Stanford

Matteo Amitaba Mole'

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

Obstetrics & Gynecology - Reproductive Biology

CONTACT INFORMATION

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Bio

BIO

Matteo A. Molè, PhD, is an Assistant Professor in the Department of Obstetrics and Gynecology at Stanford University. He is a member of the Division of Reproductive, Stem Cell and Perinatal Biology, as well as the Dunlevie Maternal-Fetal Medicine Center for Discovery, Innovation and Clinical Impact.

Dr. Molè earned his PhD from University College London (UCL) and pursued postdoctoral research fellowships at the University of Cambridge and the Babraham Institute, where he established a license under the UK Human Fertilisation and Embryology Authority (HFEA) to conduct research on human embryos donated by patients undergoing IVF.

In the summer of 2023, Dr. Molè joined Stanford University as an Assistant Professor. His work focuses on investigating the mechanisms of human embryo implantation.

ACADEMIC APPOINTMENTS

- Assistant Professor, Obstetrics & Gynecology - Reproductive Biology
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)

LINKS

- Lab website: https://med.stanford.edu/matteo-mole.html

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

The research focus of our laboratory is centered on investigating the complex process of human embryo implantation. Due to the limited availability of suitable model systems and inability to directly observe this process in vivo, this has been traditionally referred to as the enigmatic stage of human embryonic development.

The successful implantation of an embryo is crucial for the establishment of a healthy pregnancy. During the transition between the first and second week of gestation, the human embryo must securely implant into the maternal uterus, initiating development of the placenta to receive necessary nutrients and oxygen for its growth until birth.

However, the process of implantation in humans is highly susceptible to failure, with a significant percentage of embryos unable to develop beyond this stage leading to early miscarriages. This clinically observed "implantation barrier" often requires patients to undergo numerous cycles of IVF treatment, with no guarantee of a successful pregnancy outcome.

The primary objective is to increase the understanding of maternal-embryo interactions initiated at implantation, with the goal of developing clinical interventions to address the high incidence of implantation failures underlying pre-clinical miscarriages.

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Dan Su

Publications

PUBLICATIONS

- **A single cell characterisation of human embryogenesis identifies pluripotency transitions and putative anterior hypoblast centre** *NATURE COMMUNICATIONS*
  Mole, M. A., Coorens, T. H., Shahbazi, M. N., Weberling, A., Weatherbee, B. T., Gantner, C. W., Sancho-Serra, C., Richardson, L., Drinkwater, A., Syed, N., Engley, S., Snell, P., Christie, et al
  2021; 12 (1): 3679
- **Integrin beta 1 coordinates survival and morphogenesis of the embryonic lineage upon implantation and pluripotency transition** *CELL REPORTS*
  Mole, M., Weberling, A., Faessler, R., Campbell, A., Fishel, S., Zernicka-Goetz, M.
  2021; 34 (10): 108834
- **Integrin-Mediated Focal Anchorage Drives Epithelial Zippering during Mouse Neural Tube Closure** *DEVELOPMENTAL CELL*
  Mole, M. A., Galea, G. L., Rolo, A., Weberling, A., Nychyk, O., De Castro, S. C., Savery, D., Faessler, R., Ybot-Gonzalez, P., Greene, N. E., Copp, A. J.
  2020; 52 (3): 321-+
- **Comparative analysis of human and mouse development: From zygote to pre-gastrulation** *GASTRULATION: FROM EMBRYONIC PATTERN TO FORM*
  Mole, M. A., Weberling, A., Zernicka-Goetz, M., SolnicaKrezel, L.
  2020; 136: 113-+
- **Cellular basis of neuroepithelial bending during mouse spinal neural tube closure** *DEVELOPMENTAL BIOLOGY*
  McShane, S. G., Mole, M. A., Savery, D., Greene, N. E., Tam, P. L., Copp, A. J.
  2015; 404 (2): 113-124
- **Live-Imaging Analysis of Epithelial Zippering During Mouse Neural Tube Closure.** *Methods in molecular biology (Clifton, N.J.)*
  Mole, M. A., Galea, G. L., Copp, A. J.
  2023; 2608: 147-162
- **Vangl2-environment interaction causes severe neural tube defects, without abnormal neuroepithelial convergent extension** *DISEASE MODELS & MECHANISMS*
  Nychyk, O., Galea, G. L., Mole, M., Savery, D., Greene, N. E., Stanier, P., Copp, A. J.
  2022; 15 (1)
- **The role of cell-ECM adhesions in mouse neural tube closure**
  Papastergios, E. V., Mole, M. A., Galea, G. L., Greene, N. E., Copp, A. J.

WILEY.2021: 959

- **Human embryo polarization requires PLC signaling to mediate trophectoderm specification** *ELIFE*
  Zhu, M., Shahbazi, M., Martin, A., Zhang, C., Sozen, B., Borsos, M., Mandelbaum, R. S., Paulson, R. J., Mole, M. A., Esbert, M., Titus, S., Scott, R. T., Campbell, et al
  2021; 10

- **Modelling the impact of decidual senescence on embryo implantation in human endometrial assembloids** *ELIFE*
  Rawlings, T. M., Makwana, K., Taylor, D. M., Mole, M. A., Fishwick, K. J., Tryfonos, M., Odendaal, J., Hawkes, A., Zernicka-Goetz, M., Hartshorne, G. M., Brosens, J. J., Lucas, E. S.
  2021; 10

- **The role of Sox2 in neuromesodermal progenitors and neural specification in the mouse**
  Papastergios, E. V., Mugele, D., Moulding, D. A., Savery, D., Mole, M. A., Greene, N. E., Martinez-Barbera, J., Copp, A. J.
  WILEY.2020: 338

- **Vangl2 disruption alters the biomechanics of late spinal neurulation leading to spina bifida in mouse embryos** *DISEASE MODELS & MECHANISMS*
  Galea, G. L., Nychyk, O., Mole, M. A., Moulding, D., Savery, D., Nikolopoulou, E., Henderson, D. J., Greene, N. E., Copp, A. J.
  2018; 11 (3)

- **Biomechanical coupling of the closing spinal neural tube facilitates neural fold apposition**
  Galea, G. L., Cho, Y., Galea, G., Mole, M. A., Rolo, A., Savery, D., Moulding, D., Nikolopoulou, E., Greene, N. E., Copp, A. J.
  HINDAWI LTD.2017

- **Biomechanical coupling facilitates spinal neural tube closure in mouse embryos** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Galea, G. L., Cho, Y., Galea, G., Mole, M. A., Rolo, A., Savery, D., Moulding, D., Culshaw, L. H., Nikolopoulou, E., Greene, N. E., Copp, A. J.
  2017; 114 (26): E5177-E5186

- **Regulation of cell protrusions by small GTPases during fusion of the neural folds** *ELIFE*
  Rolo, A., Savery, D., Escuin, S., de Castro, S. C., Armer, H. J., Munro, P. G., Mole, M. A., Greene, N. E., Copp, A. J.
  2016; 5: e13273

- **Cell-matrix interactions and cell dynamics of neuroepithelial bending during mouse spinal neural tube closure**
  Mole, M. A., Mugele, D., Ybot-Gonzalez, P., Greene, N. E., Copp, A. J.
  HINDAWI LTD.2015