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Education

9/81-6/85 Stanford University, Stanford, California. B.S. degree in Biological Sciences, with Honors and Departmental Distinction, June 1985 (emphasis in molecular biology and biochemistry).
9/85-6/93 University of California, San Diego, School of Medicine. La Jolla, California. Medical Scientist Training Program, M.D./Ph.D. Ph.D, Department of Biology, Molecular Genetics.
7/93-6/94 Stanford University Hospital, internship in Internal Medicine.
7/94-11/98 Stanford University Hospital, residency/fellowship in Dermatology.

Academic and Research Experience

11/87-6/93 Ph.D. thesis, Dr. Ronald Evans, Salk Institute, Gene Expression Lab and Howard Hughes Medical Institute. Title: Molecular and genetic analysis of two *Drosophila* nuclear receptors, knirps-related and ultraspiracle
6/96-11/98 Post-doctoral Fellowship, Dr. Matthew P. Scott, Department of Genetics and Developmental Biology, Howard Hughes Medical Institute, Stanford University school of Medicine. Genetics of vertebrate skin development
11/98-9/06 Assistant Professor, Department of Dermatology, Stanford University, School of Medicine. Genetics of vertebrate skin development Stanford Cancer Institute
9/06-10/11 Associate Professor, Department of Dermatology, Stanford University, School of Medicine. Genetics of vertebrate skin development Stanford Cancer Institute
10/11-6/17 Professor, Department of Dermatology, Stanford University, School of Medicine. Epithelial regeneration and carcinogenesis
6/17- Eugene and Gloria Bauer Endowed Professor of Dermatology Stanford University
6/17- Associate Director, Center for Definitive and Curative Medicine Stanford University
6/17- Co-Director, Stanford Child Health Research Institute

Certification

California License #G079854 DEA #B04867454 Board Certification, Dermatology, 10/98, 08/08, 10/18

National Advisory Committees, Boards and Service

1998-2000 Society for Investigative Dermatology, Board of Directors
2000-present Society for Investigative Dermatology, Committee on Kligman Travel Fellowships.
2000-present National Institutes of Health, Ad Hoc grant reviewer
2007-2010 Board of Directors, North American Hair Research Society
2010-2015 Chair, Nominating committee, North American Hair Research Society
2005-present Medical Advisory Board, Gorlin's Syndrome Life Support Network
2006-present National Alopecia Areata Foundation, Scientific Review Board
2007-2012 Program Committee, Society for Investigative Dermatology
2010-2014 Permanent Member, NIH ACTS Study Section
2010-present American Skin Association, Medical Advisory Committee
2012-2017 Board of Directors, Society for Investigational Dermatology
2013-2017 Executive Committee, Society for Investigative Dermatology
2013 Vice Chair, Gordon Research Conference Epithelial Differentiation Barga, Italy
2015-present External Advisory Board, Northwestern Skin Disease Research Center
2015 Chair, Gordon Research Conference Epithelial Differentiation Sunday River, ME
2017-present Deputy Editor, Journal of Investigative Dermatology
2018 NIAMS Board of Scientific Advisors, Ad Hoc reviewer
2018-present NIAMS Advisory Council Member
2018-present Nominating Committee, Society for Investigative Dermatology
2019 Vice Chair, Keystone Meeting on Skin Health and Disease Hannover, Germany

Scholarships and Awards

6/85 Elected Phi Beta Kappa, Stanford University
7/87-9/91 Elected A. Baird Hastings Honor Society, UCSD School of Medicine
5/88-5/89 Secretary, A. Baird Hastings Honor Society
9/88-9/91 Howard Hughes Medical Institute Graduate Student Award
9/85-9/93 NIH Medical Scientist Training Program
4/96 Thomas Fitzpatrick Research Award, KAO Corporation
6/97 Alvin Jacobs Research Award, Society for Pediatric Dermatology
4/98 Society for Investigative Dermatology Board of Directors, Resident/Fellow
9/99 Terman Faculty Scholarship, Stanford University, School of Medicine
7/00 Charles E. Culpeper Foundation Scholarship in Medical Science
5/06 Nature Publishing Poster Prize, Society for Investigative Dermatology
12/06 Duhring Lectureship University of Pennsylvania
1/12 M.H. Samitz Lectureship University of Pennsylvania

4/15 Jeffrey Schechner Memorial Lecture, Yale University School of Medicine
3/13 Marion Sulzberger Lectureship American Academy of Dermatology
5/16 William Montagna Lectureship, Society for Investigative Dermatology
5/17 George F. Odlund Lecture, University of Washington

Patents (16)

11/1996 US Patent Application 5571696 for "RECEPTORS"
11/1996 US Patent Application 5578483 for "RECEPTORS TRANSCRIPTION-REPRESSION ACTIVITY COMPOSITIONS AND METHODS"
02/1997 US Patent Application 5602009 for "DOMINANT NEGATIVE CHIMERAS OF THE STEROID/THYROID SUPERFAMILY OF RECEPTORS"
07/1997 US Patent Application 5641652 for "INSECT RETINOID-LIKE RECEPTOR COMPOSITIONS AND METHODS"
11/1997 US Patent Application 5688691 for "INSECT RETINOID-LIKE COMPOSITIONS AND METHODS"
12/1997 US Patent Application 5696233 for "ORPHAN STEROID HORMONE RECEPTORS"
01/1998 US Patent Application 5710004 for "METHODS OF USING NOVEL STEROID HORMONE ORPHAN RECEPTORS"
07/2001 US Patent Application 6265173 for "METHODS OF MODULATING THE EXPRESSION OF GENES USING ULTRASPIRACLE RECEPTOR"
08/2001 US Patent Application 6281330 for "MULTIMERIC FORMS OF MEMBERS OF THE STEROID/THYROID HORMONE SUPERFAMILY OF RECEPTORS WITH THE ULTRASPIRACLE RECEPTOR"
11/2005 US Patent Application 20060142245 for "INHIBITORS OF HEDGEHOG SIGNALING PATHWAYS, COMPOSITIONS AND USES RELATED THERETO"
10/2006 US Patent Application 7119077 for "MULTIMERIC FORMS OF MEMBERS OF THE STEROID/THYROID SUPERFAMILY OF RECEPTORS WITH THE ULTRASPIRACLE RECEPTOR"
07/2008 US Patent Application 12/075,944 for "BONE MORPHOGENETIC PROTEIN ANTAGONIST AND USES THEREOF"
07/2008 US Patent Pending, STAN-08-77, "NOVEL HAIR CYCLE REGULATORS FOR HAIR GROWTH"
08/2009 US Patent Pending, STAN-671PRV, "NOVEL HAIR GROWTH REGULATORS"
02/2013 US Patent, 14/728,916 "INHIBITORS OF ATYPICAL PROTEIN KINASE C AND THEIR USE IN TREATING HEDGEHOG PATHWAY DEPENDENT CANCERS"
02/2016 US Patent Pending, US2016/012735, "R-SPONDIN AGONIST-MEDIATED HAIR GROWTH"

Memberships in Professional Associations

Society for Investigative Dermatology
American Academy of Dermatology
North American Hair Research Society
American Society for Clinical Investigation, 2008
American Dermatological Association, 2010

Bibliography

1. **Oro, A.E.** and Walbot, V. (1984). Speculations about Lack of Variation in B37N Mitochondrial DNA. *Maize Cooperative Newsletter* 58, 187.
2. **Oro, A.E.**, Newton, K.J., and Walbot, V. (1984). Lack of Variation in B37N Mitochondrial DNA in Maize. *Maize Cooperative Newsletter* 58, 186.
3. **Oro, A.E.**, Newton, K.J., and Walbot, V. (1985). Molecular Analysis of the Inheritance and Stability of the Mitochondrial Genome of an Inbred Line of Maize. *Theoretical and Applied Genetics* 70, 287-293.
4. Hollenberg, S.M., Weinberger, C., Ong, E.S., Cerelli, G., **Oro, A.**, Lebo, R., Thompson, E.B., Rosenfeld, M.G., and Evans R.M.(1985). Primary Structure and Expression of a Functional Human Glucocorticoid Receptor cDNA. *Nature* 318, 635-641.
5. **Oro, A.E.**, Simerly, R.B., and Swanson, L.W.(1988). Estrous Cycle Variations in Levels of CCK Immunoreactivity within cells of Three Interconnected Sexually Dimorphic Forebrain Nuclei. *Neuroendocrinology* 47, 225-235.
6. **Oro, A.E.**, Hollenberg, S.M., and Evans R.M.(1988). Transcriptional Inhibition by a Glucocorticoid receptor- β -galactosidase Fusion protein. *Cell* 55, 1109-1114.
7. **Oro, A.E.**, Ong, E.S., Margolis, J.S., Posakony, J.W., McKeown, M., and Evans, R.M.(1988). The *Drosophila* gene *knirps*-related is a member of the steroid receptor gene superfamily. *Nature* 336, 493-496.
8. Hong, F.D., Huang, H.J., To, H., Young, L.J., **Oro, A.**, Bookstein, R., Lee, E.Y., and Lee, W.H.(1989). Structure of the Human Retinoblastoma Gene. *Proc Natl Acad Sci USA* 86, 5502-5506.
9. **Oro, A.E.**, Umesono, K., and Evans R.M. (1989). Steroid Hormone Receptor Homologs in Development. *Development* 107 (Suppl.), 133-140.
10. **Oro, A.E.**, McKeown, M., and Evans, R.M.(1990). Relationship between the product of the *Drosophila* ultraspiracle locus and the vertebrate retinoic acid responsive transcription factor, the Retinoid X receptor. *Nature* 347, 298-301.
11. Mangelsdorf, D.J., Borgmeyer, U., Heyman, R.A., Zhou, J., Ong, E.S., **Oro, A.E.**, Kakizuka, A., and Evans, R.M. (1992). Characterization of the three RXR genes that mediate the action of 9-cis retinoic acid. *Genes Dev* 6, 329-344.
12. **Oro, A.E.**, McKeown, M. and Evans, R.M. (1992). The *Drosophila* Retinoid X receptor homolog ultraspiracle functions in both female reproduction and eye morphogenesis. *Development* 115, 449-462.
13. Yao, Tso-Pang, Segraves, W.A., **Oro, A.E.**, McKeown, M., and Evans, R.M.(1992). Transactivation by the ecdysone receptor requires the conserved heterodimerization function of ultraspiracle. *Cell* 71, 63-72.

14. **Oro, A.E.**, McKeown, M., and Evans, R.M. (1992). The Drosophila nuclear receptors: new insight into the actions of nuclear receptors in development. *Curr Op Genet Dev* 2, 269-274.
15. **Oro, A.E.**, Higgins, K.M., Hu, Z., Bonifas, J.M., Epstein, E.H., and Scott, M.P. (1997). Basal Cell Carcinomas in Mice Overexpressing Sonic Hedgehog. *Science* 276, 817-821.
16. Fan, H., **Oro, A.E.**, Scott, M.P., and Khavari, P. A., (1997). Induction of basal cell carcinoma features in transgenic human skin expressing Sonic Hedgehog. *Nature Med* 3, 788-792.
17. **Oro, A.E.** and Scott, M.P. (1998). Splitting Hairs: Dissecting Roles of Signaling Systems in Epidermal Development, *Cell* 95, 575-578.
18. Azsterbaum, M, Epstein, J., **Oro, A.**, Douglas, V., LeBoit, P.E., Scott, M.P., and Epstein, E.H. (1999). Ultraviolet and ionizing radiation enhance the growth of BCCs and trichoblastomas in patched heterozygous knockout mice, *Nature Med* 5, 1285-1291.
19. Callahan, C.A. and **Oro, A.E.**, (2001). Monstrous attempts at adnexogenesis: regulating hair follicle progenitors through Sonic hedgehog signaling. *Curr Opin Genet Dev*, 11:541-6.
20. **Oro, A.E.**, Higgins, K, (2003). Hair cycle regulation of Hedgehog signal reception, *Dev Bio* 253, 23-44.
21. Chang, HY, Ridky, TW, Kimball, AB, Hughes, E, and **Oro AE**, (2003). Eruptive xanthomas associated with olanzapine use, *Arch Dermatol*, Aug;139(8):1045-8.
22. Gotlib J, Kohler S, Reicherter P, **Oro AE**, Zehnder JL. (2003). Heterozygous prothrombin G20210A gene mutation in a patient with livedoid vasculitis. *Arch Dermatol*, 139, 1081-3.
23. Callahan, C.A., Ofstad, T., Horng L., Wang J.K., Zhen H.H., Coulombe P.A., and **Oro A.E.** (2004). BEG4 / MTSS1, a Sonic hedgehog target gene that potentiates Gli transcription *Genes Dev*.18, 2724-9.
24. Gonzalez-Quevedo, R., Shoffer, M., Horng, L., and **Oro A. E.**, (2005). Receptor tyrosine phosphatase-dependent Cytoskeletal remodeling by the hedgehog-responsive gene MIM / BEG4 *J Cell Biol* 168, 453-463.
25. Sarin KY, Cheung P, Gilson D, Lee E, Tennen RI, Wang E, Artandi MK, **Oro A.E.**, and Artandi SE. (2005). Conditional telomerase induction causes proliferation of hair follicle stem cells. *Nature* 436, 1048-52.
26. Huntzicker E.G., Estay I, Zhen H., Lokteva L.A., Jackson P. K., **Oro A.E.**, (2005). Dual degradation signals control Gli stability and tumor formation *Genes Dev* 20, 276-81.
27. Oro, A.E. (2005). Spatial and temporal regulation of hair follicle progenitors by hedgehog signaling. In: *Hedgehog-Gli Signaling and Human Disease*. Ariel Ruiz I Altaba, editor. Kluwer Academic / Plenum Publishers, Landes Bioscience.
28. **Oro AE** (2006). Mammalian Variations on a Theme: a Smo and Sufu Surprise: *Dev Cell* 10:156.
29. Sneddon, J.B., Zhen, H.H., Montgomery, K., van de Rijn, M., Tward, A.D., West, R., Gladstone, H., Chang, H., Morganroth, G.S., **Oro, AE.**, Brown. P.O. (2006). BMP Antagonist Gremlin 1 is Widely Expressed by Cancer-associated Stromal Cells and Can Promote Tumor Cell Proliferation. *Proc Natl Acad Science* 103, 14842-7.
30. **Oro AE.**, (2007). The Primary cilia, a 'Rab-id' transit system for hedgehog signaling. *Current Opinion in Cell Biology* 19, 1-6.
31. Huntzicker E.G., **Oro, AE.**, (2008). Controlling Hair Follicle Signaling Pathways through Polyubiquitination. *J Invest Dermatol*. 128, 1081-7.
32. **Oro, AE.** (2008). A new role for an old friend: NFAT and stem cell quiescence. *Cell Stem Cell* 2, 104-6.
33. Gao, J, DeRouen, M., Chen, C-H., Nguyen, M, Nguyen, N.T., Ido, H., Harada, K., Sekiguchi, K., Morgan, B.A., Miner, J., **Oro, A.E.** and Marinkovich, M.P. (2008). Laminin-511 is an epithelial message promoting dermal papilla development and function during early hair morphogenesis. *Genes Dev* 22, 2111-24.
34. **Oro, AE.** (2008). Basal Cell Nevus Syndrome. In: *Fitzpatrick's Dermatology in General Medicine, 7th Edition*. The McGraw-Hill Companies, Inc. Publisher.
35. DeRouen MC, **Oro AE.** (2009). The primary cilium: a small yet mighty organelle. *J Invest Dermatol*. 129, 264-5. Review.
36. Quinones GA, Jin J, **Oro AE.** (2010). I-BAR protein antagonism of endocytosis mediates directional sensing during guided cell migration. *J Cell Biol.* 189, 353-67.
37. Quinones GA, **Oro AE.** (2010). BAR domain competition during directional cellular migration. *Cell Cycle*. 9, Epub Jul 19;9(13).
38. Bershteyn M, Atwood SX, Woo W-M, Li M, **Oro AE.** (2010). MIM and cortactin antagonism regulates ciliogenesis and Hedgehog signaling. *Dev Cell*. 19, 270-283.
39. DeRouen MC, Zhen H, Tan SH, Williams S, Marinkovich MP, **Oro AE.** (2010). Laminin-511 and integrin beta-1 in hair follicle development and basal cell carcinoma formation. *BMC Dev Biol*. 10:112-5.
40. Ra H, Piyawattanametha W, González-Gonzalez E, Mandella MJ, Kino GS, Solgaard O, Leake D, Kaspar R, **Oro AE**, Contag CH. (2011). In vivo imaging of human and mouse skin with a handheld dual-axis confocal fluorescence microscope, *J Invest Dermatol*. 13, 1061-6.
41. Yucel G, and **Oro, AE.** (2011). Cell Migration:GSK3 β steers the cytoskeleton's tip, *Cell* 144, 319-21.
42. Woo WM, **Oro AE.** (2011). SnapShot: hair follicle stem cells. *Cell*. 146, 334-334.e2.
43. Hillman RT, Feng BY, Ni J, Woo W-M, Milenkovic L, Hayden Gephart MG, Teruel MN, **Oro AE**, Chen JK, Scott MP. (2011). Neuropilins are positive regulators of Hedgehog signal transduction. *Genes Dev*. 25, 2333-46.
44. Gomez-Ospina N, Chang A, Qu K, **Oro AE.** (2012) A Sonic Hedgehog Locus Translocation associated with Basal Cell Carcinomas. *N Engl J Med* 366, 2233-4
45. Sekulic A, Migden, MR, **Oro, AE**, Dirix L, Lewis KD, Hainsworth JD, Solomon JA, Yoo S, Arron ST, Friedlander PA, Marmur E, Rudin CM, Chang ALS, Low JA, Mackey HM, Yauch RL, Graham RA, Reddy JC, Hauschild A. (2012) Efficacy and Safety of Vismodegib in Advanced Basal Cell Carcinoma. *N Engl J Med* 366:2171-9
46. Woo W-M, Zhen HH, **Oro AE.** (2012) Shh maintains dermal papilla identity and hair morphogenesis via a Noggin – Shh regulator loop. *Genes and Dev* 26: 1235-46
47. Atwood, SX, Chang, ALS, and **Oro, AE** (2012) Hedgehog pathway inhibition and the race against tumor evolution *J Cell Biol* 199:193-7
48. Chang, ALS and **Oro, AE** (2012) Initial Assessment of tumor regrowth after vismodegib in advanced Basal cell carcinoma *Arch Dermatol* 148:1324-5.
49. **Oro, AE** and Tang, JY (2012). Basal Cell Nevus Syndrome. In: *Fitzpatrick's Dermatology in General Medicine, 8th Edition*. The McGraw-Hill Companies, Inc. Publisher.

51. Atwood, SX., Tang, J, Chang, A., Li, M., and **Oro, AE** (2013), "Gli activation by aPKC regulates BCC growth" *Nature* 2013 494:484-8.
52. Aasi, S. Silkiss, R., Tang, JY, Wysong, A. Liu, A. Epstein, E. **Oro, AE**, Chang AL (2013) New onset keratoacanthomas after vismodegib treatment fro locally advanced basal cell carcinoma: a report of 2 cases. *JAMA Dermatol* 149:242-3.
53. Woo WM, Atwood SX, Zhen HH, **Oro AE** (2013) Rapid Genetic Analysis of epithelial-mesenchymal signaling during hair regeneration. *J Vis Exp Feb 28: (72) e4344*.
54. Danial C, Lingala B, Balise R, **Oro AE**, Reddy S, Colevas A, Chang AL (2013) Markedly improved overall survival in 10 consecutive metastatic basal cell carcinoma patients. *Br J Dermatol*, 169(3):673-6.
55. Xiao Y, Woo WM, Nagao K, Li W, Terunuma A, Mukouyama YS, **Oro AE**, Vogel JC, Brownell I. (2013) Perivascular hair follicle stem cells associate with a venule annulus *J Invest Dermatol* 133:2324-31.
56. Atwood, SX, Whitson RJ, **Oro, AE** (2013) "Patch"ing up our tumor signaling knowledge *J Invest Derm* 133:1131-3.
57. Chang AL, Atwood SX, Tartar DM, **Oro AE** (2013) Surgical excision after neoadjuvant therapy with vismodegib for a locally advanced basal cell carcinoma and resistant basal cell carcinoma in Gorlin Syndrome *JAMA Dermatol* 149:639-41.
58. Yucel, G, Altindag, B. Gomez-ospina, N. Rana, A. Panagiotakos, G., Lara, MF, Dolmetsch, R and **Oro, AE** (2013) State-dependent signaling by Cav1.2 regulates hair follicle stem cell function, *Genes Dev.* 27: 1217-22
59. Whyte, JL, Smith AA, Liu B., Manzano WR, Evans, ND, Dhamdhare GR, Fang, MY, Chang, HY, **Oro, AE**, and Helms, JA (2013) Augmenting endogenous Wnt signaling improves skin wound healing *PLoS One* 8:e76883
60. Yucel, G. Arnam, J. Case-Means P. Huntzicker, E. Lara, M. Yuan J. Kuo C. and **Oro, AE** (2014) Partial Proteasome Inhibitors Induce Hair Follicle Growth by Stabilizing B-catenin, *Stem Cells* 32:85-92
61. Melo, S. Lisowski, L. Bashkirova, E. Zhen H. Chu K. Keene, D. Marinkovich, P. Kay, M. **Oro, AE** (2014) Somatic scarless correction of junctional epidermolysis bullosa by a highly recombinogenic AAV virus. *Mol Therapy* 22:725-33
62. Atwood, SX and **Oro, AE** (2014) "Atypical" Regulation of Hedgehog-dependent cancers *Cancer Cell* 25:133-4
63. Tang, Y. Schubert, S. Bandopadhaay, P. Berghold, G. Nguyen, B. Masoud, S. Vue, N. Balansay B. , Yu, F., Oh, S., Chen, S. Ponnuswami, A. Monje-Diesserth, M., Atwood, SX, Whitson RJ, Lee, A, Tang, JY, Qi, J, Beroukhir, R., Wechsler-Reya, R., **Oro, AE**, Bradner, JE, and Cho, YJ, (2014) Epigenetic Regulation of Hedgehog Pathway transcriptional output by BRD4 *Nature Medicine.* 20(7):732-40
64. **Oro, AE** and Watt, FM. (2014), editors. *The Skin and Its Diseases.* Cold Spring Harbor Perspectives in Medicine
65. Atwood, SX, Whitson, R., and **Oro AE** (2014) Advanced Basal Cell Carcinoma Therapy, in Cold Spring Harbor Perspectives in Medicine Oro AE and Watt, FM, eds. CSH Press: New York. 4(7):a013581
66. Sebastiano, V, Zhen HH, Derafshi, BH, Bashkirova, L, Melo, S, Wang, P, Leung, T, Siprashvili, Tichy, A., Li,J, Ameen M., Hawkins, J., Lee, S., Li, L, Bauer, G., Lisowski, Kay, M., Kim, SK, Lane, AT, Wernig, M. and **Oro, AE** (2014) Human COL7A1-Corrected Induced Pluripotent Stem cells for the Treatment of Recessive Dystrophic Epidermolysis Bullosa. *Sci Transl. Med.* 6:264-9.
67. Atwood SX, Sarin KY, Whitson RJ, Li JR, Kim G, Rezaee M, Ally MS, Kim J, Yao C, Chang AL, **Oro AE**, Tang JY. (2015) Smoothened variants explain the majority of drug resistance in Basal cell carcinoma. *Cancer Cell* 27: 342-53. PMID: PMC4357167.
68. Atwood SX, Sarin KY, Li JR, Yao C, Urman NM, Chang AL, Tang JY, **Oro AE**. (2015) Rolling the Genetic Dice: Neutral and Deleterious Smoothened Mutations in Drug-Resistant Basal Cell Carcinoma. *J Invest Dermatol.* 135(8):2138-41. PMID: PMC4504757.
69. Zhao X, Ponomaryov T, Ornell KJ, Zhou P, Dabral SK, Pak E, Li W, Atwood SX, Whitson RJ, Chang AL, Li J, **Oro AE**, Chan JA, Kelleher JF, Segal RA. (2015) RAS/MAPK Activation Drives Resistance to Smo Inhibition, Metastasis, and Tumor Evolution in Shh Pathway-Dependent Tumors. *Cancer Research.* 75(17):3623-35. PMID: PMC4558230.
70. Jaju PD, Nguyen CB, Mah AM, Atwood SX, Li J, Zia A, Chang AL, **Oro AE**, Tang JY, Lee CS, Sarin KY. (2015) Mutations in the Kinetochore Gene KNSTRN in Basal Cell Carcinoma. *J Invest Dermatol.* 136(4):882. PMID: MC4747638.
71. Danial C, Sarin KY, **Oro AE**, Chang AL. (2016) An Investigator-Initiated Open-Label Trial of Sonidegib in Advanced Basal Cell Carcinoma Patients Resistant to Vismodegib. *Clinical Cancer Research.* 22(6):1325-9. PMID: PMC4794361.
72. Kwon GP, Ally MS, Bailey-Healy I, **Oro AE**, Kim J, Chang AL, Aasi S, Tang JY. (2016) Update to an open-label clinical trial of vismodegib as neoadjuvant before surgery for high-risk basal cell carcinoma (BCC). *J Am Acad Dermatol.* 75(1):213-5. PMID: 27317518.
73. Wang K, Lee CS, Marinkovich MP, Chang HY, **Oro AE**, Khavari PA. (2016) Factors That May Promote an Effective Local Research Environment. *J Invest Dermatol.* 136(8):1529-31. PMID: 27450496.
74. Kennedy Crispin M, Ko JM, Craiglow BG, Li S, Shankar G, Urban JR, Chen JC, Cerise JE, Jabbari A, Winge MC, Marinkovich MP, Christiano AM, **Oro AE**, King BA. (2016) Safety and efficacy of the JAK inhibitor ofacitinib citrate in patients with alopecia areata. *JCI Insight.* 1(15):e89776. PMID: 27699252
75. Urman NM, Mirza A, Atwood SX, Whitson RJ, Sarin KY, Tang JY, **Oro AE**. (2016) Tumor-Derived Suppressor of Fused Mutations Reveal Hedgehog Pathway Interactions. 11(12):e0168031. doi: 10.1371/journal.pone.0168031. PMID: 28030567
76. Whitson RJ, **Oro AE**. (2017) Soil Primes the Seed: Epigenetic Landscape Drives Tumor Behavior. *Cell Stem Cell.* 20(2):149-150. doi: 10.1016/j.stem.2017.01.007. PubMed PMID: 28157493.
77. Mirza AN, Fry MA, Urman NM, Atwood SX, Roffey J, Ott GR, Chen B, Lee A, Brown AS, Aasi SZ, Hollmig T, Ator MA, Dorsey BD, Ruggeri BR, Zificsak CA, Sirota M, Tang JY, Butte A, Epstein E, Sarin KY, **Oro AE** (2017) Combined inhibition of atypical PKC and histone deacetylase 1 is cooperative in basal

- cell carcinoma treatment. *JCI insight* 2017 Nov 2;2(21).
78. Whitson, RJ, Lee, A, Urman, NM, Mirza, A, Yao, CY Brown, A, Li, JR, Shankar, G, Fry, MA, Atwood, SX, Hollmig, ST, Aasi, SZ, Sarin, KY, Epstein, EH, Tang, JY, and **Oro, AE** (2018) Non-canonical hedgehog pathway activation by MKL1/SRF promotes drug-resistance in basal cell carcinomas. *Nature Med* 24:271-81
 79. Tang, JY, Epstein, EE, and **Oro, A.** (2018). Basal Cell Nevus Syndrome. In: *Fitzpatrick's Dermatology in General Medicine*, Edition 9e. The McGraw-Hill Companies, Inc. Publisher.
 80. Kuonen F, Surbeck I, Sarin KY, Dontenwill M, Rüegg C, Gilliet M, **Oro AE**, Gaide O (2018) TGF β , Fibronectin and Integrin α 5 β 1 Promote Invasion in Basal Cell Carcinoma. *J Invest Dermatol.* 2018 Jul 14. pii: S0022-202X(18)31966-3. doi: 10.1016/j.jid.2018.04.029. PMID:29758283
 81. Drummond ML, Li M, Tarapore E, Nguyen TTL, Barouni BJ, Cruz S, Tan KC, **Oro AE**, Atwood SX. (/2018) Actin polymerization controls cilia-mediated signaling. *J Cell Biol.* 2018 Sep 3;217(9):3255-3266. doi: 10.1083/jcb.201703196. Epub 2018 Jun 26. PubMed PMID: 29945904; PMCID: PMC6122990.
 82. Cho HG, Kuo KY, Li S, Bailey I, Aasi S, Chang ALS, **Oro AE**, Tang JY, Sarin KY.(2018) Frequent basal cell cancer development is a clinical marker for inherited cancer susceptibility. *JCI Insight.* 2018 Aug 9;3(15). pii: 122744. doi: 10.1172/ jci.insight.122744. PubMed PMID: 30089731; PMCID: PMC6129130.
 83. Pattison, JM, Melo, SP, Piekos SN, Torkelson JL, Bashkirova, E, Mumbach, MR, Rajasingh, C, Zhen, HH, Li, L, Liaw, EJ, Alber, D, Rubin, AJ, Shankar, G, Bao, X, Chang, HY, Khavari, PA, and **Oro, AE** (2018) Retinoic Acid and BMP4 Cooperate with TP63 to alter chromatin dynamics during Surface Epithelial Commitment *Nature Genetics* 50(12): 1658-1665.
 84. Brown, AS, Meera, P, Altindag, B, Chopra, R, Perkins, E, Paul, S, Scoles, DR, Tarapore, E, Magri, J, Huang, H, Jackson, M, Shakkottai, VG, Otis, TS, Pulst, SM, Atwood, SX, **Oro, AE** (2018), MTSS1/Src family kinase Dysregulation Underlies Multiple Inherited Ataxias. *Proc Natl Acad Sci Dec 7* <https://doi.org/10.1073/pnas.1816177115>.
 85. Mirza, AN, McKellar, SA, Urman, NM, Brown, AS, Hollmig, T., Aasi, SZ, and **Oro AE** (2019) LAP2 proteins Chaparone Gli1 movement between Lamina and Chromatin to regulate Transcription, *Cell* 176, 198-212.
 86. Li, L, Wang, Y, Torkelson, JL, Pattison, JM, Zhen, HH, Duren, Z, Fang, F, Melo, SP, Piekos SN, Li, J, Liaw, EJ, Chen, L., Li, R., Wernig, M, Wong, WH, Chang, HY, and **Oro, AE** (2019) Feedback Regulation between Initiation and Maturation Networks Orchestrates the Chromatin Dynamics of Epidermal Lineage Commitment, *Cell Stem Cell* Jan 24 <https://doi.org/10.1016/j.stem.2018.12.012>
 87. Kuonen, F, Huskey, NE, Shankar, G, Jaju, P, Whitson, RJ, Rieger, KE, Atwood, SX, Sarin KY, and **Oro, AE** ed(2019) Loss of primary cilia drives switching from hedgehog to ras/MAPK pathway in resistant basal cell carcinoma, *J Invest Dermatol*, in press.