CIBIO EXTERNAL SEMINAR

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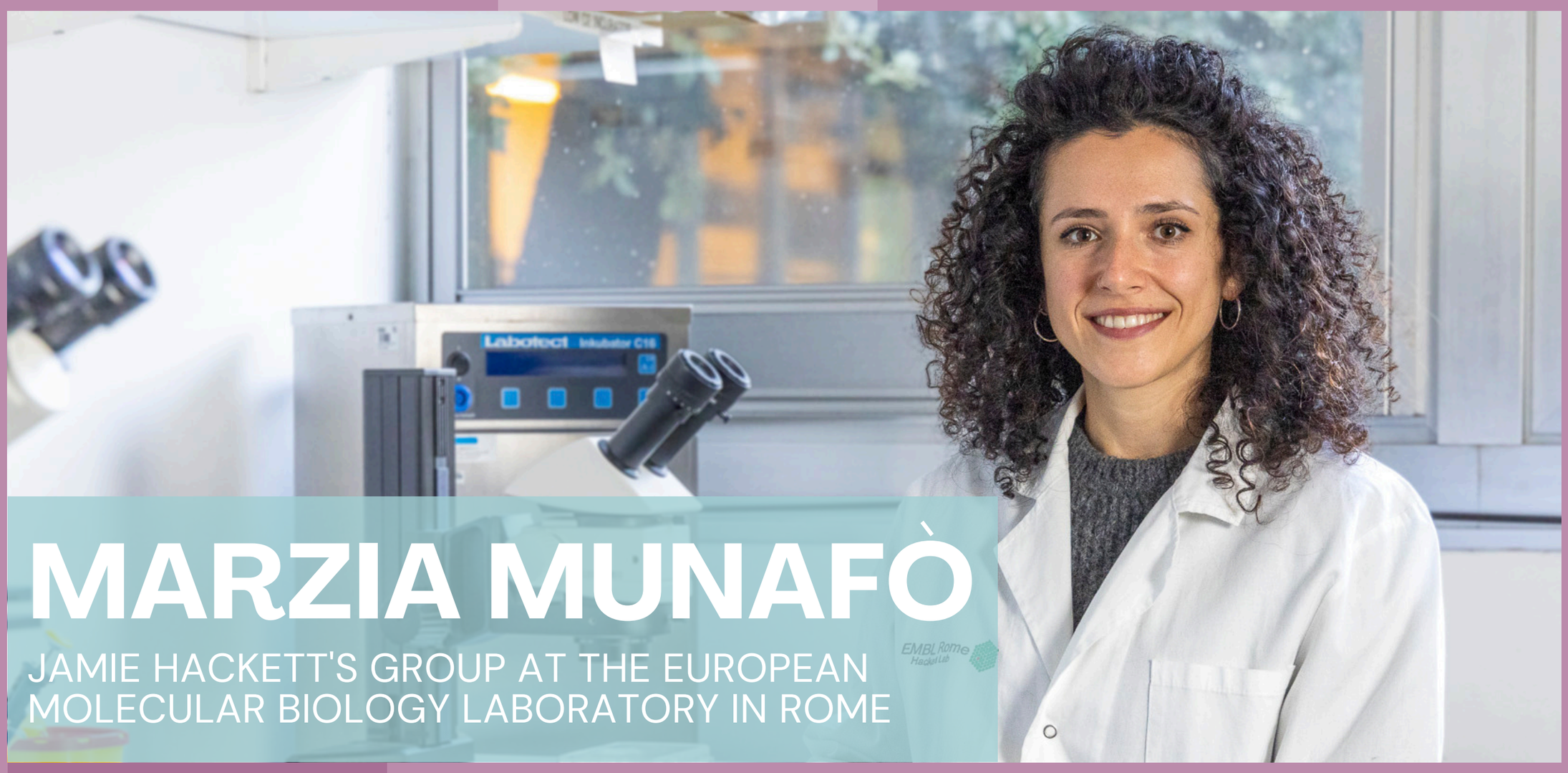

MARZIA MUNAFÒ

JAMIE HACKETT'S GROUP AT THE EUROPEAN MOLECULAR BIOLOGY LABORATORY IN ROME

PRECISION GENETIC PERTURBATIONS REVEAL THE FUNCTIONAL ROLE OF CHROMATIN MARKS IN OOGENESIS AND INHERITANCE

Upon fertilisation, genetic and epigenetic information is transmitted from gametes to zygotes. The parental epigenomes are largely reset after fertilisation, yet transiently inherited epigenetic states can impact embryonic development and beyond. However, the precise function of chromatin landscapes in developing oocytes and upon inheritance into early embryos is incompletely understood. Here, we present a novel strategy to rapidly and systematically engineer precision genetic perturbations into developing oocytes. Our approach is scalable, potentially applicable to any gene of interest, and enables integrated analysis across multiple perturbations. We exploit this strategy to generate oocyte-specific catalytic mutants of chromatin modifying enzymes, to isolate the functional roles of chromatin modifications per se. By coupling this strategy with single-oocyte/embryo ‘omics’ at scale, we capture the direct and interconnected regulatory roles of key chromatin pathways during oogenesis. Moreover, we extend this to probe the function of chromatin marks during maternal transmission into early embryos, and in doing so identify unexpected new modalities of epigenetic inheritance

UNIVERSITÀ DI TRENTO
Dipartimento di
Biologia Cellulare, Computazionale e Integrata - CIBIO

DEPARTMENT OF CELLULAR, COMPUTATIONAL AND INTEGRATIVE BIOLOGY - CIBIO
VIA SOMMARIVE, 9
38123 - POVO (TN)
COMUNICAZIONE.CIBIO@UNITN.IT