

# Oocyte Mechanics and Morphogenesis

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## Selected Publications (\* corresponding authors):

- Nikalayevich E, Letort G, De Labbey G, Todisco E, Shihabi A, Turlier H, Voituriez R, Yahiatene M, Pollet-Villard X, Innocenti M, Schuh M, Terret ME\*, Verlhac MH\*. (2024). Aberrant cortex contractions impact mammalian oocyte quality. *Dev Cell* 59:841-852
- Crozet F, Letort G, Da Silva C, Eichmuller A, Tortorelli AF, Belle M, Dumont J, Piolot T, Dauphin A, Couplier F, Chédotal A, Maître JL, Verlhac MH, Clarke HJ, Terret ME\*. (2023). The filipodia-like protrusions of adjacent somatic cells shape the developmental potential of mouse oocytes. *Life Sci All* 6:e202301963.
- Al Jord A\*, Letort G, Chanut S, Tsai FC, Antoniewski C, Eichmuller A, Da Silva C, Huynh JR, Gov NS, Voituriez R, Terret ME, Verlhac MH. (2022). Cytoplasmic forces functionally reorganize nuclear condensates in oocytes. *Nat Commun* 13:5070.
- Letort G \*, Eichmuller A, Da Silva C, Nikalayevich E, Crozet F, Salle J, Minc N, Labrune E, Wolf JP, Terret ME, Verlhac MH. (2022). An interpretable and versatile machine learning approach for oocyte phenotyping. *J Cell Sci* jcs.260281
- Crozet F, Da Silva C, Verlhac MH\*, Terret ME\*. (2021). Myosin-X is dispensable for spindle morphogenesis and positioning in mouse oocyte. *Dev* 148: dev199364
- Bennabi I, Crozet F°, Nikalayevich E°, Chaigne A, Letort G, Manil-Ségalen M, Campillo C, Cadart C, Othmani A, Attia R, Sykes C, Genovesio A, Verlhac MH\*, Terret ME\*. (2020). Artificially decreasing cortical tension generates aneuploidy in mouse oocytes. *Nat Commun* 11: 1649-1663
- Colin A, Letort G, Razin N, Almonacid M, Ahmed W, Betz T, Terret ME, Gov NS, Voituriez R, Gueroui Z\*, Verlhac MH\*. (2020). Active diffusion in oocytes non-specifically centers large objects during Prophase I and Meiosis I. *J Cell Biol* 219: e201908195
- Almonacid M, Al Jord A, El-Hayek S, Othmani A, Couplier F, Lemoine S, Miyamoto K, Grosse R, Piolot T, Klein C, Mailly P, Voituriez R, Genovesio A\*, Verlhac MH.\* (2019). Active fluctuations of the nuclear envelope shape the transcriptional dynamics in oocytes. *Dev Cell* 51: 145-157
- Letort G\*, Bennabi I, Dmitrieff S, Nedelec F, Verlhac MH, Terret ME\*. (2019). A computational model of the early stages of acentriolar meiotic spindle assembly. *Mol Biol Cell* 30:863-875
- Manil-Ségalen M, Łuksza M, Kanaan J, Marthiens V, Lane SIR, Jones KT, Terret ME, Basto R, Verlhac MH\*. (2018). Chromosome structural anomalies due to aberrant spindle forces exerted at gene editing sites in meiosis. *J Cell Biol* 217: 3416-3430

- Bennabi I, Quéguiner I, Kolano A, Boudier T, Mailly P, Verlhac MH\*, Terret ME\*. (2018). Shifting meiotic to mitotic spindle assembly in oocytes disrupts chromosome alignment. *Embo Rep* 19: 368-381
- Chaigne A, Campillo C, Voituriez R, Gov NS, Sykes C, Verlhac MH\*, Terret ME\*. (2016). F-actin mechanics control spindle centering in the mouse zygote. *Nat Commun* 7:10253-10267.
- Almonacid M, Ahmed WW, Bussonnier M, Mailly P, Betz T, Voituriez R, Gov NS, Verlhac MH\*. (2015). Active diffusion positions the nucleus in mouse oocytes. *Nat Cell Biol* 17: 470-479
- Chaigne A, Campillo C, Gov NS, Voituriez R, Sykes C, Verlhac M-H\*, Terret ME\*. (2015). A narrow window of cortical tension guides asymmetric spindle positioning in the mouse oocyte. *Nat Commun* 6: 6027-6037.
- Chaigne A, Campillo C, Gov NS, Voituriez R, Azoury J, Umana-Diaz C, Almonacid M, Queguiner I, Nassoy P, Sykes C, Verlhac MH\*, Terret ME\*. (2013). A soft cortex is essential for asymmetric spindle positioning in mouse oocytes. *Nat Cell Biol* 15,958-66.
- Łuksza M, Queguiner I, Verlhac MH\*, Brunet S\*. (2013). Rebuilding MTOCs upon centriole loss during mouse oogenesis. *Dev Biol* 382, 48-56.
- Kolano A, Brunet S, Silk AD, Cleveland DW\*, Verlhac MH\*. (2012). Error prone mammalian female meiosis from silencing the SAC without normal interkinetochore tension. *PNAS* 109, E1858-E1867.

#### Invited reviews and book chapters:

- Verlhac MH. (2024). Exploring the maternal inheritance transmitted by the oocyte to its progeny. *Comptes Rendus de Biologie* from the French Academy of Sciences 347:45-52.
- Bulteau R, Barbier L, Lamour G, Piolot T, Labrune E, Campillo C\*, Terret ME\*. (2024). Mechanical characterization of murine oocytes by Atomic Force Microscopy. *Meth Mol Biol* 2740:117-124.
- Al Jord A\*, Verlhac MH\*. (2023). Dyes illuminate live human embryogenesis. *Cell* 186:3143-3145.
- Nikalayevich E\*, Terret ME. 2023. Meiosis: Actin and microtubule networks drive chromosome clustering in oocytes. *Curr Biol* 33:R272-R274.
- Almonacid M\*, Verlhac MH. 2022. A mitochondrial niche protects oocyte RNPs. *Dev Cell* 57:2599–2600.
- Verlhac MH. (2021). The groom shall wait until the bride is ready. *J Cell Biol* 220:e202108030
- Nikalayevich E\*, Verlhac MH. (2021). Selfish centromeres, selfless heterochromatin. *Cell* 184:4843-4844
- Almonacid M\*, Verlhac MH. (2020). A new mode of mechano-transduction shakes the oocyte nucleus, thereby fine tunes gene expression modulating the developmental potential. *Comptes Rendus de Biologie* from the French Academy of Sciences 343: 223-234
- Bennabi I\*, Verlhac MH, Terret ME\*. (2020). Cortical tension of the oocyte and euploidy: the right balance. *Med Sci* 36:965-968
- Almonacid M\*, Terret ME, Verlhac MH. (2019.) Nuclear positioning as an integrator of cell fate. *Curr Op Cell Biol* 56:122-129

- Al Jord A\*, Verlhac MH. (2018). Spindle Assembly: Two Spindles for Two Genomes in a Mammalian Zygote. *Curr Biol* 28:R948-R951
- Verlhac MH. (2018). An actin shell delays oocyte chromosome capture by microtubules. *J Cell Biol* 217:2601-2603
- Book edition in *Meth Mol Biol* at Springer Protocols by MH Verlhac & ME Terret. (2018). Doi.org/10.1007/978-1-4939-8603-3
- Almonacid M\*, Terret ME, Verlhac MH. (2018). Control of nucleus positioning in mouse oocytes. *Semin Cell Dev Biol* 9521 : 30358
- Chaigne A, Terret ME, Verlhac MH\*. (2017). Asymmetries and symmetries in the mouse oocyte and zygote. Book Chapter in *Results Probl Cell Differ* 61:285-299
- Bennabi I\*, Terret ME, Verlhac MH\*. (2016). Meiotic spindle assembly and chromosome segregation in oocytes. *J Cell Biol* 215: 611-619
- Verlhac MH. (2016). Mother centrioles are kicked out so that starfish zygote can grow. *J Cell Biol* 212: 759-61
- Verlhac MH\*, Terret ME. (2016). Oocyte Maturation and Development. *F1000Research* 5 : 309-317

**Patent (alphabetical order):**

- Barbier L, Bulteau R, Campillo C, Terret ME, Verlhac MH. Microfluidic device for use in a system for measuring at least one biomarker of at least one oocyte. European patent filed in 2023, PCT extension in 2024 (EP2024/059100).