

Stanford



Vittorio Sebastiano

Assistant Professor (Research) of Obstetrics and Gynecology (Reproductive and Stem Cell Biology)

Obstetrics & Gynecology - Reproductive Biology

Bio

ACADEMIC APPOINTMENTS

- Assistant Professor (Research), Obstetrics & Gynecology - Reproductive Biology
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Institute for Stem Cell Biology and Regenerative Medicine
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Co-Director PhD Program in Stem Cell Biology and Regenerative Medicine, Stanford School of Medicine, (2017- present)
- Director, Transgenic Knockout and Tumor Model Service (TKTC) Stanford Cancer Institute, Stanford School of Medicine, (2014- present)
- Director, Human Pluripotent Stem Cells Core Facility Stanford Institute for SCBRM, Stanford School of Medicine, (2010- present)

HONORS AND AWARDS

- AFAR Junior Investigator Awardee, American Federation for Aging Research (2017)
- Siebel Stem Cell Institute Scholar, Stanford School of Medicine (2014)
- Postdoctoral Training Grant, California Institute for Regenerative Medicine, Stanford School of Medicine (2009)
- Postdoctoral Training Grant, Max Planck for Molecular Biomedicine, Max Plank Institute for Molecular Biomedicine (2004)
- Honorary fellow member, Examination Board of Zoology and Developmental Biology, University of Pavia, ITALY (2001)
- Scholarship “Borsa Jacobi-Mazzocchi” for the best B.S. thesis in Applied Biomedicine, University of Pavia, ITALY (2001)

LINKS

- SCBRM PhD Program: <http://stemcellphd.stanford.edu/faculty/vittorio-sebastiano.html>
- My LinkedIn Profile: <https://www.linkedin.com/in/vittorio-sebastiano-36605538?trk=hp-identity-photo>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Germ cells, preimplantation embryos and pluripotent stem cells at first glance seem to have nothing in common. A more careful look, though, reveals that they are very closely linked to each other. The zygote originates from the fusion of two highly specialized germ cells (the sperm and the oocyte) and in a few days develops

into a blastocyst with a pluripotent cell population (the inner cell mass). These cells diverge from the extraembryonic cells of the trophoectoderm and can give rise to embryonic stem cells, in which a perpetual pluripotent and undifferentiated state is maintained.

The correct establishment of pluripotency guarantees the correct onset of development and therefore its acquisition is a fundamental biological process; any mistake associated with it has profound impact on gestation. A detailed understanding of the mechanisms that induce and regulate pluripotency is critical for the basic understanding of fundamental developmental processes that depend from it like the onset of differentiation and cellular plasticity. This is particularly relevant in consideration of the potential clinical application of human pluripotent stem cells (hPSCs).

Teaching

COURSES

2018-19

- Stem Cell Intensive: STEMREM 200 (Spr)
- Stem Cells and Human Development Laboratory: STEMREM 201B (Aut)

2017-18

- Stem Cell Intensive: STEMREM 200 (Aut, Spr)
- Stem Cells and Human Development Laboratory: STEMREM 201B (Aut)
- Stem Cells and Human Development: From Embryo to Cell Lineage Determination: STEMREM 201A (Aut)

2016-17

- Stem Cell Intensive: STEMREM 200 (Aut, Spr)
- Stem Cells and Human Development Laboratory: STEMREM 201B (Aut)
- Stem Cells and Human Development: From Embryo to Cell Lineage Determination: STEMREM 201A (Aut)

2015-16

- Stem Cell Intensive: STEMREM 200 (Aut, Spr)
- Stem Cells and Human Development Laboratory: STEMREM 201B (Aut)
- Stem Cells and Human Development: From Embryo to Cell Lineage Determination: STEMREM 201A (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Fabian Suchy

Postdoctoral Faculty Sponsor

Andrea Cipriano, Maharshi Deb, Roberta Sala

Doctoral Dissertation Advisor (AC)

Nurlybek Mursaliyev

Postdoctoral Research Mentor

Andrea Cipriano, Maharshi Deb, Roberta Sala

Doctoral (Program)

Nurlybek Mursaliyev

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Stem Cell Biology and Regenerative Medicine (Phd Program)

Publications

PUBLICATIONS

- **Replication study: Melanoma exosomes educate bone marrow progenitor cells toward a pro-metastatic phenotype through MET.** *eLife*
Kim, J., Afshari, A., Sengupta, R., Sebastiano, V., Gupta, A., Kim, Y. H., Reproducibility Project: Cancer Biology, Iorns, E., Tsui, R., Denis, A., Perfito, N., Errington, T. M., Iorns, E., et al
2018; 7
- **Honey bee Royalactin unlocks conserved pluripotency pathway in mammals.** *Nature communications*
Wan, D. C., Morgan, S. L., Spencley, A. L., Mariano, N., Chang, E. Y., Shankar, G., Luo, Y., Li, T. H., Huh, D., Huynh, S. K., Garcia, J. M., Dovey, C. M., Lumb, et al
2018; 9 (1): 5078
- **Efficient scarless genome editing in human pluripotent stem cells.** *Nature methods*
Ikeda, K., Uchida, N., Nishimura, T., White, J., Martin, R. M., Nakauchi, H., Sebastiano, V., Weinberg, K. I., Porteus, M. H.
2018; 15 (12): 1045–47
- **A distinct isoform of ZNF207 controls self-renewal and pluripotency of human embryonic stem cells.** *Nature communications*
Fang, F., Xia, N., Angulo, B., Carey, J., Cady, Z., Durruthy-Durruthy, J., Bennett, T., Sebastiano, V., Reijo Pera, R. A.
2018; 9 (1): 4384
- **Influenza virus infection causes global RNAPII termination defects** *NATURE STRUCTURAL & MOLECULAR BIOLOGY*
Zhao, N., Sebastiano, V., Moshkina, N., Mena, N., Hultquist, J., Jimenez-Morales, D., Ma, Y., Rialdi, A., Albrecht, R., Fenouil, R., Sanchez-Aparicio, M., Ayllon, J., Ravisankar, et al
2018; 25 (9): 885-+
- **Do Induced Pluripotent Stem Cell Characteristics Correlate with Efficient In Vitro Smooth Muscle Cell Differentiation? A Comparison of Three Patient-Derived Induced Pluripotent Stem Cell Lines.** *Stem cells and development*
Zhou, Y., Kang, G., Wen, Y., Briggs, M., Sebastiano, V., Pederson, R., Chen, B.
2018
- **NKX3-1 is required for induced pluripotent stem cell reprogramming and can replace OCT4 in mouse and human iPSC induction.** *Nature cell biology*
Mai, T., Markov, G. J., Brady, J. J., Palla, A., Zeng, H., Sebastiano, V., Blau, H. M.
2018
- **Use of human-derived stem cells to create a novel, in vitro model designed to explore FMR1 CGG repeat instability amongst female premutation carriers.** *Journal of assisted reproduction and genetics*
Gustin, S. L., Wang, G., Baker, V. M., Latham, G., Sebastiano, V.
2018
- **Single cell expression analysis of primate-specific retroviruses-derived HPAT lincRNAs in viable human blastocysts identifies embryonic cells co-expressing genetic markers of multiple lineages** *HELIYON*
Glinsky, G., Durruthy-Durruthy, J., Wossidlo, M., Grow, E. J., Weirather, J. L., Au, K., Wysocka, J., Sebastiano, V.
2018; 4 (6): e00667
- **Human Ipsc-Derived Thymic Epithelial Progenitor Cells as Stem Cell-Based Therapy to Restore Thymic Function in Hematopoietic Stem Cell Transplant Recipients**
Gai, H., Sebastiano, V., Weinacht, K. G.
ELSEVIER SCIENCE INC.2018: S364
- **CRISPR/Cas9 microinjection in oocytes disables pancreas development in sheep** *SCIENTIFIC REPORTS*
Vilarino, M., Rashid, S., Suchy, F., McNabb, B., van der Meulen, T., Fine, E. J., Ahsan, S., Mursaliyev, N., Sebastiano, V., Diab, S., Huisling, M. O., Nakauchi, H., Ross, et al
2017; 7: 17472
- **A semi-interpenetrating network of polyacrylamide and recombinant basement membrane allows pluripotent cell culture in a soft, ligand-rich microenvironment.** *Biomaterials*
Price, A. J., Huang, E. Y., Sebastiano, V., Dunn, A. R.
2017; 121: 179-192

- **A Comprehensive TALEN-Based Knockout Library for Generating Human Induced Pluripotent Stem Cell-Based Models for Cardiovascular Diseases.** *Circulation research*
Karakikes, I., Termglinchan, V., Cepeda, D. A., Lee, J., Diecke, S., Hendel, A., Itzhaki, I., Ameen, M., Shrestha, R., Wu, H., Ma, N., Shao, N., Seeger, et al
2017
- **Spatiotemporal Reconstruction of the Human Blastocyst by Single-Cell Gene-Expression Analysis Informs Induction of Naive Pluripotency** *DEVELOPMENTAL CELL*
Durruthy-Durruthy, J., Wossidlo, M., Pai, S., Takahashi, Y., Kang, G., Omberg, L., Chen, B., Nakauchi, H., Pera, R. R., Sebastiano, V.
2016; 38 (1): 100-115
- **YAP Induces Human Naive Pluripotency.** *Cell reports*
Qin, H., Hejna, M., Liu, Y., Percharde, M., Wossidlo, M., Blouin, L., Durruthy-Durruthy, J., Wong, P., Qi, Z., Yu, J., Qi, L. S., Sebastiano, V., Song, et al
2016; 14 (10): 2301-2312
- **The primate-specific noncoding RNA HPAT5 regulates pluripotency during human preimplantation development and nuclear reprogramming.** *Nature genetics*
Durruthy-Durruthy, J., Sebastiano, V., Wossidlo, M., Cepeda, D., Cui, J., Grow, E. J., Davila, J., Mall, M., Wong, W. H., Wysocka, J., Au, K. F., Reijo Pera, R. A.
2016; 48 (1): 44-52
- **Derivation of GMP-Compliant Integration-Free hiPSCs Using Modified mRNAs.** *Methods in molecular biology (Clifton, N.J.)*
Durruthy, J. D., Sebastiano, V.
2015; 1283: 31-42
- **Patenting parthenotes in the US and Europe.** *Nature biotechnology*
Senatore, V., Scott, C. T., Sebastiano, V.
2015; 33 (12): 1232-34
- **Lift NIH restrictions on chimera research.** *Science (New York, N.Y.)*
Sharma, A., Sebastiano, V., Scott, C. T., Magnus, D., Koyano-Nakagawa, N., Garry, D. J., Witte, O. N., Nakauchi, H., Wu, J. C., Weissman, I. L., Wu, S. M.
2015; 350 (6261): 640
- **Human COL7A1-corrected induced pluripotent stem cells for the treatment of recessive dystrophic epidermolysis bullosa** *SCIENCE TRANSLATIONAL MEDICINE*
Sebastiano, V., Zhen, H. H., Derafshi, B. H., Bashkirova, E., Melo, S. P., Wang, P., Leung, T. L., Siprashvili, Z., Tichy, A., Li, J., Ameen, M., Hawkins, J., Lee, et al
2014; 6 (264)
- **The transcriptome of human pluripotent stem cells.** *Current opinion in genetics & development*
Au, K. F., Sebastiano, V.
2014; 28: 71-77
- **Germ Cell Nuclear Factor Regulates Gametogenesis in Developing Gonads** *PLOS ONE*
Sabour, D., Xu, X., Chung, A. C., Le Menuet, D., Ko, K., Tapia, N., Arauzo-Bravo, M. J., Gentile, L., Greber, B., Huebner, K., Sebastiano, V., Wu, G., Schoeler, et al
2014; 9 (8)
- **Quantifying Genome-Editing Outcomes at Endogenous Loci with SMRT Sequencing.** *Cell reports*
Hendel, A., Kildebeck, E. J., Fine, E. J., Clark, J. T., Punjya, N., Sebastiano, V., Bao, G., Porteus, M. H.
2014; 7 (1): 293-305
- **Efficient endoderm induction from human pluripotent stem cells by logically directing signals controlling lineage bifurcations.** *Cell stem cell*
Loh, K. M., Ang, L. T., Zhang, J., Kumar, V., Ang, J., Auyeong, J. Q., Lee, K. L., Choo, S. H., Lim, C. Y., Nichane, M., Tan, J., Noghabi, M. S., Azzola, et al
2014; 14 (2): 237-252
- **Rapid and Efficient Conversion of Integration-Free Human Induced Pluripotent Stem Cells to GMP-Grade Culture Conditions.** *PloS one*
Durruthy-Durruthy, J., Briggs, S. F., Awe, J., Ramathal, C. Y., Karumbayaram, S., Lee, P. C., Heidmann, J. D., Clark, A., Karakikes, I., Loh, K. M., Wu, J. C., Hoffman, A. R., Byrne, et al
2014; 9 (4)
- **Germ cell nuclear factor regulates gametogenesis in developing gonads.** *PloS one*
Sabour, D., Xu, X., Chung, A. C., Le Menuet, D., Ko, K., Tapia, N., Arauzo-Bravo, M. J., Gentile, L., Greber, B., Hübner, K., Sebastiano, V., Wu, G., Schöler, et al

2014; 9 (8)

- **Characterization of the human ESC transcriptome by hybrid sequencing** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Au, K. F., Sebastiano, V., Afshar, P. T., Durruthy, J. D., Lee, L., Williams, B. A., van Bakel, H., Schadt, E. E., Reijo-Pera, R. A., Underwood, J. G., Wong, W. H.
2013; 110 (50): E4821-E4830
- **SHANK3 and IGF1 restore synaptic deficits in neurons from 22q13 deletion syndrome patients.** *Nature*
Shcheglovitov, A., Shcheglovitova, O., Yazawa, M., Portmann, T., Shu, R., Sebastiano, V., Krawisz, A., Froehlich, W., Bernstein, J. A., Hallmayer, J. F., Dolmetsch, R. E.
2013; 503 (7475): 267-271
- **SHANK3 and IGF1 restore synaptic deficits in neurons from 22q13 deletion syndrome patients** *NATURE*
Shcheglovitov, A., Shcheglovitova, O., Yazawa, M., Portmann, T., Shu, R., Sebastiano, V., Krawisz, A., Froehlich, W., Bernstein, J. A., Hallmayer, J. F., Dolmetsch, R. E.
2013; 503 (7475): 267-?
- **Generation and characterization of transgene-free human induced pluripotent stem cells and conversion to putative clinical-grade status** *STEM CELL RESEARCH & THERAPY*
Awe, J. P., Lee, P. C., Ramathal, C., Vega-Crespo, A., Durruthy-Durruthy, J., Cooper, A., Karumbayaram, S., Lowry, W. E., Clark, A. T., Zack, J. A., Sebastiano, V., Kohn, D. B., Pyle, et al
2013; 4
- **Human amniotic mesenchymal stem cell-derived induced pluripotent stem cells may generate a universal source of cardiac cells.** *Stem cells and development*
Ge, X., Wang, I. E., Toma, I., Sebastiano, V., Liu, J., Butte, M. J., Reijo Pera, R. A., Yang, P. C.
2012; 21 (15): 2798-2808
- **Human Amniotic Mesenchymal Stem Cell-Derived Induced Pluripotent Stem Cells May Generate a Universal Source of Cardiac Cells** *STEM CELLS AND DEVELOPMENT*
Ge, X., Wang, I. E., Toma, I., Sebastiano, V., Liu, J., Butte, M. J., Pera, R. A., Yang, P. C.
2012; 21 (15): 2798-2808
- **Ultrastructural Characterization of Mouse Embryonic Stem Cell-Derived Oocytes and Granulosa Cells** *STEM CELLS AND DEVELOPMENT*
Psathaki, O. E., Huebner, K., Sabour, D., Sebastiano, V., Wu, G., Sugawa, F., Wieacker, P., Pennekamp, P., Schoeler, H. R.
2011; 20 (12): 2205-2215
- **In Situ Genetic Correction of the Sickle Cell Anemia Mutation in Human Induced Pluripotent Stem Cells Using Engineered Zinc Finger Nucleases** *STEM CELLS*
Sebastiano, V., Maeder, M. L., Angstman, J. F., Haddad, B., Khayter, C., Yeo, D. T., Goodwin, M. J., Hawkins, J. S., Ramirez, C. L., Batista, L. F., Artandi, S. E., Wernig, M., Joung, et al
2011; 29 (11): 1717-1726
- **Induction of human neuronal cells by defined transcription factors** *NATURE*
Pang, Z. P., Yang, N., Vierbuchen, T., Ostermeier, A., Fuentes, D. R., Yang, T. Q., Citri, A., Sebastiano, V., Marro, S., Suedhof, T. C., Wernig, M.
2011; 476 (7359): 220-U122
- **Telomere shortening and loss of self-renewal in dyskeratosis congenita induced pluripotent stem cells** *NATURE*
Batista, L. F., Pech, M., Zhong, F. L., Nguyen, H. N., Xie, K. T., Zaugg, A. J., Crary, S. M., Choi, J., Sebastiano, V., Cherry, A., Giri, N., Wernig, M., Alter, et al
2011; 474 (7351): 399-?
- **Embryonic Stem Cells, Derived Either after In Vitro Fertilization or Nuclear Transfer, Prolong Survival of Semiallogeneic Heart Transplants** *JOURNAL OF IMMUNOLOGY*
Imberti, B., Casiraghi, F., Cugini, D., Azzollini, N., Cassis, P., Todeschini, M., Solini, S., Sebastiano, V., Zuccotti, M., Garagna, S., Redi, C. A., Noris, M., Morigi, et al
2011; 186 (7): 4164-4174
- **Oct1 regulates trophoblast development during early mouse embryogenesis** *DEVELOPMENT*
Sebastiano, V., Dalvai, M., Gentile, L., Schubart, K., Sutter, J., Wu, G., Tapia, N., Esch, D., Ju, J., Huebner, K., Arauzo-Bravo, M. J., Schoeler, H. R., Cavaleri, et al
2010; 137 (21): 3551-3560

- **Dynamic link of DNA demethylation, DNA strand breaks and repair in mouse zygotes** *EMBO JOURNAL*
Wossidlo, M., Arand, J., Sebastiano, V., Lepikhov, K., Boiani, M., Reinhardt, R., Schoeler, H., Walter, J.
2010; 29 (11): 1877-1888
- **Induction of Pluripotency in Adult Unipotent Germline Stem Cells** *CELL STEM CELL*
Ko, K., Tapia, N., Wu, G., Kim, J. B., Arauzo-Bravo, M. J., Sasse, P., Glaser, T., Ruau, D., Han, D. W., Greber, B., Hausdoerfer, K., Sebastiano, V., Stehling, et al
2009; 5 (1): 87-96
- **Oct4-Induced Pluripotency in Adult Neural Stem Cells** *CELL*
Kim, J. B., Sebastiano, V., Wu, G., Arauzo-Bravo, M. J., Sasse, P., Gentile, L., Ko, K., Ruau, D., Ehrich, M., Van Den Boom, D., Meyer, J., Huebner, K., Bernemann, et al
2009; 136 (3): 411-419
- **Pluripotent stem cells induced from adult neural stem cells by reprogramming with two factors** *NATURE*
Kim, J. B., Zaehres, H., Wu, G., Gentile, L., Ko, K., Sebastiano, V., Arauzo-Bravo, M. J., Ruau, D., Han, D. W., Zenke, M., Schoeler, H. R.
2008; 454 (7204): 646-U54
- **Experimental demonstration that mammalian oocytes are not selective towards X- or Y-bearing sperm** *MOLECULAR REPRODUCTION AND DEVELOPMENT*
Zuccotti, M., Sebastiano, V., Garagna, S., Redi, C. A.
2005; 71 (2): 245-246
- **Cloned pre-implantation mouse embryos show correct timing but altered levels of gene expression** *MOLECULAR REPRODUCTION AND DEVELOPMENT*
Sebastiano, V., Gentile, L., Garagna, S., Redi, C. A., Zuccotti, M.
2005; 70 (2): 146-154
- **Three-dimensional localization and dynamics of centromeres in mouse oocytes during folliculogenesis** *JOURNAL OF MOLECULAR HISTOLOGY*
Garagna, S., Merico, V., Sebastiano, V., Monti, M., Orlandini, G., Gatti, R., Scandroglia, R., Redi, C. A., Zuccotti, M.
2004; 35 (6): 631-638
- **Single-cell quantitative RT-PCR analysis of Cpt1b and Cpt2 gene expression in mouse antral oocytes and in preimplantation embryos** *CYTOGENETIC AND GENOME RESEARCH*
Gentile, L., Monti, M., Sebastiano, V., Merico, V., Nicolai, R., Calvani, M., Garagna, S., Redi, C. A., Zuccotti, M.
2004; 105 (2-4): 215-221