

# Sibel Kalyoncu-Uzunlar

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## EDUCATION

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2011-2016 **PhD**, School of Chemistry & Biochemistry, Georgia Institute of Technology, Atlanta, GA, USA

2008-2010 **MSc**, Department of Chemical and Biological Engineering, Koc University, Istanbul, Turkey

2003-2008 **BSc**, Department of Chemistry (2<sup>nd</sup> Major), Bogazici University, Istanbul, Turkey

2003-2008 **BSc**, Department of Molecular Biology & Genetics, Bogazici University, Istanbul, Turkey

## ACADEMIC CAREER

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### Research Group Leader

2018-present, Izmir Biomedicine and Genome Center (IBG), Izmir, Turkey

- Discovery and directed evolution of antibodies targeting cancer biomarkers for therapeutic and diagnostic approaches
- Antibody engineering approaches to develop biobetter antibody fragments
- Development of therapeutic antibody fragment-protein fusions

### Postdoctoral Research Associate

2016-2017, Center for Biotechnology and Interdisciplinary Studies, Rensselaer Polytechnic Institute, Troy, NY, USA

Advisor: Prof. Peter M. Tessier

- Designed and evolved antibody fragments specific to amyloid aggregates for diagnostic applications (sponsored by Novo Nordisk A/S)
- Antibody libraries are generated based on directed evolution methods, and yeast surface display technology is used to screen these antibody libraries for desired conformational specificity and binding affinity

### Research Assistantships

2011-2016, School of Chemistry & Biochemistry, Georgia Institute of Technology, Atlanta, GA, USA

Advisor: Prof. Raquel L. Lieberman

Ph.D. Thesis: Structural and Functional Characterization of an Intramembrane Peptidase and a Non-peptidase Homologue

- Cloned, expressed, purified, and crystallized antibody fragments, membrane proteins and novel enzymes
- Determined structures of various engineered single chain antibody fragments (scFvs) as a toolbox for membrane protein co-crystallization
- Discovered a novel enzymatic mechanism based on determined structures of a non-peptidase homologue enzyme, 5-nitroantranilic acid aminohydrolase (5NAA-A), in various functional states
- Developed enzyme assays for 5NAA-A and analyzed 5NAA-A kinetics/mechanism/binding interactions/structure/function
- Designed new biophysical assays to investigate substrate gating mechanism of Signal Peptide Peptidase (SPP) through a structure-function study

2008-2010, Department of Chemical and Biological Engineering, Koc University, Istanbul, Turkey

Advisors: Prof. Ozlem Keskin and Prof. Attila Gursoy

M.Sc. Thesis: Interaction prediction and classification of PDZ domains

- Constructed feature vectors for protein domains and peptides and optimized parameters for various machine learning tools
- Designed peptide libraries for protein domain interactions and virtual screening

## JOURNAL ARTICLES

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Stimple SD, Kalyoncu S, Desai AA, Mogensen JE, Spang, LT, Asgreen, DJ, Staby A, Tessier PM. (2019) Sensitive detection of glucagon aggregation using amyloid fibril-specific antibodies. *Biotechnology and Bioengineering*. doi: 10.1002/bit.26994.

Kaleli NE, Karadag M, Kalyoncu S. (2019) Phage display derived therapeutic antibodies have enriched aliphatic content: Insights for developability issues. *Proteins: Structure, Function, and Bioinformatics*. doi.org/10.1002/prot.25685.

Arslan M, Karadag D, Kalyoncu S. (2019) Protein engineering approaches for antibody fragments: directed evolution and rational design approaches. *Turkish Journal of Biology*. 43(1):1-12.

Naing, S.H., Kalyoncu, S., Smalley, D.M., Kim, H., Tao, X., George, J.B., Jonke, A., Oliver R.C., Urban, V.S., Torres, M.P., Lieberman, R.L. (2018) Both positional and chemical variables control *in vitro* proteolytic cleavage of a presenilin ortholog, *Journal of Biological Chemistry*, 293(13): 4653–4663.

Kalyoncu, S., Heaner, D.P., Kurt, Z., Bethel, C.M., Ukachukwu, C.U., Chakravarthy S., Spain, J.C., Lieberman, R.L. (2016) Enzymatic hydrolysis by transition-metal-dependent nucleophilic aromatic substitution, *Nature Chemical Biology*, 12, 1031–1036. **\*Georgia Tech Sigma Xi 2017 Best Paper Award**

Naing, S.H., Vukoti, K.M., Drury, J.E., Johnson, J.L. Kalyoncu, S., Hill, S.E., Torres, M.P., Lieberman, R.L. (2015) Catalytic properties of substrate hydrolysis by an intramembrane aspartyl protease evaluated using a FRET peptide cleavage assay, *ACS Chemical Biology*, 10(9), 2166-74.

Johnson, J.L., Entzminger, K., Hyun, J., Kalyoncu, S., Heaner, D.P., Morales, I.A., Sheppard, A., Gumbart, J.C., Maynard, J.A., Lieberman, R.L. (2015) Structural and biophysical characterization of epitope-specific engineered Fab fragment and complexation with membrane proteins: implications for co-crystallization, *Acta Crystallogr D Biol Crystallogr.*, 71(Pt 4).

Kalyoncu, S., Hyun, J., Pai, J.C., Johnson, J.L., Entzminger, K., Jain, A., Heaner, D.P., Morales, I.A., Truskett, T.M., Maynard, J.A., Lieberman, R.L. (2014) Effects of protein engineering and rational mutagenesis on crystal lattice of single chain antibody fragments, *Proteins: Structure, Function, and Bioinformatics*, 82(9).

Kalyoncu, S., Keskin, O., Gursoy, A. (2010) Interaction prediction and classification of PDZ domains, *BMC Bioinformatics*, 11(357).

## BOOK CHAPTERS

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Johnson, J.L., Kalyoncu, S., Lieberman, R.L. (2016) Lessons from an  $\alpha$ -helical membrane enzyme: expression, purification, and detergent optimization for biophysical and structural characterization. *Methods in Molecular Biology*, 1432:281-301.