R*, Parrello B, Pusch GD, Stevens RL, Vonstein V, Xia F. SEED Servers: high-performance access to the SEED genomes, annotations, and metabolic models. **PLoS One.** **2012**; 7(10):e48053. doi: 10.1371/journal.pone.0048053. Epub 2012 Oct 2
39. Cole JN, **Aziz RK**, Kuipers K, Timmer AM, Nizet V, van Sorge NM. A conserved UDP-glucose dehydrogenase outside the hasABC operon contributes to capsule biogenesis in group A Streptococcus **J Bacteriol.** **2012** Nov;194(22):6154-61. doi: 10.1128/JB.01317-12. Epub 2012 Sep 7.
38. Maamary PG, Ben Zakour NL, Cole JN, Hollands A, **Aziz RK**, Barnett TC, Cork AJ, Henningham A, Sanderson-Smith M, McArthur JD, Venturini C, Gillen CM, Kirk JK, Johnson DR, Taylor WL, Kaplan EL, Kotb M, Nizet V, Beatson SA, Walker MJ. Tracing the evolutionary history of the pandemic group A streptococcal M1T1 clone. **FASEB J.** **2012** Nov;26(11):4675-84. doi: 10.1096/fj.12-212142. Epub 2012 Aug 9.
37. Khouzam RN, Shaheen M, **Aziz RK**, Ibebuogu UN. The Important Role of Inflammatory Biomarkers Pre- and Post Bare-Metal and Drug-Eluting Stent Implantation. **Can J Cardiol.** **2012** Nov;28(6):700-5. doi: 10.1016/j.cjca.2012.05.012. Epub 2012 Jul 21.
36. Rizkallah MR, Gamal-Eldin S, Saad R, **Aziz RK***. The Pharmacomicrobiomics portal: a database for drug-microbiome interactions. **Curr Pharmacogenomics Person Med.** **2012** Sep 1;10(3):195-203.
35. Akhter S, **Aziz RK**, Edwards RA. PhiSpy: A novel algorithm for finding prophages in microbial genomes that combines similarity-based and composition-based strategies. **Nucleic Acids Res.** **2012** Sep;40(16):e126. doi: 10.1093/nar/gks406. Epub 2012 May 14.
34. Ozdemir V, Rosenblatt DS, Warnich L, Srivastava S, Tadmouri GO, **Aziz RK**, Reddy PJ, Manamperi A, Dove ES, Joly Y, Zawati MH, Hizel C, Yazan Y, John L, Vaast E, Ptolemy AS, Faraj SA, Kolker E,

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Cotton RG. Towards an Ecology of Collective Innovation: Human Variome Project (HVP), Rare Disease Consortium for Autosomal Loci (RaDiCAL) and Data-Enabled Life Sciences Alliance (DELSA). **Curr Pharmacogenomics Person Med.** 2011 Dec 1;9(4):243-251

2006-2010:

33. Ozdemir V, Armengaud J, Dubé L, **Aziz RK**, Knoppers BM. Nutriproteomics and proteogenomics: cultivating two novel hybrid fields of personalized medicine with added Societal value. **Current Pharmacogenomics and Person Med.** 2010 Dec 1;8(4):240-244.
32. Maamary PG, Sanderson-Smith ML, **Aziz RK**, Hollands A, Cole JN, McKay FC, McArthur JD, Kirk JK, Cork AJ, Keefe RJ, Kansal RG, Sun H, Taylor WL, Chhatwal GS, Ginsburg D, Nizet V, Kotb M, Walker MJ. Parameters Governing Invasive Disease Propensity of Non-M1 Serotype Group A Streptococci. **J Innate Immun.** 2010;2(6):596-606. doi: 10.1159/000317640. Epub 2010 Sep 2
31. Rizkallah MR, Saad R, **Aziz RK***. The Human Microbiome Project, Personalized Medicine and the Birth of Pharmacomicrobiomics, 12. **Current Pharmacogenomics and Personalized Med.** 2010 Sep 1;8(3):182-193.
30. **Aziz RK***, Breitbart M, Edwards RA. Transposases are the most abundant, most ubiquitous genes in nature. **Nucleic Acids Res.** 2010 Jul;38(13):4207-17. Epub 2010 Mar 9.
29. **Aziz RK***, Kansal R, Aronow BJ, Taylor WL, Rowe SL, Kubal M, Chhatwal GS, Walker MJ, Kotb M. Microevolution of group A streptococci in vivo: capturing regulatory networks engaged in sociomicrobiology, niche adaptation, and hypervirulence. **PLoS One.** 2010 Apr 14;5(4):e9798.
28. Khalifa MM, Sharaf RR, **Aziz RK***. *Helicobacter pylori*: a poor man's gut pathogen? **Gut Pathog.** 2010 Mar 31;2(1):2.
27. **Aziz RK**, Nizet V. Pathogen microevolution in high resolution. **Sci Transl Med.** 2010 Jan 27;2(16):16ps4.
26. Kansal RG, Datta V, **Aziz RK**, Abdeltawab NF, Rowe S, Kotb M. Dissection of the molecular basis for hypervirulence of an in vivo-selected phenotype of the widely disseminated M1T1 strain of group A *Streptococcus* bacteria. **J Infect Dis.** 2010 Mar 15;201(6):855-65.
25. Milani CJ[#], **Aziz RK[#]**, Locke JB, Dahesh S, Nizet V, Buchanan JT. The novel polysaccharide deacetylase homolog Pdi contributes to virulence of the aquatic pathogen *Streptococcus iniae*. **Microbiology.** 2010. 156: 543-54. Epub 2009 Sep 17. PMID: 19762441. ([#]Joint first author)
24. **Aziz RK***. A hundred-year-old insight into the gut microbiome! **Gut Pathog.** 2009 Dec 7;1(1):21.
23. Khouzam RN, **Aziz RK**. A case report: can altitude change blood pressure that much? **J Clin Hypertens (Greenwich).** 2009 Sep;11(9):498-9.
22. **Aziz RK***. The case for biocentric microbiology. **Gut Pathog.** 2009 Aug 4;1(1):16. PMID: 19653908.
21. Cox KH, Ruiz-Bustos E, Courtney HS, Dale JB, Pence MA, Nizet V, **Aziz RK**, Gerling I, Price SM, Hasty DL. Inactivation of DltA modulates virulence factor expression in *Streptococcus pyogenes*. **PLoS One.** 2009;4(4):e5366. Epub 2009 Apr 29.
20. **Aziz RK***. Bioinformatic analysis of streptococcal peptidoglycan deacetylases family that confers resistance to lysozyme. **Bulletin Fac. Pharm. Cairo Univ.** 2008
19. Hollands A, **Aziz RK**, Kansal R, Kotb B, Nizet V, Walker MJ. A naturally occurring mutation in *ropB* suppresses SpeB expression and reduces M1T1 group A streptococcal systemic virulence. **PLoS One.** 2008. Dec. 31;3(12): e4102.
18. Kotb M, Fathey N, **Aziz R**, Rowe S, Williams RW, Lu L. Unbiased forward genetics and systems biology approaches to understanding how gene-environment interactions work to predict susceptibility and outcomes of infections. **Novartis Found Symp.** 2008;293:156-65; discussion 165-7, 181-3. Review.
17. **Aziz RK*** and Kotb M. Rise and persistence of the global M1T1 clone of *Streptococcus pyogenes*. **Emerg Infect Dis.** 2008 Oct;14(10):1511-7.

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16. Locke JB, **Aziz RK**, Vicknair MR, Nizet V, Buchanan JT. *Streptococcus iniae* M-like protein contributes to virulence in fish and is a target for live attenuated vaccine development. **PLoS One**. **2008** Jul 30;3(7):e2824.
15. Abdeltawab NF, **Aziz RK**, Kansal R, Rowe SL, Su Y, Gardner L, Brannen C, Nooh MM, Attia RR, Abdelsamed H, Taylor WL, Lu L, Williams RW, Kotb M. An unbiased, systems genetics approach to mapping genetic loci modulating susceptibility to severe streptococcal sepsis. **PLoS Pathogens**. **2008** Apr 18;4(4):e1000042. doi: 10.1371/journal.ppat.1000042.
14. **Aziz RK**, et al. The RAST Server: Rapid Annotations using Subsystems Technology. **BMC Genomics**. **2008** Feb 8;9:75. doi: 10.1186/1471-2164-9-75.
13. Arthur JC, Lich JD, **Aziz RK**, Kotb M, Ting JPY. Hsp90 associates with Monarch-1 and regulates its ability to promote degradation of NF- κ B inducing kinase. **Journal of Immunology** **2007** Nov 1;179(9):6291-6. PMID: 17947705.
12. Walker MJ, Hollands A, Sanderson-Smith ML, Cole JN, Kirk JK, Henningham A, McArthur JD, Dinkla K, **Aziz RK**, Kansal RG, Simpson AJ, Buchanan JT, Chhatwal GS, Kotb M, Nizet V. DNase Sda1 provides selection pressure for a switch to invasive group A streptococcal infection. **Nat Med**. **2007** Aug;13(8):981-5. Epub 2007 Jul 15.
11. **Aziz RK**, Kansal R, Abdeltawab NF, Rowe SL, Su Y, Carrigan D, Nooh MM, Attia RR, Brannen C, Gardner LA, Lu L, Williams RW, Kotb M. Susceptibility to severe streptococcal sepsis: use of a large set of isogenic mouse lines to study genetic and environmental factors. **Genes Immun**. **2007** Jul;8(5):404-415. Epub 2007 May 24.
10. McNeil LK, Reich C, **Aziz RK**, Bartels D, Cohoon M, Disz T, et al. The National Microbial Pathogen Database Resource (NMPDR): a genomics platform based on subsystem annotation. **Nucleic Acids Res**. **2007** Jan;35(Database issue):D347-53. Epub 2006 Dec 1.
9. Kwinn LA, Khosravi A, **Aziz RK**, Timmer AM, Doran KS, Kotb M, Nizet V. Genetic Characterization and Virulence Role of the RALP3/LSAP Locus Upstream of the Streptolysin S Operon in Invasive M1T1 Group A Streptococcus. **J Bacteriol**. **2007** Feb;189(4):1322-9. Epub 2006 Nov 17.
8. Nooh MN[#], **Aziz RK**[#], Kotb M, Eroshkin A, Chuang W-J, Proft T, and Kansal R. Streptococcal mitogenic exotoxin, SmeZ, is the most susceptible M1T1 streptococcal superantigen to degradation by the streptococcal cysteine protease, SpeB. **J Biol Chem**. **2006** Nov 17;281(46):35281-8. Epub 2006 Sep 15. ([#]Joint first author)
7. Buchanan JT, Simpson AJ, **Aziz RK**, Liu GY, Kristian SA, Kotb M, Feramisco J, Nizet V. DNase expression allows the pathogen group A Streptococcus to escape killing in neutrophil extracellular traps. **Curr Biol**. **2006** Feb 21;16(4):396-400.
6. **Aziz RK**, Kotb, M. Integrating proteomics, genomics, and bioinformatics tools to define unique features of the clonal M1T1 substrain of *S. pyogenes*. **International Congress Series**. **2006** 1289: 175-179.

2001-2005:

5. Kansal R, **Aziz RK**, and Kotb M. Modulation of expression of superantigens by human transferrin and lactoferrin: a novel mechanism in host-streptococcus interactions. **J Infect Dis**. **2005** Jun 15;191(12):2121-9
4. **Aziz RK**, Edwards, RA, Taylor WW, Low DE, McGeer A, and Kotb M. Mosaic phages with horizontally acquired genes account for the emergence and diversification of the global M1T1 *S. pyogenes* clone. **J. Bacteriol**. **2005** May;187(10):3311-8.
3. **Aziz RK**, Ismail, SA, Park H, Kotb M. Post-proteomic identification of Sda1, a novel phage-encoded streptodornase in *Streptococcus pyogenes*. **Mol Microbiol**. **2004** Oct;54(1):184-97.
2. **Aziz RK**, Pabst MJ, Jeng A, Kansal R, Low DE, Nizet V, Kotb M. Invasive M1T1 group A Streptococcus

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undergoes a phase-shift in vivo to prevent proteolytic degradation of multiple virulence factors by SpeB. **Mol Microbiol.** 2004 Jan;51(1):123-34.

1. Kazmi SU, Kansal R, **Aziz RK**, Hooshdaran M, Norrby-Teglund A, Low DE, Halim AB, Kotb M. Reciprocal, temporal expression of SpeA and SpeB by invasive M1T1 group A streptococcal isolates in vivo. **Infect Immun.** 2001 Aug;69(8):4988-95.

Book:

- Molecular Dissection of the Clonal M1T1 Group A Streptococci. **Ramy Karam Aziz (2009)**. VDM Verlag. ISBN-13: 978-3639196597

Book Sections:

- S1. Dutilh BE and **Aziz RK***. Genomes, Metagenomes, and Microbiomes: A New Biology for a New Millennium. In **New Life Sciences: Linking Science to Society. 2013**. TWAS/ Biovision Alexandria.NXT 2012, Alexandria, Egypt. Edited by: Serageldin I and Yahia M. (ISBN: 978-977-452-226-8)
- S2. **Aziz RK*** and Binfield P. Open Access: The Next Revolution in Scholarly Publishing. In **Publishing Scientific Papers in the Developing World. 2012**. TWAS/ Biovision Alexandria.NXT 2010, Alexandria, Egypt. Edited by: Serageldin I and Massoud E. (ISBN: 978-977-452-209-3).
- S3. McNeil L and **Aziz RK**. In silico reconstruction of the metabolic and pathogenic potential of bacterial genomes using subsystems. In **Genome Dyn.** 2009;6:21-34. Edited by: Bereswill S and Dereuse H.
- S4. Kotb M, Fathey N, **Aziz R**, Rowe S, Williams RW, Lu L. Unbiased forward genetics and systems biology approaches to understanding how gene-environment interactions work to predict susceptibility and outcomes of infections. **Aug 4 2008**. In **Genetic Effects on Environmental Vulnerability to Disease** (Novartis Foundation Symposia; 293) pp.156-65; discussion 165-7, 181-3. (ISBN: 978-0470777800)
- S5. Kotb M, Williams RW, Fathey N, Nooh M, Rowe S, Kansal R, and **Aziz R**. Biotoools for determining the genetics of susceptibility to infectious diseases and expediting research translation into effective countermeasures. **Jul 2008**. In **National Institute of Allergy and Infectious Diseases, NIH: Volume 1: Frontiers in Research (Infectious Disease) Vassil St. Georgiev**. Humana Press. (ISBN: 978-1934115770)

Published Conference Abstracts:

- A1. Henningham A, Yamaguchi M, Aziz RK, ... and Cole JN. Nonencapsulated group A *Streptococcus* associated with human invasive disease. **FASEB J.** 2014. 28 (1) Supplement 790.1
- A2. Cole JN, van Sorge N, Kuipers K, Henningham A, **Aziz RK**, ... and Nizet V. Genetics and virulence role of the classical group A *Streptococcus* Lancefield antigen. **FASEB J.** 2014. 28 (1) Supplement 790.2
- A3. **Aziz RK***, Saad R, Rizkallah MR. PharmacoMicrobiomics or how bugs modulate drugs: an educational initiative to explore the effects of human microbiome on drugs. **BMC Bioinformatics.** 2011. 12(Suppl 7):A10.
- A4. **Aziz RK***, Dwivedi B, Breitbart M, Edwards RA. Phage Eco-Locator: a web tool for visualization and analysis of phage genomes in metagenomic data sets. **BMC Bioinformatics.** 2011. 12(Suppl 7):A9.
- A5. **Aziz RK***. Subsystems-based servers for rapid annotation of genomes and metagenomes. **BMC Bioinformatics.** 2010; 11 (Suppl 4).
- A6. Mahmoud AA, **Aziz RK***. Do pathogenic bacteria encode more secreted proteins than their non-pathogenic relatives? **BMC Bioinformatics.** 2010; 11 (Suppl 4).
- A7. **Aziz RK***. In silico analysis of a family of extracellular polysaccharide deacetylases involved in virulence of pathogenic gram-positive cocci. **BMC Bioinformatics.** 2010; 11 (Suppl 4).

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- A8. **Aziz RK***, Aronow BJ, Taylor WL ... and Kotb MK. Integrating neighbor clustering, coexpression clustering and subsystems analysis to define dynamic changes in regulatory networks associated with group A streptococcal sociomicrobiology and niche adaptation. **BMC Bioinformatics**. **2010**; 11 (Suppl 4).
- A9. Amin HM, Hashem A, **Aziz RK***. Bioinformatics determination of ETEC signature genes as potential targets for molecular diagnosis and reverse vaccinology. **BMC Bioinformatics** **2009**; 10 (Suppl7): A8 doi: 10.1186/1471-2105-10-S7-A8
- A10. **Aziz RK***, McNeil LK. Reconstructing the virulome of the human pathogen *Streptococcus pyogenes* using NMPDR subsystems-based annotation **BMC Bioinformatics** **2009**; 10 (Suppl7): A7 doi: 10.1186/1471-2105-10-S7-A7

Invited Lectures at Meetings or Seminars:

- 1- Phage genomics and metagenomics. Feb 5-6 2015. CeBio Metagenomics Workshop, Belo Horizonte, Brazil
- 2- Genes Without Borders: Mobile Genetic Elements in Genomes and Metagenomes. November 6 2014. Glimpses at Pan-Gneomes Workshop, Valencia, Spain
- 3- Genomics and Systems Biology of Host-Microbe Interactions The dynamic balance and complex interactions between host and parasitic cells & genomes. June 3 2014. Research Seminar. University of North Dakota, School of Medicine & Health Sciences, North Dakota, USA
- 4- Genes Without Borders: Mobile Genetic Elements in Genomes and Metagenomes. May 6 2014. 2nd International Conference on Biotechnology and Environmental Safety, National Research Center Symposium, Cairo, Egypt
- 5- Impact of The Human Microbiome on Health, Nutrition, and Pharmacotherapy. April 24 2014. 5rh International Scientific Conference of Faculty of Pharmacy, Cairo University, Cairo, Egypt
- 6- Genes Without Borders: Mobile Genetic Elements in Genomes and Metagenomes. March 27 2014. III International Meeting on Environmental Microbiology, Belo Horizonte, Brazil
- 7- Detecting and decoding invisible life: What have we learned from genomic and metagenomic analysis of trillions of bacteria and viruses? October 4 2013. 24th TWAS General Meeting, Buenos Aires, Argentina
- 8- Genomics and Systems Biology of Microbial Pathogens: From virulence gene discovery and global gene regulation to therapeutic intervention. April 26 2012. 3rd International Scientific Conference of Faculty of Pharmacy, Cairo University, Cairo, Egypt
- 9- Genes Without Borders: Mobile Genetic Elements in Metagenomes. April 24 2012. BioVision Alexandria 2012, Bibliotheca Alexandrina, Alexandria, Egypt
- 10- "Don't be like me!" Innovation-driven education and research. April 21 2012. TWAS/BioVision Alexandria NXT2012, Bibliotheca Alexandrina, Alexandria, Egypt
- 11- The subsystems approach to genome annotation, metabolic reconstruction, and comparative genomics. November 19 2011. The 2011 International Symposium on Infectious Disease and Signal Transduction. Tainan, Taiwan
- 12- PharmacoMicrobiomics: On Drugs and Bugs. November 17 2011. National Central University, Taoyuan, Taiwan
- 13- On hosts, pathogens, and pathogens' pathogens. June 14 2011. National Cheng Kung University, Tainan, Taiwan
- 14- PLoS and the revolution in scholarly communication. June 13 2011. National Central University, Taoyuan, Taiwan

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- 15- Open Access and the next revolution in scientific publishing. April 10 2010. TWAS/BioVision Alexandria NXT2010, Bibliotheca Alexandrina, Alexandria, Egypt
- 16- Genes Without Borders: Mobile Genetic Elements in Genomes and Metagenomes. November 13 2014. Graduate Seminar, Biology Department, the American University in Cairo, New Cairo, Egypt
- 17- The Human Microbiome Project and The Emerging Field of Pharmaco-Microbiomics. Sep 23 2014. Beni Sueif University Research Symposium, Beni Sueif, Egypt
- 18- "Speak so I may see you!" On communicating Science to the public. December 30 2013. 9th TWAS/ARO Meeting. Alexandria, Egypt
- 19- Genes without borders: A survey of mobile genetic elements in genomes and metagenomes. March 18 2011. Computational Science Research Center, San Diego State University, San Diego, CA, USA
- 20- A Brief Introduction to Proteomics. March 01 2007. The German Egyptian network of young scientists (GENYS) biotechnology colloquium at the Agricultural Genetic Engineering Research Institute (AGERI), Giza, Egypt
- 21- Bioinformatics and Its Applications in Microbiology, Biomedical, and Pharmaceutical Sciences. December 2006. The 30th Conference of Pharmaceutical Sciences, Cairo, Egypt.

Oral Presentations:

- 1- PharmacoMicrobiomics: A Database for Drug-Microbiome Interactions or Pharmacogenomics of the Human Supraorganism. The 10th Annual Rocky Mountain Bioinformatics Conference. Snowmass, CO, USA. Dec. 2012
- 2- Genes Without Borders: Mobile DNA in metagenomes. UT-ORNL-KBRIN 10th Bioinformatics Summit, Memphis, TN. Apr. 2011
- 3- PhiRAST: A Pipeline for Rapid Annotation of Phage Genomes Using Subsystems Technology. The 8th Annual Rocky Mountain Bioinformatics Conference. Snowmass, CO, USA. Dec. 2010
- 4- The PhAnToMe Project. Phage Annotation Tools and Methods. RAST users workshop at the Argonne National Laboratory, IL. Aug. 2010
- 5- Subsystems-based servers for rapid annotation of genomes and metagenomes. UT-ORNL-KBRIN Bioinformatics Summit, Cadiz, KY. Mar. 2010
- 6- Can We Accurately Determine the Fittest Genes in Nature? The 7th Annual Rocky Mountain Bioinformatics Conference. Snowmass, CO, USA. Dec. 2009
- 7- Which is the most successful gene on Earth? San Diego Microbiology Group One Day Meeting. San Diego, CA, USA. May 2009
- 8- Use of NMPDR subsystems-based annotation and genome comparison tools for understanding Streptococcus pyogenes virulome. The 6th Annual Rocky Mountain Bioinformatics Conference. Snowmass, CO, USA. Dec. 2008.
- 9- Genomic and phenotypic characterization of in vivo-selected M1T1 S. pyogenes mutants reveal molecular and regulatory events underlying niche-adaptation. The XVII Lancefield International Symposium for Streptococci and Streptococcal Diseases, Porto Heli, Greece, June 2008.

Poster Presentations:

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- 1- The PharmacoMicrobiomics Portal: Towards a knowledge base for drug-microbiome interactions. Rizkalah MR, Saad R, Gamal S, Aziz RK. 24th TWAS General Meeting. Buenos Aires, Argentina. Oct. 2013
- 2- A model-guided workflow for prediction and validation of synthetic lethal gene pairs as antibiotic targets in pathogenic enterobacteria. Aziz RK et al. The 10th Annual Rocky Mountain Bioinformatics Conference. Snowmass, CO, USA. Dec. 2012
- 3- The PharmacoMicrobiomics Portal: A database for drug-microbiome interactions. Rizkalah MR, Saad R, Gamal S, Aziz RK. BioVision Alexandria 2012, Bibliotheca Alexandrina, Alexandria, Egypt. Apr. 2012
- 4- PharmacoMicrobiomics or How Bugs Modulate Drugs: An educational initiative to explore the effects of human microbiome on drugs. UT-ORNL-KBRIN 10th Bioinformatics Summit, Memphis, TN. Apr. 2011
- 5- Phage Eco-Locator: A web tool for visualization and analysis of phage genomes in metagenomic data sets. UT-ORNL-KBRIN 10th Bioinformatics Summit, Memphis, TN. Apr. 2011
- 6- Comparative Analysis of the Fractions of Secreted Proteins Encoded by Bacterial Genomes. The 8th Annual Rocky Mountain Bioinformatics Conference. Snowmass, CO, USA. Dec. 2010
- 7- Phages without borders: distribution of phage nucleic acids in 310 metagenomes. ASM 110th General Meeting, San Diego, CA, USA. May 2010
- 8- PhAnToMe (Phage Annotation Tools and Methods): A Platform for Phage Annotation and Comparative Genomics. ASM 110th General Meeting, San Diego, CA, USA. May 2010
- 9- Comparison of fractions of secreted proteins between pathogenic and non-pathogenic bacteria. ASM 110th General Meeting, San Diego, CA, USA. May 2010
- 10- Do pathogenic bacteria encode more secreted proteins than their non-pathogenic relatives? UT-ORNL-KBRIN Bioinformatics Summit, Cadiz, KY. Mar. 2010
- 11- In silico analysis of a family of extracellular polysaccharide deacetylases involved in virulence of pathogenic gram-positive cocci. UT-ORNL-KBRIN Bioinformatics Summit, Cadiz, KY. Mar. 2010
- 12- Integrating neighbor clustering, coexpression clustering and subsystems analysis to define dynamic changes in regulatory networks associated with group A streptococcal sociomicrobiology and niche adaptation. UT-ORNL-KBRIN Bioinformatics Summit, Cadiz, KY. Mar. 2010
- 13- PhAnToMe: PHage ANnotation TOols and METHods. The 7th Annual Rocky Mountain Bioinformatics Conference. Snowmass, CO, USA. Dec. 2009
- 14- PhAnToMe: PHage ANnotation TOols and METHods. The 18th Biennial Evergreen International Phage Biology Meeting. Evergreen, WA, USA. Aug. 2009
- 15- Reconstructing the virulome of the fish pathogen *Streptococcus iniae* by pyrosequencing, RAST annotation, and high-throughput virulence screens. ASM 109th General Meeting, Philadelphia, PA, USA. May 2009
- 16- Comparative analysis of predicted fractions of secreted proteins in ten microbial genera. ASM 109th General Meeting, Philadelphia, PA, USA. May 2009
- 17- Sociomicrobiology of sibling group A streptococcal phenotypic variants under host pressure. ASM 109th General Meeting, Philadelphia, PA, USA. May 2009
- 18- Computer-based determination of ETEC pathotype-specific genes as targets for molecular diagnosis and reverse vaccinology. The 6th Annual Rocky Mountain Bioinformatics Conference, Snowmass, CO, Dec. 2008.
- 19- Use of NMPDR subsystems-based annotation and genome comparison tools for understanding *Streptococcus pyogenes* virulome. The 6th Annual Rocky Mountain Bioinformatics Conference, Snowmass, CO, Dec. 2008.

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- 20- Bioinformatics determination of ETEC signature genes as potential targets for molecular diagnosis and reverse vaccinology. UT-ORNL-KBRIN Bioinformatics Summit, Fall Creeks Falls State Park, Pikeville, TN, Mar. 2008
- 21- Reconstructing the virulome of the human pathogen *Streptococcus pyogenes* using NMPDR subsystems-based annotation. UT-ORNL-KBRIN Bioinformatics Summit, Fall Creeks Falls State Park, Pikeville, TN, Mar. 2008
- 22- Role of *pdi*, a novel deacetylase homologue, in virulence of the aquatic pathogen *Streptococcus iniae*. The XVII Lancefield International Symposium for Streptococci and Streptococcal Diseases, Porto Heli, Greece, Jun. 2008.
- 23- Endemic Gastric Disorders Linked to Groundwater Contamination with *Helicobacter pylori* in an Egyptian Oasis. ASM 108th General Meeting, Boston, MA, USA, Jun. 2008
- 24- Phenotypic Microarrays and In Vivo Transcriptome Analysis Reveal Molecular and Regulatory Events Underlying Niche-Adaptation of M1T1 *S. pyogenes*. ASM 108th General Meeting, Boston, MA, USA, Jun. 2008
- 25- Bioinformatics Mapping of Genetic Loci Modulating Susceptibility to Severe Streptococcal Sepsis using a Reference Population of Recombinant Inbred Mice. ASM 107th General Meeting, Toronto, Canada, May 2007 {Co-author}
- 26- Core Genomes and Signature Genes that Define *Streptococcus pyogenes*. UT-ORNL-KBRIN Bioinformatics Summit, Paris Landing State Park, Buchanan, TN, Apr. 2007
- 27- Bioinformatics Mapping of Genetic Loci Modulating Susceptibility to Severe Streptococcal Sepsis using a Reference Population of Recombinant Inbred Mice. UT-ORNL-KBRIN Bioinformatics Summit, Paris Landing State Park, Buchanan, TN, Apr. 2007 {Co-author}
- 28- A Genetically Diverse Mouse Reference Population to Study the Mechanism of Susceptibility of Streptococcal Infections. Egyptian Conference for Genetic Engineering, Sharm El Sheikh, Egypt, Nov. 2006
- 29- Using the NMPDR and the SEED subsystems approach for comparative genomics and understanding streptococcal virulence. The First Annual Conference on Gram-Positive Pathogens, Omaha, Nebraska, Oct. 2006
- 30- Using a Genetically Diverse Mouse Reference Population to Map Novel Loci for Susceptibility to Invasive Streptococcal Infections. ASM Conference on Streptococcal Genetics, Saint Malo, France, Jun. 2006
- 31- Novel Bioinformatics Tools: Using The NMPDR and The SEED Subsystems Approach for Comparative Genomics and Understanding Streptococcal Virulence. ASM Conference on Streptococcal Genetics, Saint Malo, France, Jun. 2006
- 32- A Genetically Diverse Mouse Reference Population to Study the Mechanism of Susceptibility of Streptococcal Infections. ASM 106th General Meeting, Orlando, FL, May 2006
- 33- Molecular evolution and genomic characteristics of the virulent, globally disseminated M1T1 strain of *S. pyogenes*. The XVIth Lancefield International Symposium on Streptococci & Streptococcal Diseases. Sep. 2005.
- 34- Integrating genomics, proteomics, and bioinformatics reveals unique features of the clonal M1T1 *S. pyogenes*. The International Union of Microbiological Societies (IUMS) joint meeting, San Francisco, CA. Jul. 2005.
- 35- Mosaic phages with horizontally acquired genes account for the emergence and diversification of the global M1T1 *S. pyogenes* clone. ASM 105th General Meeting, Atlanta, GA, Jun. 2005



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- 36- Integration of proteomics, genomics, and bioinformatics tools to define unique features of the invasive M1T1 clone of *S. pyogenes*. The ASM conference for Functional Genomics and Bioinformatics, Portland, OR. Oct. 2004.
- 37- Proteomic and genomic identification of two novel bacteriophages encoding important virulence proteins in invasive M1T1 *S. pyogenes*. ASM 104th General Meeting, New Orleans, LA, May 2004
- 38- Post-proteomic analysis of *S. pyogenes* culture supernatants identifies a novel phage-encoded streptodornase. 43rd ICAAC meeting, Chicago, IL. Sep. 2003
- 39- Comparative proteomic analysis of immunogenic proteins secreted by isogenic *Streptococcus pyogenes* phase variants before and after in vivo passage. Ramy Aziz, Nagla ElGengihi, Rita Kansal, Malak Kotb, Victor Nizet, Michael Pabst. ASM 103rd General Meeting, Washington, D.C., May 2003
- 40- Proteomic analysis of streptococcal secreted proteins expressed in vivo by isogenic strains of *S. pyogenes* with different superantigen expression profiles. Ramy Aziz, Robert Hettich, Rita Kansal, Malak Kotb, Michael Pabst ASM 102nd General Meeting, Salt Lake City, UT, May 2002