

POSTDOCTORAL RESEARCH FELLOW

DNA Repair, Structural Biology & Nanobody Engineering

Prakash Laboratory

Department of Biochemistry & Molecular Biology

Frederick P. Whiddon College of Medicine | Mitchell Cancer Institute

University of South Alabama

POSITION OVERVIEW

The Prakash Laboratory invites applications for a Postdoctoral Research Fellow to join an active, extramurally funded research program focused on DNA repair biochemistry, structural biology, and translational nanobody engineering. The successful candidate will work across multiple funded projects that collectively span base excision repair (BER), mismatch repair (MMR), mitochondrial DNA maintenance, gene-environment interactions, and protein engineering. This is an opportunity to train broadly while building a competitive independent research profile.

RESEARCH ENVIRONMENT

The lab investigates how cells recognize and repair DNA damage, with an emphasis on the structure and function of repair enzymes and the consequences of their dysregulation in cancer and environmental disease. Current areas of investigation include:

- Structure–function studies of BER glycosylases and MMR proteins, using X-ray crystallography, enzymology, and biophysical approaches
- Engineering and characterization of inhibitory nanobodies targeting DNA repair enzymes, with applications in synthetic-lethal cancer therapy
- Functional classification of mismatch repair gene variants of uncertain significance through deep mutational scanning and cell-based assays
- Gene-environment studies examining how environmental genotoxins compromise repair pathways and contribute to cancer susceptibility
- Engineered strategies to enhance mitochondrial DNA repair capacity through artificial targeting of nuclear repair enzymes

The lab maintains in-house X-ray crystallography capabilities and is supported by active federal and extramural funding from multiple agencies.

RESPONSIBILITIES

- Protein expression, purification, and biophysical characterization of DNA repair enzymes and engineered nanobodies
- X-ray crystallography - from crystal screening through data collection, structure determination, and refinement
- Enzyme kinetics and DNA substrate-based activity assays
- Mammalian cell culture, lentiviral transduction, and cell-based functional assays
- Deep mutational scanning library construction, pooled selection, and sequencing data analysis
- Mitochondrial fractionation, import assays, and mtDNA damage quantification
- Manuscript preparation, grant writing, and mentoring of graduate and undergraduate trainees
- Presentation of research at national and international conferences

REQUIRED QUALIFICATIONS

- Ph.D. in biochemistry, molecular biology, structural biology, biophysics, or a closely related discipline
- Demonstrated productivity with first-author publications in peer-reviewed journals
- Hands-on experience with recombinant protein biochemistry (cloning, expression, purification)
- Strong foundation in DNA repair mechanisms and/or genome maintenance pathways
- Ability to work independently, manage multiple concurrent projects, and communicate results clearly

PREFERRED QUALIFICATIONS

- Experience with X-ray crystallography or other structural methods (cryo-EM, SAXS)
- Familiarity with nanobody or single-domain antibody engineering
- Background in mismatch repair, base excision repair, or Fanconi anemia biology
- Experience with deep mutational scanning, functional genomics, or next-generation sequencing
- Interest in translational research and clinical applications of basic science findings

WHAT WE OFFER

- A collaborative, well-funded lab with multiple active extramural grants
- Access to in-house X-ray crystallography
- Breadth of training across structural biology, cancer biology, chemical biology, and functional genomics
- Mentorship toward independent funding (K99/R00, individual fellowships) and faculty positions
- Proximity to the Mitchell Cancer Institute and its translational research infrastructure
- Competitive salary and benefits commensurate with NIH/institutional guidelines

TO APPLY

Interested candidates should submit the following materials to Dr. Aishwarya Prakash (aprakash@southalabama.edu):

- Cover letter describing research experience, career goals, and interest in the position
- Curriculum vitae with complete publication list
- Contact information for three references

Review of applications will begin immediately and continue until the position is filled. The anticipated start date is flexible.

The University of South Alabama is an equal opportunity/equal access employer.