Stanford

Paul A. Khavari, MD, PhD

Carl J. Herzog Professor of Dermatology in the School of Medicine

CLINICAL OFFICES

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- **Dermatology Clinic**
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- **VA Palo Alto Health Care System**
  3801 Miranda Ave
  Palo Alto, CA 94304
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ACADEMIC CONTACT INFORMATION

- **Alternate Contact**
  Michela Pilo - Executive Assistant
  Email mpilo@stanford.edu

Bio

BIO

Dr. Khavari only sees U.S. veteran patients at the VA Palo Alto Healthcare System

CLINICAL FOCUS

- Cancer > Cutaneous (Dermatologic) Oncology
- Dermatology
- General Dermatology

ACADEMIC APPOINTMENTS

- Professor, Dermatology
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)
- Faculty Fellow, Sarafan ChEM-H
- Member, Stanford Cancer Institute

ADMINISTRATIVE APPOINTMENTS

- Chair Department of Dermatology, Stanford University School of Medicine, (2010- present)
- Co-Director, Stanford Program in Epithelial Biology, (1999- present)

PROFESSIONAL EDUCATION

- Medical Education: Yale School Of Medicine (1988) CT
- Fellowship: Stanford University School of Medicine (1994) CA
- Residency: Stanford University School of Medicine (1991) CA
- Board Certification: Dermatology, American Board of Dermatology (1992)
- Internship: Yale-New Haven Hospital (1989) CT
- Residency: Yale - New Haven Hospital (1990) CT

LINKS

- Khavari Lab: http://khavarilab.stanford.edu/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Our experimental focus is on the mammalian setting using multiomics, informatics, mouse genetics, human genetics, single cell studies, and new human tissue platforms. The latter encompass human skin regenerated on immune deficient mice as well as organotypic constructs with epithelial and stromal cells embedded within architecturally faithful mesenchyma in vitro. These new models, which we term Multi-Functional Human Tissue Genetics, allow up to 10 alleles or more to be altered simultaneously, permitting genetic experiments with an unprecedented degree of rapidity and complexity.

Stem cell biology and differentiation

In stratified epithelia proliferative basal cells adherent to the underlying basement membrane undergo cell cycle arrest then outward migration and terminal differentiation. This process is mediated by 2 mutually exclusive programs of gene expression: 1) an undifferentiated program supporting proliferation by stem cells within the basal layer and 2) a differentiation program instructing growth arrest and differentiation-associated programmed cell death in suprabasal layers. The control of this transition from epithelial stem cell to differentiated corneocyte, which is abnormal in epidermal cancers, is not well understood. We are currently pursuing studies of the dominant signaling and gene regulatory networks that control this process, including the Ras/MAPK cascade, which is required for stem cell-mediated self-renewal and the p53 transcription factor family member, p63, which is required for epidermal differentiation.

Epigenetic regulation by histone modifying proteins and noncoding RNA

In addition to classical gene regulatory networks noted above, we have recently identified a central role for additional biologic mechanisms, namely gene regulation by chromatin regulators and by noncoding RNAs. Epigenetic control of gene expression lasts through multiple cell divisions without alterations in primary DNA sequence and can occur via mechanisms that include histone modification and DNA methylation. Noncoding RNA sequences can regulate gene expression via interactions with epigenetic and other control mechanisms. The function of histone modifying epigenetic regulators and noncoding RNA as central mediators of epithelial stem cell renewal and differentiation represent major emerging areas of study in the lab.

Cancer

Skin malignancies, including epidermal squamous cell carcinoma (SCC), alone account for nearly as many cancers as all other tissues combined. Progress in understanding epithelial carcinogenesis has been hindered in the past by a lack of models that faithfully recapitulate the 3-dimensional architecture of tumor-stroma co-evolution. To address this and to also study the oncogenic potential of unregulated function of dominant regulators of epithelial homeostasis noted above, we developed Multi-Functional Human Tissue Genetics noted above which, when combined with skin tissue regeneration on immune deficient mice, has permitted the molecular reconstruction of events sufficient to trigger human cancer. These models are being used to systematically elucidate proteins required for cutaneous carcinogenesis and to test their potential role as therapeutic targets.

Molecular Therapeutics

Epithelial tissues in general and skin in particular offer an attractive site for development of new approaches in molecular therapeutics. A family of human genetic skin diseases is characterized by defective epithelial gene expression. Among the most severe of these are subtypes of epidermolysis bullosa (EB) and lamellar ichthyosis (LI). We have developed approaches for high efficiency gene transfer to EB and LI patient skin tissue that are corrective at biochemical, histologic, clinical and functional levels. In addition to EB subtypes and LI, similar corrective efforts have also been undertaken with a number of other genetic skin disorders.

CLINICAL TRIALS

- Characteristics of Patients With Recessive Dystrophic Epidermolysis Bullosa, Recruiting
- Analysis of Cutaneous and Hematologic Disorders by High-Throughput Nucleic Acid Sequencing, Not Recruiting
- Characteristics of Adult Patients With Recessive Dystrophic Epidermolysis Bullosa, Not Recruiting
- Gene Transfer for Recessive Dystrophic Epidermolysis Bullosa, Not Recruiting
- Pilot Trial to Evaluate the Effect of Vitamin D on Melanocyte Biomarkers, Not Recruiting

Teaching

COURSES

2019-20

- Cellular and Clinical Aspects of Cancer: CBIO 242 (Spr)

2018-19

- Cellular and Clinical Aspects of Cancer: CBIO 242 (Spr)

STANFORD ADVISEES

Med Scholar Project Advisor

Omar Garcia

Doctoral Dissertation Reader (AC)

Emily Ashkin, Noah Lee, Yuanhao Qu

Postdoctoral Faculty Sponsor

Luca Ducoli, Audrey Hong, Weili Miao

Doctoral Dissertation Advisor (AC)

Ian Ferguson, Margaret Guo, Laura Kellman, Gyu Kim, Lindsey Meservey, Robin Meyers, Ron Shanderson, Xue Yang

Postdoctoral Research Mentor

Luca Ducoli, Audrey Hong, Weili Miao

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Cancer Biology (Phd Program)
- Dermatology (Fellowship Program)
- Molecular and Genetic Medicine (Fellowship Program)

Publications

PUBLICATIONS

- **The dynamic, combinatorial cis-regulatory lexicon of epidermal differentiation.** *Nature genetics*
  Kim, D. S., Risca, V. I., Reynolds, D. L., Chappell, J., Rubin, A. J., Jung, N., Donohue, L. K., Lopez-Pajares, V., Kathiria, A., Shi, M., Zhao, Z., Deep, H., Sharmin, et al
  2021

- **Multimodal Analysis of Composition and Spatial Architecture in Human Squamous Cell Carcinoma.** *Cell*
  Ji, A. L., Rubin, A. J., Thrane, K., Jiang, S., Reynolds, D. L., Meyers, R. M., Guo, M. G., George, B. M., Mollbrink, A., Bergenstråhle, J., Larsson, L., Bai, Y., Zhu, et al
  2020; 182 (6): 1661-1662

- **Methods to study RNA-protein interactions.** *Nature methods*
  Ramanathan, M., Porter, D. F., Khavari, P. A.
  2019; 16 (3): 225–34

- **The Functional Proximal Proteome of Oncogenic Ras Includes mTORC2.** *Molecular cell*
  Kovalski, J. R., Bhaduri, A., Zehnder, A. M., Neela, P. H., Che, Y., Wozniak, G. G., Khavari, P. A.
  2019

- **Coupled Single-Cell CRISPR Screening and Epigenomic Profiling Reveals Causal Gene Regulatory Networks.** *Cell*
  Rubin, A. J., Parker, K. R., Satpathy, A. T., Qi, Y., Wu, B., Ong, A. J., Mumbach, M. R., Ji, A. L., Kim, D. S., Cho, S. W., Zarnegar, B. J., Greenleaf, W. J., Chang, et al
  2018

- **RNA-protein interaction detection in living cells.** *Nature methods*
  Ramanathan, M. n., Majzoub, K. n., Rao, D. S., Neela, P. H., Zarnegar, B. J., Mondal, S. n., Roth, J. G., Gai, H. n., Kovalski, J. R., Siprashvili, Z. n., Palmer, T. D., Carette, J. E., Khavari, et al
  2018

- **Lineage-specific dynamic and pre-established enhancer-promoter contacts cooperate in terminal differentiation.** *Nature genetics*
  Rubin, A. J., Barajas, B. C., Furlan-Magaril, M. n., Lopez-Pajares, V. n., Mumbach, M. R., Howard, I. n., Kim, D. S., Boxer, L. D., Cairns, J. n., Spivakov, M. n., Wingett, S. W., Shi, M. n., Zhao, et al
  2017; 49 (10): 1522–28

- **CSNK1a1 Regulates PRMT1 to Maintain the Progenitor State in Self-Renewing Somatic Tissue.** *Developmental cell*
  Bao, X. n., Siprashvili, Z. n., Zarnegar, B. J., Shenoy, R. M., Rios, E. J., Nady, N. n., Qu, K. n., Mah, A. n., Webster, D. E., Rubin, A. J., Wozniak, G. G., Tao, S. n., Wysocka, et al
  2017; 43 (2): 227–39.e5

- **irCLIP platform for efficient characterization of protein-RNA interactions** *NATURE METHODS*
  Zarnegar, B. J., Flynn, R. A., Shen, Y., Do, B. T., Chang, H. Y., Khavari, P. A.
  2016; 13 (6): 489-?

- **The noncoding RNAs SNORD50A and SNORD50B bind K-Ras and are recurrently deleted in human cancer.** *Nature genetics*
  Siprashvili, Z., Webster, D. E., Johnston, D., Shenoy, R. M., Ungewickell, A. J., Bhaduri, A., Flockhart, R., Zarnegar, B. J., Che, Y., Meschi, F., Puglisi, J. D., Khavari, P. A.
  2016; 48 (1): 53-58

- **Genomic analysis of mycosis fungoides and Sézary syndrome identifies recurrent alterations in TNFR2.** *Nature genetics*
  Ungewickell, A., Bhaduri, A., Rios, E., Reuter, J., Lee, C. S., Mah, A., Zehnder, A., Ohgami, R., Kulkarni, S., Armstrong, R., Weng, W., Gratzinger, D., Tavallaee, et al

2015; 47 (9): 1056-1060

- **Advances in skin grafting and treatment of cutaneous wounds** *SCIENCE*
  Sun, B. K., Siprashvili, Z., Khavari, P. A.
  2014; 346 (6212): 941-945

- **Recurrent point mutations in the kinetochore gene KNSTRN in cutaneous squamous cell carcinoma** *NATURE GENETICS*
  Lee, C. S., Bhaduri, A., Mah, A., Johnson, W. L., Ungewickell, A., Aros, C. J., Nguyen, C. B., Rios, E. J., Siprashvili, Z., Straight, A., Kim, J., Aasi, S. Z., Khavari, et al
  2014; 46 (10): 1060-1062

- **IQGAP1 scaffold-kinase interaction blockade selectively targets RAS-MAP kinase-driven tumors.** *Nature medicine*
  Jameson, K. L., Mazur, P. K., Zehnder, A. M., Zhang, J., Zarnegar, B., Sage, J., Khavari, P. A.
  2013; 19 (5): 626-630

- **ACTL6a enforces the epidermal progenitor state by suppressing SWI/SNF-dependent induction of KLF4.** *Cell stem cell*
  Bao, X., Tang, J., Lopez-Pajares, V., Tao, S., Qu, K., Crabtree, G. R., Khavari, P. A.
  2013; 12 (2): 193-203

- **Control of somatic tissue differentiation by the long non-coding RNA TINCR.** *Nature*
  Kretz, M., Siprashvili, Z., Chu, C., Webster, D. E., Zehnder, A., Qu, K., Lee, C. S., Flockhart, R. J., Groff, A. F., Chow, J., Johnston, D., Kim, G. E., Spitale, et al
  2013; 493 (7431): 231-235

- **DNMT1 maintains progenitor function in self-renewing somatic tissue** *NATURE*
  Sen, G. L., Reuter, J. A., Webster, D. E., Zhu, L., Khavari, P. A.
  2010; 463 (7280): 563-U189

- **PROBER identifies proteins associated with programmable sequence-specific DNA in living cells.** *Nature methods*
  Mondal, S., Ramanathan, M., Miao, W., Meyers, R. M., Rao, D., Lopez-Pajares, V., Siprashvili, Z., Reynolds, D. L., Porter, D. F., Ferguson, I., Neela, P., Zhao, Y., Meservey, et al
  2022; 19 (8): 959-968

- **Spatially resolved clonal copy number alterations in benign and malignant tissue.** *Nature*
  Erickson, A., He, M., Berglund, E., Marklund, M., Mirzazadeh, R., Schultz, N., Kvastad, L., Andersson, A., Bergenstrahle, L., Bergenstrahle, J., Larsson, L., Alonso Galicia, L., Shamikh, et al
  2022; 608 (7922): 360-367

- **Targeted Proteomic Approaches for Proteome-Wide Characterizations of the AMP-Binding Capacities of Kinases.** *Journal of proteome research*
  Miao, W., Yin, J., Porter, D. F., Jiang, X., Khavari, P. A., Wang, Y.
  2022

- **Super-resolved spatial transcriptomics by deep data fusion.** *Nature biotechnology*
  Bergenstrahle, L., He, B., Bergenstrahle, J., Abalo, X., Mirzazadeh, R., Thrane, K., Ji, A. L., Andersson, A., Larsson, L., Stakenborg, N., Boeckxstaens, G., Khavari, P., Zou, et al
  2021

- **The proximal proteome of 17 SARS-CoV-2 proteins links to disrupted antiviral signaling and host translation.** *PLoS pathogens*
  Meyers, J. M., Ramanathan, M., Shanderson, R. L., Beck, A., Donohue, L., Ferguson, I., Guo, M. G., Rao, D. S., Miao, W., Reynolds, D., Yang, X., Zhao, Y., Yang, et al
  2021; 17 (10): e1009412

- **Mutant collagen COL11A1 enhances cancerous invasion.** *Oncogene*
  Lee, C. S., Siprashvili, Z., Mah, A., Bencomo, T., Elcavage, L. E., Che, Y., Shenoy, R. M., Aasi, S. Z., Khavari, P. A.
  2021

- **Integrating single-cell and spatial transcriptomics to elucidate intercellular tissue dynamics.** *Nature reviews. Genetics*
  Longo, S. K., Guo, M. G., Ji, A. L., Khavari, P. A.
  2021

- **SARS-CoV-2 B.1.1.7 and B.1.351 spike variants bind human ACE2 with increased affinity.** *The Lancet. Infectious diseases*
  Ramanathan, M., Ferguson, I. D., Miao, W., Khavari, P. A.

2021

- **Dissecting intercellular communication in adult human skin with single-cell and spatial transcriptomics**
  Ji, A., Thrane, K., Guo, M., Rubin, A., Kim, D., Hollmig, T., Aasi, S., Lundeberg, J., Khavari, P.
  ELSEVIER SCIENCE INC.2021: S17

- **Metabolomic identification of an essential glucose-IRF6 axis in differentiation**
  Lopez-Pajares, V., Bhaduri, A., Guerrero, A., Zhao, Y., Donohue, L., Guo, M., Gowrishankar, G., Gambhir, S. S., Khavari, P.
  ELSEVIER SCIENCE INC.2021: S24

- **easyCLIP analysis of RNA-protein interactions incorporating absolute quantification.** *Nature communications*
  Porter, D. F., Miao, W., Yang, X., Goda, G. A., Ji, A. L., Donohue, L. K., Aleman, M. M., Dominguez, D., Khavari, P. A.
  2021; 12 (1): 1569

- **The proximal proteome of 17 SARS-CoV-2 proteins links to disrupted antiviral signaling and host translation.** *bioRxiv : the preprint server for biology*
  Meyers, J. M., Ramanathan, M., Shanderson, R. L., Donohue, L., Ferguson, I., Guo, M. G., Rao, D. S., Miao, W., Reynolds, D., Yang, X., Zhao, Y., Yang, Y. Y., Wang, et al
  2021

- **SARS-CoV-2 B.1.1.7 and B.1.351 Spike variants bind human ACE2 with increased affinity.** *bioRxiv : the preprint server for biology*
  Ramanathan, M., Ferguson, I. D., Miao, W., Khavari, P. A.
  2021

- **Structural modularity of the XIST ribonucleoprotein complex.** *Nature communications*
  Lu, Z., Guo, J. K., Wei, Y., Dou, D. R., Zarnegar, B., Ma, Q., Li, R., Zhao, Y., Liu, F., Choudhry, H., Khavari, P. A., Chang, H. Y.
  2020; 11 (1): 6163

- **Spen links RNA-mediated endogenous retrovirus silencing and X chromosome inactivation.** *eLife*
  Carter, A. C., Xu, J., Nakamoto, M. Y., Wei, Y., Zarnegar, B. J., Shi, Q., Broughton, J. P., Ransom, R. C., Salhotra, A., Nagaraja, S. D., Li, R., Dou, D. R., Yost, et al
  2020; 9

- **Genome-wide meta-analysis identifies eight new susceptibility loci for cutaneous squamous cell carcinoma.** *Nature communications*
  Sarin, K. Y., Lin, Y. n., Daneshjou, R. n., Ziyatdinov, A. n., Thorleifsson, G. n., Rubin, A. n., Pardo, L. M., Wu, W. n., Khavari, P. A., Uitterlinden, A. n., Nijsten, T. n., Toland, A. E., Olafsson, et al
  2020; 11 (1): 820

- **Multimodal Analysis of Composition and Spatial Architecture in Human Squamous Cell Carcinoma.** *Cell*
  Ji, A. L., Rubin, A. J., Thrane, K. n., Jiang, S. n., Reynolds, D. L., Meyers, R. M., Guo, M. G., George, B. M., Mollbrink, A. n., Bergenstråhle, J. n., Larsson, L. n., Bai, Y. n., Zhu, et al
  2020

- **Genetic and genomic studies of pathogenic EXOSC2 mutations in the newly described disease SHRF implicate the autophagy pathway in disease pathogenesis.** *Human molecular genetics*
  Yang, X., Bayat, V., DiDonato, N., Zhao, Y., Zarnegar, B., Siprashvili, Z., Lopez-Pajares, V., Sun, T., Tao, S., Li, C., Rump, A., Khavari, P., Lu, et al
  2019

- **HiChIRP reveals RNA-associated chromosome conformation.** *Nature methods*
  Mumbach, M. R., Granja, J. M., Flynn, R. A., Roake, C. M., Satpathy, A. T., Rubin, A. J., Qi, Y., Jiang, Z., Shams, S., Louie, B. H., Guo, J. K., Gennert, D. G., Corces, et al
  2019

- **Impact of a patient-derived hepatitis C viral RNA genome with a mutated microRNA binding site** *PLOS PATHOGENS*
  Mata, M., Neben, S., Majzoub, K., Carette, J., Ramanathan, M., Khavari, P. A., Sarnow, P.
  2019; 15 (5)

- **Characterization of novel MAPK interactor with potential in therapeutic development**
  Jiang, T. E., Che, Y., Seelman, A., Guenin, C., Khavari, P.
  ELSEVIER SCIENCE INC.2019: S69

- **Uncovering causative, noncoding genetic variants in cutaneous diseases**

Wozniak, G., Shen, Y., Rubin, A., Neela, P., Khavari, P.
ELSEVIER SCIENCE INC.2019: S68

- **Dissecting intratumoral heterogeneity and microenvironment interactions in SCC through single-cell RNA-sequencing**
  Ji, A., Rubin, A., Reynolds, D., Guo, M., Bhaduri, A., George, B., Hollmig, S., Aasi, S., Khavari, P.
  ELSEVIER SCIENCE INC.2019: S24

- **Small non-coding RNA SNORA12 effects MAPK1 signaling**
  Siprashvili, Z., Shenoy, R. M., Elcavage, L., Khavari, P. A.
  ELSEVIER SCIENCE INC.2019: S21

- **Unraveling keratinocyte gene regulatory networks with single-cell cripsr screening and epigenomic profiling**
  Ramanathan, M., Rubin, A., Parker, K., Satpathy, A., Greenleaf, W., Chang, H., Khavari, P.
  ELSEVIER SCIENCE INC.2019: S63

- **Profiling of rotavirus 3UTR-binding proteins reveals the ATP synthase subunit ATP5B as a host factor that supports late-stage virus replication** *JOURNAL OF BIOLOGICAL CHEMISTRY*
  Ren, L., Ding, S., Song, Y., Li, B., Ramanathan, M., Co, J., Amieva, M. R., Khavari, P. A., Greenberg, H. B.
  2019; 294 (15): 5993–6006

- **Methods to study RNA-protein interactions (vol 16, pg 225, 2019)** *NATURE METHODS*
  Ramanathan, M., Porter, D. F., Khavari, P. A.
  2019; 16 (4): 351

- **Author Correction: Methods to study RNA-protein interactions.** *Nature methods*
  Ramanathan, M., Porter, D. F., Khavari, P. A.
  2019

- **Methods to study RNA-protein interactions** *NATURE METHODS*
  Ramanathan, M., Porter, D. F., Khavari, P. A.
  2019; 16 (3): 225–34

- **The Functional Proximal Proteome of Oncogenic Ras Includes mTORC2** *MOLECULAR CELL*
  Kovalski, J. R., Bhaduri, A., Zehnder, A. M., Neela, P. H., Che, Y., Wozniak, G. G., Khavari, P. A.
  2019; 73 (4): 830-+

- **Profiling of rotavirus 3'UTR-binding proteins reveals the ATP synthase subunit ATP5B as a host factor that supports late-stage virus replication.** *The Journal of biological chemistry*
  Ren, L., Ding, S., Song, Y., Li, B., Ramanathan, M., Co, J., Amieva, M. R., Khavari, P. A., Greenberg, H. B.
  2019

- **Coupled Single-Cell CRISPR Screening and Epigenomic Profiling Reveals Causal Gene Regulatory Networks** *CELL*
  Rubin, A. J., Parker, K. R., Satpathy, A. T., Qi, Y., Wu, B., Ong, A. J., Mumbach, M. R., Ji, A. L., Kim, D. S., Cho, S., Zarnegar, B. J., Greenleaf, W. J., Chang, et al
  2019; 176 (1-2): 361-+

- **Impact of a patient-derived hepatitis C viral RNA genome with a mutated microRNA binding site.** *PLoS pathogens*
  Mata, M. n., Neben, S. n., Majzoub, K. n., Carette, J. n., Ramanathan, M. n., Khavari, P. A., Sarnow, P. n.
  2019; 15 (5): e1007467

- **KRAS regulation by small non-coding RNAs and SNARE proteins.** *Nature communications*
  Che, Y. n., Siprashvili, Z. n., Kovalski, J. R., Jiang, T. n., Wozniak, G. n., Elcavage, L. n., Khavari, P. A.
  2019; 10 (1): 5118

- **Retinoic acid and BMP4 cooperate with p63 to alter chromatin dynamics during surface epithelial commitment** *NATURE GENETICS*
  Pattison, J. M., Melo, S. P., Piekos, S. N., Torkelson, J. L., Bashkirova, E., Mumbach, M. R., Rajasingh, C., Zhen, H., Li, L., Liaw, E., Alber, D., Rubin, A. J., Shankar, et al
  2018; 50 (12): 1658-+

- **Retinoic acid and BMP4 cooperate with p63 to alter chromatin dynamics during surface epithelial commitment.** *Nature genetics*

Pattison, J. M., Melo, S. P., Piekos, S. N., Torkelson, J. L., Bashkirova, E., Mumbach, M. R., Rajasingh, C., Zhen, H. H., Li, L., Liaw, E., Alber, D., Rubin, A. J., Shankar, et al

2018

- **Cancer-Associated Long Noncoding RNA SMRT-2 Controls Epidermal Differentiation** *JOURNAL OF INVESTIGATIVE DERMATOLOGY*

  Lee, C. S., Mah, A., Aros, C. J., Lopez-Pajares, V., Bhaduri, A., Webster, D. E., Kretz, M., Khavari, P. A.

  2018; 138 (6): 1445–49

- **Single-cell RNA-sequencing reveals SCC intratumoral heterogeneity**

  Ji, A., Rubin, A., Hollmig, S., Aasi, S., Khavari, P.

  ELSEVIER SCIENCE INC.2018: S31

- **Targeting pathogenic interactions between Rac1 and NCK1 in psoriasis**

  Winge, M. G., Nasrallah, M., Fuhriman, J. M., Ramanathan, M., Azameera, A., Nguyen, N., Inayathullah, M., Rajadas, J., Khavari, P., Butte, A., Marinkovich, M.

  ELSEVIER SCIENCE INC.2018: S161

- **Phase I / II Clinical Trial for Recessive Dystrophic Epidermolysis Bullosa Using EB-101 (COL7A1 Gene-Corrected Autologous Keratinocytes)**

  Tang, J. Y., Marinkovich, M. P., Siprashvili, Z., Nguyen, N. T., Gorell, E. S., Loutit, K., Dutt-Singkh, Y., Barriga, M., Solis, D., Khuu, P., Furukawa, L., Lorenz, H. P., Leung, et al

  CELL PRESS.2018: 158

- **KRAS regulation by small non-coding RNAs and SNARE proteins**

  Che, Y., Khavari, P.

  ELSEVIER SCIENCE INC.2018: S27

- **Dynamic morphogen-p63 chromatin interactions that guide epigenetic changes and p63 activity in surface ectoderm commitment**

  Pattison, J., Melo, S., Piekos, S., Torkelson, J., Mumbach, M. R., Rubin, A., Li, L., Zhen, H., Chang, H., Khavari, P., Oro, A. E.

  ELSEVIER SCIENCE INC.2018: S243

- **Metabolomic analysis reveals an essential role for glucose in epidermal differentiation**

  Lopez-Pajares, V., Bhaduri, A., Garcia, O., Guerrero, A., Gowrishankar, G., Che, Y., Sanchez, A., Boxer, L., Gambhir, S., Khavari, P.

  ELSEVIER SCIENCE INC.2018: S123

- **Small non-coding RNAs control the MAPK/ERK pathway**

  Siprashvili, Z., Shenoy, R., Elcavage, L., Khavari, P.

  ELSEVIER SCIENCE INC.2018: S27

- **Decoding regulatory sequence across skin differentiation with deep learning**

  Kim, D., Risca, V., Chappell, J., Shi, M., Zhao, Z., Jung, N., Chang, H., Snyder, M., Greenleaf, W., Kundaje, A., Khavari, P.

  ELSEVIER SCIENCE INC.2018: S135

- **Transcript-indexed ATAC-seq for precision immune profiling.** *Nature medicine*

  Satpathy, A. T., Saligrama, N. n., Buenrostro, J. D., Wei, Y. n., Wu, B. n., Rubin, A. J., Granja, J. M., Lareau, C. A., Li, R. n., Qi, Y. n., Parker, K. R., Mumbach, M. R., Serratelli, et al

  2018

- **The functions and unique features of long intergenic non-coding RNA.** *Nature reviews. Molecular cell biology*

  Ransohoff, J. D., Wei, Y. n., Khavari, P. A.

  2018; 19 (3): 143–57

- **Research Techniques Made Simple: Emerging Methods to Elucidate Protein Interactions through Spatial Proximity** *JOURNAL OF INVESTIGATIVE DERMATOLOGY*

  Che, Y., Khavari, P. A.

  2017; 137 (12): E197–E203

- **Phase I/IIa clinical trial for recessive dystrophic epidermolysis bullosa using EB-101 (COL7A1 gene-corrected autologous keratinocytes)**

  Siprashvili, Z., Nguyen, N. T., Gorell, E. S., Loutit, K., Dutt-Singkh, Y., Nazaroff, J., Khuu, P., Furukawa, L., Lorenz, H. P., Leung, T. H., Keene, D. R., Rieger, K. E., Khavari, et al

  MARY ANN LIEBERT, INC.2017: A10

- **Phase I/IIa clinical trial for recessive dystrophic epidermolysis bullosa using genetically corrected autologous keratinocytes**

Siprashvili, Z., Nguyen, N., Gorell, E., Loutit, K., Dutt-Singkh, Y., Nazaroff, J., Khuu, P., Furukawa, L., Lorenz, H., Leung, T., Keene, D., Rieger, K., Khavari, et al

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