

BIOGRAPHICAL SKETCH

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NAME Saleem A. Khan	POSITION TITLE Professor		
eRA COMMONS USER NAME sakhan			
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
A. M. University, Aligarh, India	M. Sc	1970	Biochemistry
Indian Institute of Science, Bangalore, India	Ph.D	1976	Biochemistry
New York University School of Medicine, NY	Postdoctoral	1975-1977	Molecular Biology
Public Health Research Institute, New York	Postdoctoral	1977-1982	Molecular Biology

A. Positions and Honors

Positions and Employment

1980-1982 Associate Scientist, Public Health Research Institute, New York
1982-present Assistant Professor (1982-1987), Associate Professor (1987-1993) and Professor (1993), Department of Molecular Genetics and Biochemistry, University of Pittsburgh School of Medicine
1986-1987 Visiting Assistant Professor, Department of Molecular Biology and Genetics, The Johns Hopkins University School of Medicine, Baltimore (Laboratory of Dr. Thomas J. Kelly, Jr.)
1990-present Member, University of Pittsburgh Cancer Institute
2007-present Affiliate Member, Center for Vaccine Research, University of Pittsburgh

Other Experience and Professional Memberships

1982-present Member, American Association for the Advancement of Science
1982-present Member, American Society for Microbiology
1986-present Member, American Society for Biochemistry and Molecular Biology
1987-1991 Member of NIH Biomedical Sciences Study Section
1993-1997 Member of NIH Microbial Physiology and Genetics Study section
2005-2008 Ad Hoc Member of NIH Topics in Bacterial Pathogenesis Study Section
2009 Ad Hoc Member of NIH Special Emphasis Panel, ZRG1 IDM-H 02
1993-present Editor, Plasmid
1998-present Member, Editorial Board, Journal of Bacteriology
2002 Organizer, International Symposium on Plasmid Biology, Pittsburgh, PA
2004-2006 Secretary-Elect, International Society for Plasmid Biology
2006-2008 Secretary, International Society for Plasmid Biology

Honors

1987-1992 NIH Research Career Development Award
2005-2006 Hillman Fellow in Innovative Cancer Research

B. Selected Publications (selected from 80 peer-reviewed publications)

1. Ranelli, D. M., Jones, C. L., Johns, M. B., Mussey, G. J. and Khan, S. A. Molecular cloning of staphylococcal enterotoxin B gene in *Escherichia coli* and *Staphylococcus aureus*. Proc. Natl. Acad. Sci. USA **82**, 5850-5854 (1985).
2. Koepsel, R. R., Murray, R. W., Rosenblum, W. D. and Khan, S. A. The replication initiator protein of plasmid pT181 has sequence-specific endonuclease and topoisomerase-like activities. Proc. Natl. Acad. Sci. USA **82**, 6845-6849 (1985).

3. Koepsel, R. R., Murray, R. W. and Khan, S. A. Sequence-specific interaction between the replication initiator protein of plasmid pT181 and its origin of replication. *Proc. Natl. Acad. Sci. USA* **83**, 5484-5488 (1986).
4. Koepsel, R. R. and Khan, S. A. Static and initiator protein enhanced bending of DNA at a replication origin. *Science* **233**, 1316-1318 (1986).
5. Murray, R. W., Koepsel, R. R. and Khan, S. A. Synthesis of single-stranded plasmid pT181 DNA in vitro: Initiation and termination of DNA replication. *J. Biol. Chem.* **264**, 1051-1057 (1989).
6. Zock, J. M., Birch, P. and Khan, S. A. Specificity of RepC protein in plasmid pT181 DNA replication. *J. Biol. Chem.* **265**, 3484-3488 (1990).
7. Mahmood, R. and Khan, S. A. Role of upstream sequences in the expression of the staphylococcal enterotoxin B gene. *J. Biol. Chem.* **265**, 4652-4656 (1990).
8. Birch, P. and Khan, S. A. Replication of single-stranded plasmid pT181 DNA in vitro. *Proc. Natl. Acad. Sci. USA* **89**, 290-294 (1992).
9. Dempsey, L. A., Birch, P. and Khan, S. A. Uncoupling of the DNA topoisomerase and replication activities of an initiator protein. *Proc. Natl. Acad. Sci. USA* **89**, 3083-3087 (1992).
10. Dempsey, L. A., Birch, P. and Khan, S. A. Six amino acids determine the sequence-specific DNA binding and replication specificity of the initiator proteins of the pT181 family. *J. Biol. Chem.* **267**, 24538-24543 (1992).
11. Sverdrup, F. and Khan, S. A. Replication of human papillomavirus DNAs supported by the HPV-18 E1 and E2 proteins. *J. Virol.* **68**, 505-509 (1994).
12. Gopalakrishnan, V. and Khan, S. A. E1 protein of human papillomavirus type 1a is sufficient for initiation of viral DNA replication. *Proc. Natl. Acad. Sci. USA* **91**, 9597-9601 (1994).
13. Dempsey, L. A., Zhao, A. C. and Khan, S. A. Localization of the start sites of lagging strand replication of plasmids from Gram-positive bacteria. *Mol. Microbiol.* **15**, 679-687 (1995).
14. Kramer, M. G., Khan, S. A. and Espinosa, M. Plasmid rolling-circle replication: identification of the RNA-polymerase directed primer RNA and requirement of DNA polymerase I for lagging strand synthesis. *EMBO J.* **16**, 5784-5795 (1997).
15. Khan, S. A. Rolling-circle replication of bacterial plasmids. *Microbiol. and Mol. Biol. Rev.* **61**, 442-455 (1997).
16. Zhao, A. C. and Khan, S. A. Sequence requirements for the termination of rolling-circle replication of plasmid pT181. *Mol. Microbiol.* **24**, 535-544 (1997).
17. Kramer, M. G., Espinosa, M., Misra, T. K. and Khan, S. A. Lagging strand replication of rolling-circle plasmids: specific recognition of the *ssoA*-type origins in different gram-positive bacteria. *Proc. Natl. Acad. Sci. USA* **95**, 10505-10510 (1998).
18. Kramer, M. G., Espinosa, M., Misra, T. K. and Khan, S. A. Characterization of a single-strand origin, *ssoU*, required for broad host range replication of rolling-circle plasmids. *Mol. Microbiol.* **33**, 466-475 (1999).
19. Khan, S. A., Sheikh, S., Sheahan, L., Van Horn, G., and Sverdrup, F. Expression of E1 protein of human papillomaviruses in eukaryotic cells. *Methods Enzymol.* **306**, 328-336 (1999).
20. Kramer, M. G., Espinosa, M., Misra, T. K. and Khan, S. A. Characterization of a single-strand origin, *ssoU*, required for broad host range replication of rolling-circle plasmids. *Mol. Microbiol.* **33**, 466-475 (1999).
21. Chang, T.-L., Kramer, G., Ansari, R. A. and Khan, S. A. Role of individual monomers of a dimeric initiator protein in the initiation and termination of plasmid rolling circle replication. *J. Biol. Chem.* **275**, 13529-13534 (2000).
22. Khan, S. A. Plasmid rolling-circle replication: recent developments. *Mol. Microbiol.* **37**, 477-484 (2000).
23. Van Horn, G., Sheikh, S. and Khan, S. A. Regulation of human papillomavirus type 1 replication by the viral E2 protein. *Virology* **287**, 214-224 (2001).
24. Chang, T.-L., Naqvi, A., Anand, S. P., Kramer, G., Munshi, R. and Khan, S. A. Biochemical characterization of the *Staphylococcus aureus* PcrA helicase and its role in plasmid rolling-circle replication. *J. Biol. Chem.* **277**, 45880-45886 (2002).
25. Sheikh, S., Van Horn, G., Naqvi, A., Sheahan, L. and Khan, S. A. Purification and biochemical characterization of the E1 replication initiation protein of the cutaneous human papillomavirus type 1. *J. Gen. Virol.* **84**, 277-285 (2003).

26. Naqvi, A, Tinsley, E and Khan, S. A. Purification and characterization of the PcrA helicase of *Bacillus anthracis*. *J. Bacteriol.* **185**, 6633-6639 (2003).
27. Anand, S. P., Mitra, P., Naqvi, A. and Khan, S. A. *Bacillus anthracis* and *Bacillus cereus* PcrA helicases can support DNA unwinding and in vitro rolling-circle replication of plasmid pT181 of *Staphylococcus aureus*. *J. Bacteriol.* **186**, 2195-2199 (2004).
28. Tinsley, E., Naqvi, A, Bourgogne, A., Koehler, T. M. and Khan, S. A. Isolation of a minireplicon of the virulence plasmid pXO2 of *Bacillus anthracis* and characterization of the plasmid-encoded RepS replication protein. *J. Bacteriol.* **186**, 2717-2723 (2004).
29. Anand, S. P. and Khan, S. A. Structure-specific DNA binding and bipolar helicase activities of PcrA. *Nucleic Acids Res.* **32**, 3190-3197 (2004).
30. Anand, S. P., Chattopadhyay, A. and Khan, S. A. The PcrA3 mutant binds DNA and interacts with the RepC initiator protein but is defective in its DNA helicase and unwinding activities. *Plasmid* **54**, 104-113 (2005).
31. Ferris, R. L., Martinez, I., Sirianni, N., Wang, J., Lopez-Albaitero, A., Gollin, S., Johnson, J. T. and Khan, S. A. Human papillomavirus-16 associated squamous cell carcinoma of the head and neck (HNSCC): a natural disease model provides insights into viral carcinogenesis. *Eur. J. Cancer* **41**, 807-815 (2005).
32. Carson, A., Wang, Z., Xiao, X. and Khan, S. A. A DNA recombination based approach to eliminate papillomavirus infection. *Gene Therapy* **12**, 534-540 (2005).
33. Chattopadhyay, A., Schmidt, M. C. and Khan, S. A. Identification of a 450-bp region of human papillomavirus type 1 that promotes episomal replication in *Saccharomyces cerevisiae*. *Virology* **340**, 133-142 (2005).
34. Tinsley, E. and Khan, S. A. A novel FtsZ-like protein is involved in the replication of the anthrax toxin-encoding pXO1 plasmid in *Bacillus anthracis*. *J. Bacteriol.* **188**, 2829-2835 (2006).
35. Ruiz-Maso, J. A., Anand, S. P., Espinosa, M., Khan, S. A. and del Solar, G. Genetic and biochemical characterization of the *Streptococcus pneumoniae* PcrA helicase and its role in plasmid rolling circle replication. *J. Bacteriol.* **188**, 7416-7425 (2006).
36. Carson, A. and Khan, S. A. Characterization of transcription factor binding to human papillomavirus type 16 DNA during cellular differentiation. *J. Virol.* **80**, 4356-4362 (2006).
37. Martinez, I., Wang, J., Hobson, K. F., Ferris, R. L. and Khan, S. A. Identification of differentially expressed genes in HPV-positive and HPV-negative squamous cell carcinomas of the head and neck. *European J. Cancer* **43**, 415-432 (2007).
38. Anand, S. P., Zheng, H., Bianco, P. R., Leuba, S. H. and Khan, S. A. DNA helicase activity of PcrA is not required for the displacement of RecA from DNA and inhibition of RecA-mediated strand exchange. *J. Bacteriol.* **189**, 4502-4509 (2007).
39. McEllistrem, M. C., Ransford, J. V. and Khan, S. A. Characterization of in vitro biofilm-associated pneumococcal phase variants of a clinically-relevant serotype 3 clone. *J. Clin. Microbiol.* **45**, 97-101 (2007).
40. Tinsley, E. and Khan, S. A. An in vitro system from *Bacillus anthracis* supports replication of plasmid pXO2 as well as rolling-circle-replicating plasmids. *Appl. Environ. Microbiol.* **73**, 5005-5010 (2007).
41. Anand, S. P., Akhtar, P., Tinsley, E, Watkins, S. C. and Khan, S. A. GTP-dependent polymerization of the tubulin-like RepX replication protein encoded by the pXO1 plasmid of *Bacillus anthracis*. *Mol. Microbiol.* **67**, 881-890 (2008).
42. Martinez, I., Gardiner, A. S., Board, K. F., Monzon, F. A., Edwards, R. P. and Khan, S. A. Human papillomavirus type 16 reduces the expression of microRNA-218 in cervical carcinoma cells. *Oncogene* **27**, 2575-2582 (2008).
43. Leuba, S. H., Anand, S. P., Harp, J. M. and Khan, S. A. Expedient placement of two fluorescent dyes for investigating dynamic DNA protein interactions in real time. *Chromosome Res.* **16**, 451-467 (2008).
44. McEllistrem, M. C., Scott, J. R., Zuniga-Castillo, J. and Khan, S. A. Marked increase in biofilm-derived rough pneumococcal variants and rifampin resistant strains not due to Hex gene mutations. *Microbial Drug Resist.* (2009, in press).
45. Akhtar, P., Anand, S. P., Watkins, S. C. and Khan, S. A. The tubulin-like RepX protein encoded by the pXO1 plasmid forms polymers in vivo in *Bacillus anthracis*. *J. Bacteriol.* (2009, in press).

C. Research Support

Ongoing Research Support

1R01 DE016406-05 Khan (PI) 02/01/05-01/31/10
NIH/NIDCR
Genomic and Proteomic Analysis of HPV-Associated SCCHN
Role: PI

The long-term goals of this research are to get a better understanding of the relationship between oncogenic human papillomaviruses and carcinogenesis by comparing the gene expression and proteomic profiles of HPV-infected tumors with HPV-negative squamous cell carcinoma of the head and neck.

2R01 GM31685-25 Khan (PI) 07/01/82-06/30/09
NIH/NIGMS
Plasmid pT181 Replication and PcrA Helicase of *S. aureus*
Role: PI

The overall objectives of this research are to study the mechanism of rolling-circle replication of plasmid pT181 of *S. aureus*, including the role of the cellular PcrA helicase in its plasmid replication.

1R13 AI080033-01 Khan (PI) 07/01/08 – 06/30/09
Plasmid Biology 2008 Symposium

The objective of this project is to support partial expenses of American scientists to attend the International Plasmid Biology Conference in Gdansk, Poland in September 2008.

1R01 GM77872-03 Leuba (PI) 05/01/06-04/30/11
NIH/NIGMS
Development of novel single-molecule approaches for nanoscale study of helicases
Role: Co-PI

The overall objectives of this research are to develop novel uses and novel configurations of single-pair fluorescence resonance energy transfer (spFRET) and magnetic tweezers (MT). We will develop these single-molecule approaches and use them to study the PcrA helicase to answer important questions concerning its DNA binding, translocation and unwinding activities.