UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
SCUOLA DI AGRARIA
E MEDICINA VETERINARIA

IL caffè SCIENTIFICO

OLTRE IL GENOMA: L'IMPORTANZA DI ESSERE METILATI

Riccardo Aversano

Dipartimento di Agraria

raversan@unina.it

IL MIO PERCORSO

ATATGCCGTATGCCAAGGGATGCTAGCGCGGTTAGAGCTAGATCGATCGCGTGATAGCTTCTAGATCGCGCGCTAGAGATCGATAGCTTCTAGATCGCGCGCTAGAGATCGCTAGATGCGCGCGCTGATGCT

2002 — LAUREA — Scienze e Tecnologie Agrarie

2005 — DOTTORATO — Agrobiologia e Agrochimica

Department of Plant Pathology
COLLEGE OF FOOD, AGRICULTURAL AND NATURAL RESOURCE SCIENCES

UNIVERSITY OF MINNESOTA

2007 — RICERCATORE — AGR/07 Genetica agraria

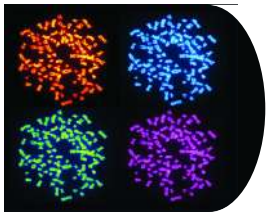
UNIVERSITÉ DE GENÈVE
FACULTÉ DES SCIENCES

SCHOLA GENEVENSIS 15 59

2020 — PROF. ASSOCIATO

I MIEI INTERESSI DI RICERCA

Valorizzazione della **#biodiversità** vegetale attraverso approcci di genomica e **#miglioramento_genetico** per la **#resistenza**

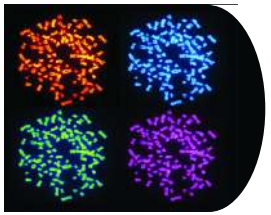


Studio degli effetti del **#raddoppiamento_numero_cromosomi**

Identificazione dei meccanismi molecolari di **#regolazione_genica** della biosintesi di **#metaboliti_secondari**

I MIEI INTERESSI DI RICERCA

Va[illegible]lla **#biodiversità** vegetale attraverso approcci di ge[illegible]**nto_genetico** per la #**resistenza**



Studio degli effetti del **#r[illegible]mero_cromosomico**

Identificazione dei meccanismi molecolari di **#regolazione_genica** della biosintesi di **#metabo[illegible]ndari**

#EPIGENETICA

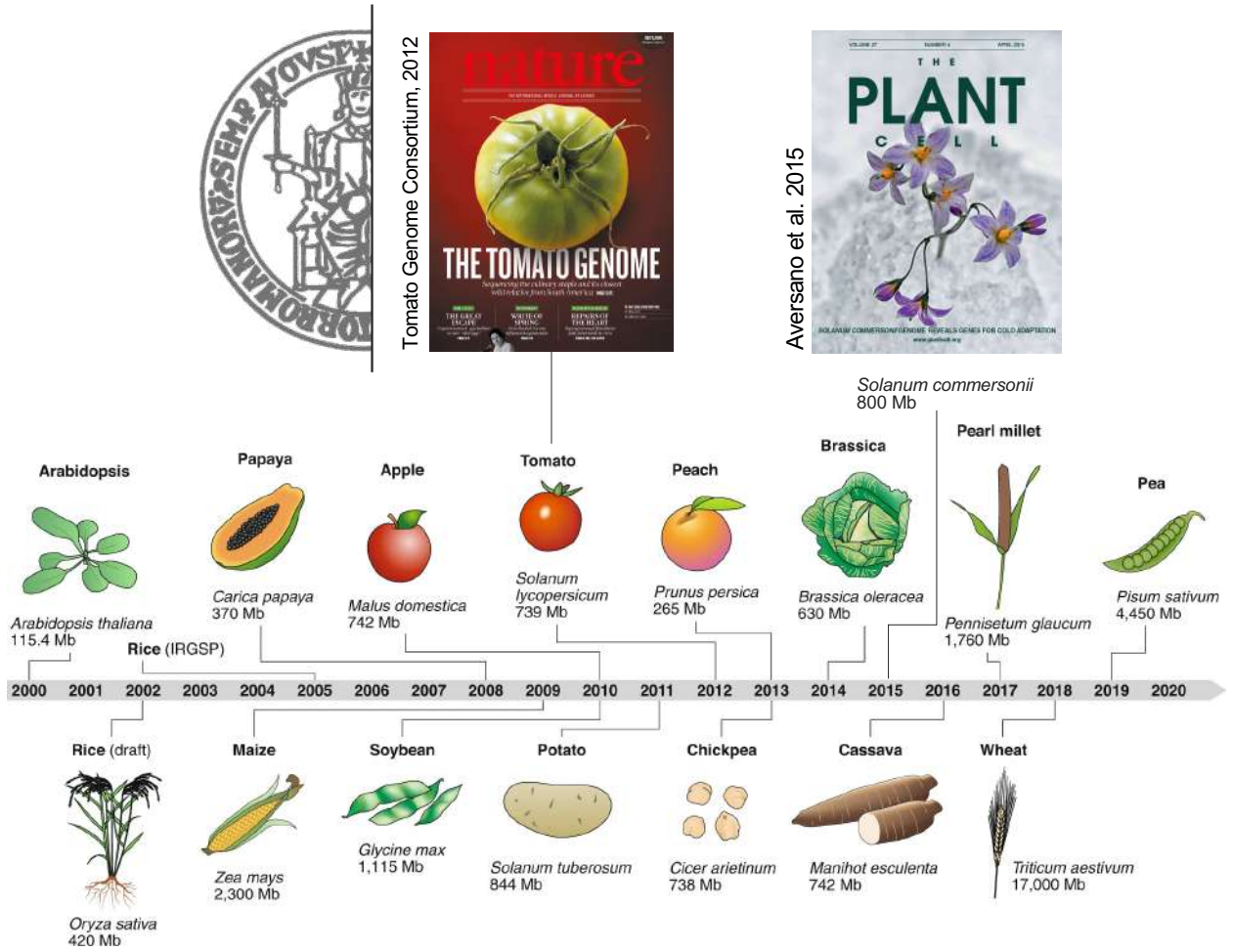
IL DESTINO SCRITTO NEI GENI

Oggi stiamo imparando il linguaggio con cui Dio ha creato la vita - Bill Clinton, Presidente USA

La mappatura del genoma umano è stata paragonata alla conquista della Luna da parte dell´uomo, ma io credo che sia più di questo. È un risultato straordinario per la storia dell´umanità - Michael Dexter, Presidente della Welcome Trust)

International Human Genome Sequencing Consortium, 2001 Nature

IL DESTINO SCRITTO NEI GENI



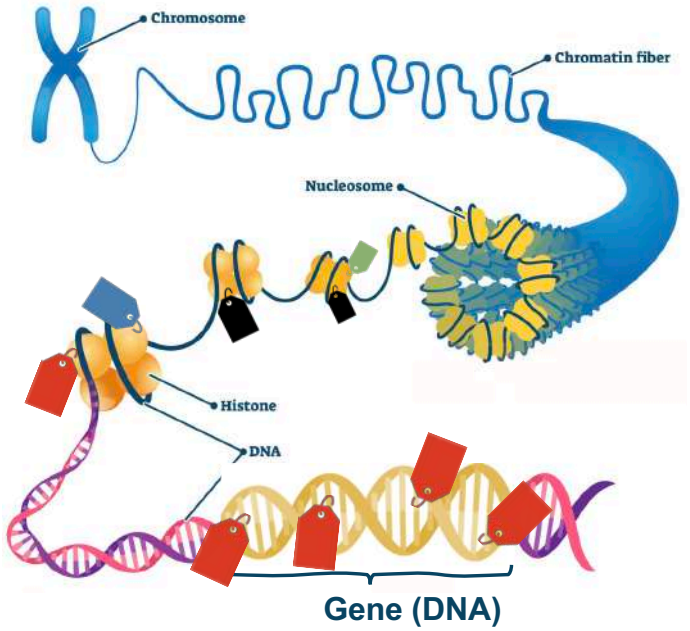
Purugganan and Jackson 2021, Nature Genetics

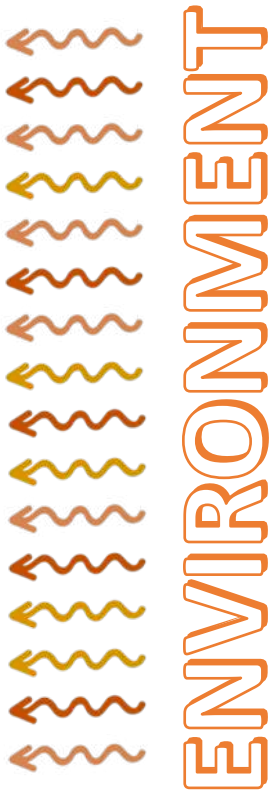
QUELLO CHE I GENI NON DICONO

QUELLO CHE I GENI NON DICONO

ἐπί
epi | al di sopra

EPIGENETICA: L'insieme dei meccanismi molecolari che modificano l'attività dei geni senza alterare la sequenza del DNA, sono influenzati dall'ambiente e sono ereditabili.

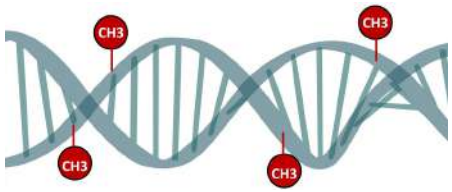




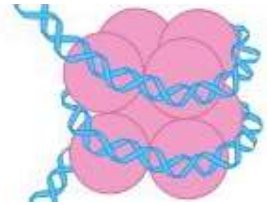
UGUALI MA DIVERSI

Fraga et al., 2005 PNAS

I TRE LIVELLI DELL'EPIGENETICA



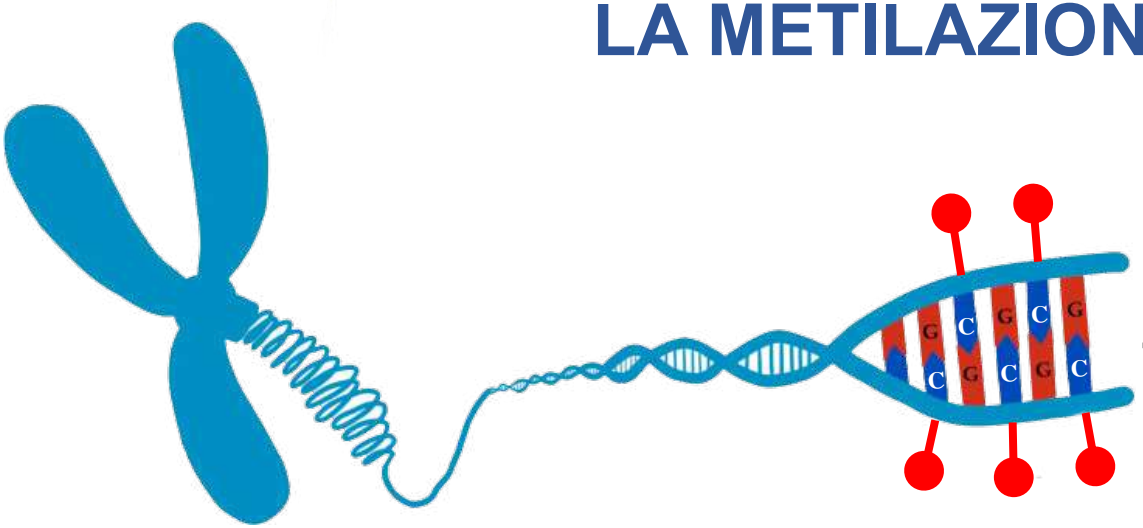
La metilazione del DNA

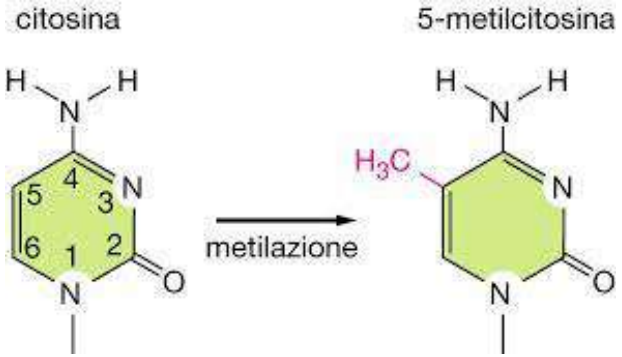


Il rimodellamento della cromatina

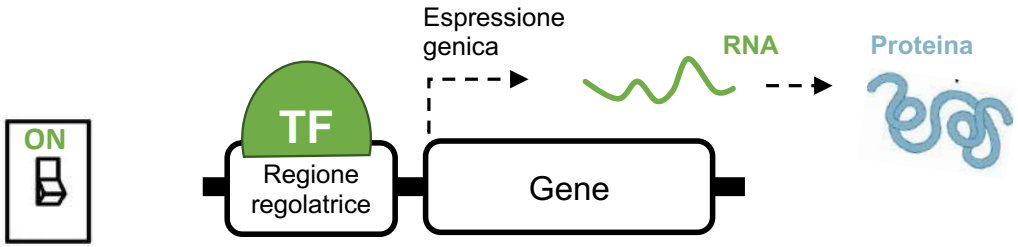
Gli RNA non codificanti

LA METILAZIONE DEL DNA

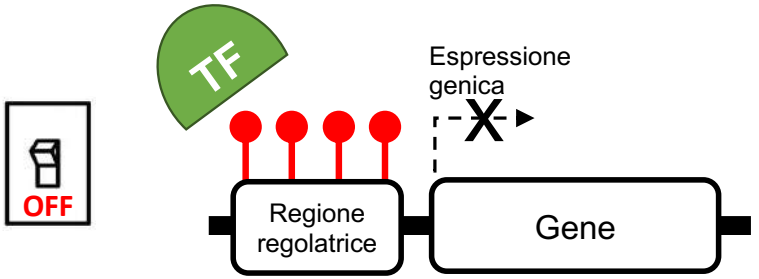




C NON METILATA



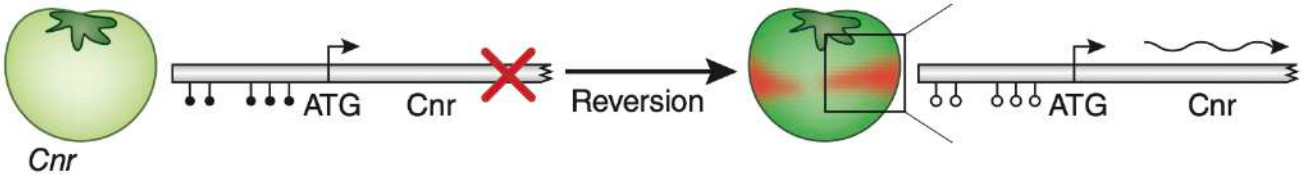
C METILATA



LA METILAZIONE DEL DNA

A naturally occurring epigenetic mutation in a gene encoding an SBP-box transcription factor inhibits tomato fruit ripening

Kenneth Manning[1], Mahmut Tör[1], Mervin Poole[2], Yiguo Hong[1], Andrew J Thompson[1], Graham J King[3], James J Giovannoni[4] & Graham B Seymour[2]



REGINA O OPERAIA: DIPENDE DA COSA MANGI

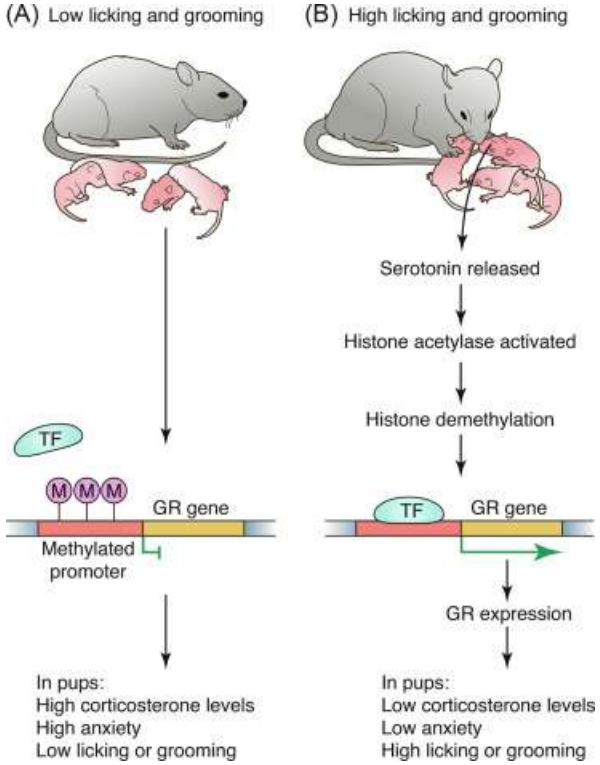
Lyko et al., 2010 Plos Biology

LA MEMORIA EPIGENETICA

Epigenetic programming by maternal behavior

Ian C G Weaver[1,2], Nadia Cervoni[3], Frances A Champagne[1,2], Ana C D'Alessio[3], Shakti Sharma[1], Jonathan R Seckl[4], Sergiy Dymov[3], Moshe Szyf[2,3] & Michael J Meaney[1,2]

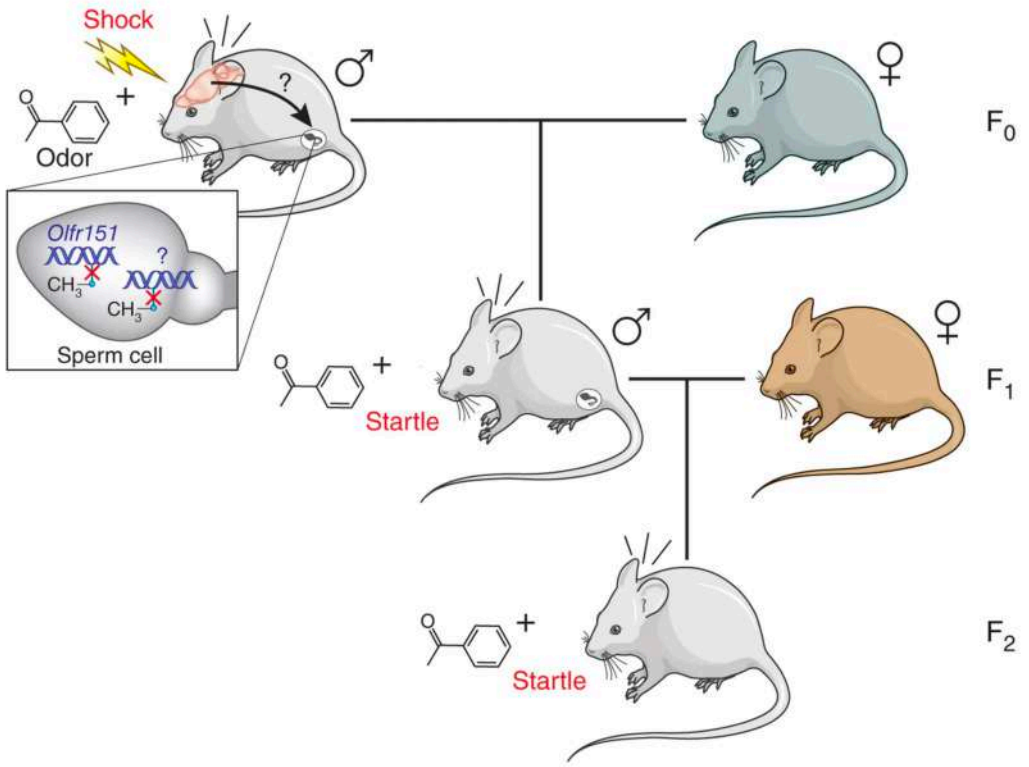
NATURE NEUROSCIENCE VOLUME 7 | NUMBER 8 | AUGUST 2004



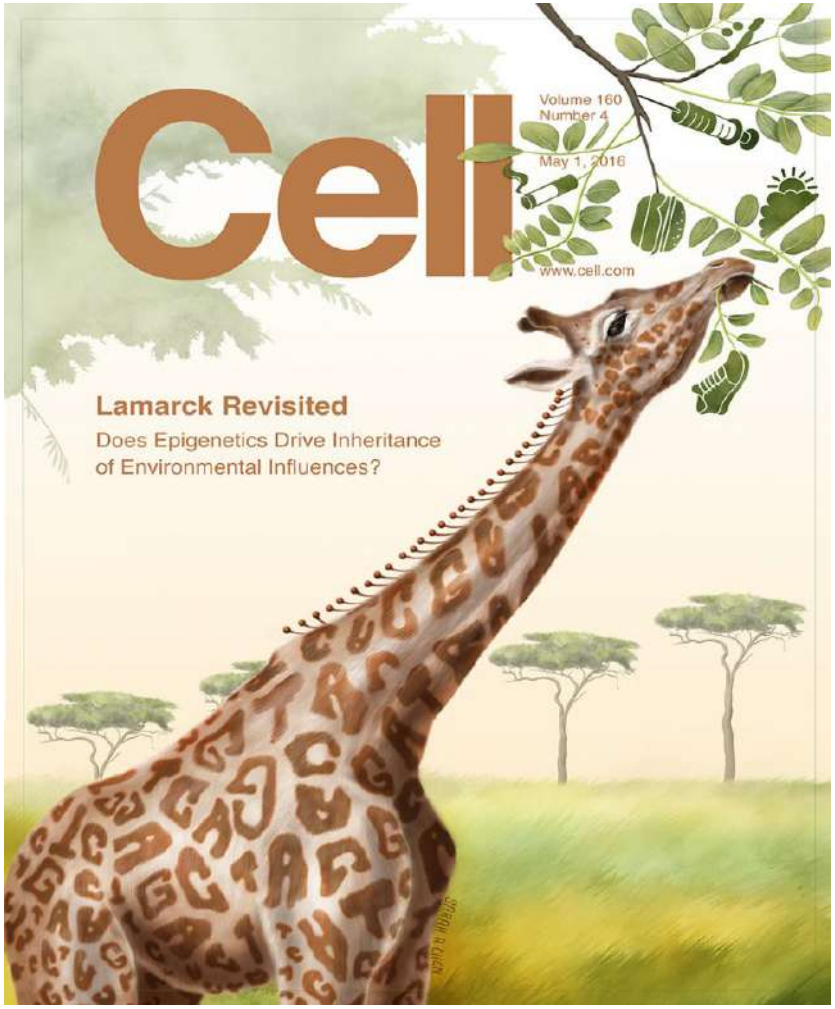
Parental olfactory experience influences behavior and neural structure in subsequent generations

Brian G Dias[1,2] & Kerry J Ressler[1–3]

NATURE NEUROSCIENCE VOLUME 17 | NUMBER 1 | JANUARY 2014



EPIGENETICA TRANSGENERAZIONALE



THE *SINS* OF THE FATHER

The roots of inheritance may extend beyond the genome, but the mechanisms remain a puzzle.

BY VIRGINIA HUGHES

When Brian Dias became a father last October, he was, like any new parent, mindful of the enormous responsibility that lay before him. From that moment on, every choice he made could affect his newborn son's physical and psychological development. But, unlike most new parents, Dias was also aware of the influence of his past experiences — not to mention those of his parents, his grandparents and beyond.

Where one's ancestors lived, or how much they valued education, can clearly have effects that pass down through the generations. But what about the legacy of their health: whether they smoked, endured famine or fought in a war?

As a postdoc in Kerry Ressler's laboratory at Emory University in Atlanta, Georgia, Dias had spent much of the two years before his son's birth studying these kinds of questions in mice. Specifically, he looked at how fear associated with a particular smell affects the animals and leaves an imprint on the brains of their descendants.

Dias had been exposing male mice to acetophenone — a chemical with a sweet, almond-like smell — and then giving them a mild foot shock. After being exposed to this treatment five times a day for three days, the mice became reliably fearful, freezing in the presence of acetophenone even when they received no shock.

Ten days later, Dias allowed the mice to mate with unexposed females. When their young grew up, many of the animals were more sensitive to acetophenone than to other odours, and more likely to be startled by an unexpected noise during exposure to the smell. Their offspring — the 'grandchildren' of the mice trained to fear the smell — were also jumpier in the presence of acetophenone. What's more, all three generations had larger-than-normal 'M71 glomeruli', structures where acetophenone-sensitive neurons in the nose connect with neurons in the olfactory bulb. In the January issue of *Nature Neuroscience*[1], Dias and Ressler suggested that this hereditary transmission of environmental information was the result of epigenetics — chemical changes to the genome that affect how DNA is packaged and expressed without altering its sequence.

Biologists first observed this 'transgenerational epigenetic inheritance' in plants. Tomatoes, for example, pass along chemical markings that control an important ripening

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@UNINA: METILAZIONE E MEIOSI

PNAS

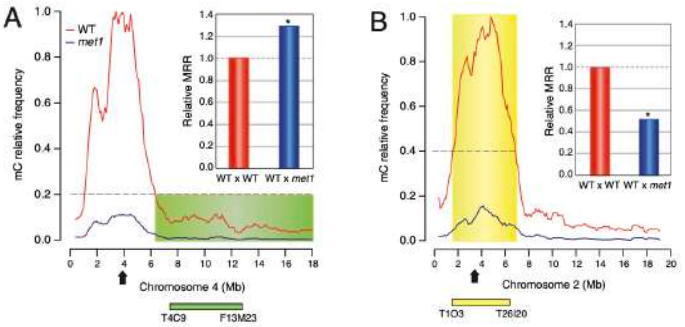
Loss of DNA methylation affects the recombination landscape in *Arabidopsis*

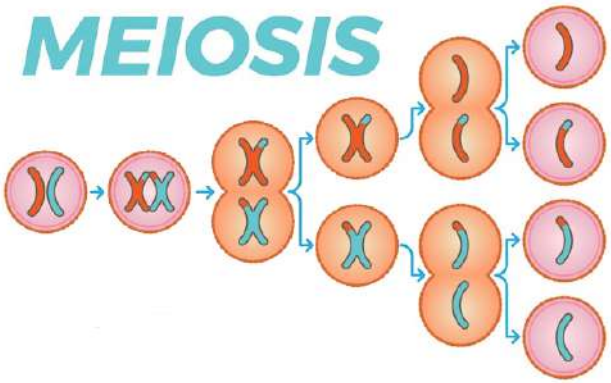
Marie Mirouze[a,b,1,2], Michal Lieberman-Lazarovich[a,1], Riccardo Aversano[a,3], Etienne Bucher[a,4], Joël Nicolet[a], Jon Reinders[a,5], and Jerzy Paszkowski[a]

[a]Department of Plant Biology, Sciences III, University of Geneva, CH-1211 Geneva 4, Switzerland; and [b]Institut de Recherche pour le Développement, Unité Mixte de Recherche UMR232 Diversité Adaptation et Développement des Plantes, Université Montpellier 2, 34394 Montpellier, France

Edited by James A. Birchler, University of Missouri, Columbia, MO, and approved February 28, 2012 (received for review December 18, 2011)

During sexual reproduction, one-half of the genetic material is deposited in gametes, and a complete set of chromosomes is restored upon condensed, transcriptionally inert heterochromatin than in actively transcribed and structurally relaxed euchromatin (5, 6), and

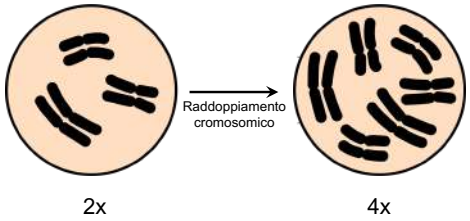




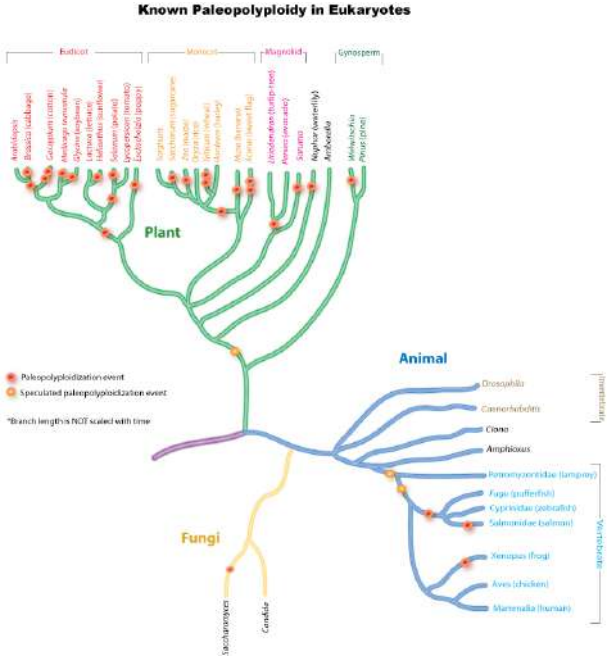
- **Epigenetic diversity**, as well as genetic diversity, contributes to plant phenotypic variation

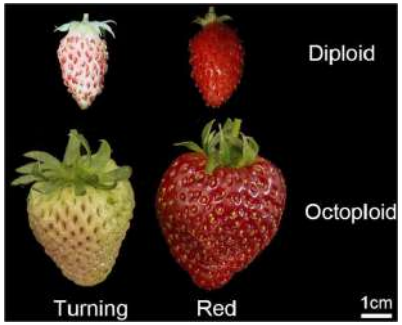
- Important for refining breeding strategies

@UNINA: METILAZIONE E POLIPLOIDIA



Poliplpoidia: condizione del nucleo cellulare caratterizzata dalla presenza di più di due copie per ciascun cromosoma





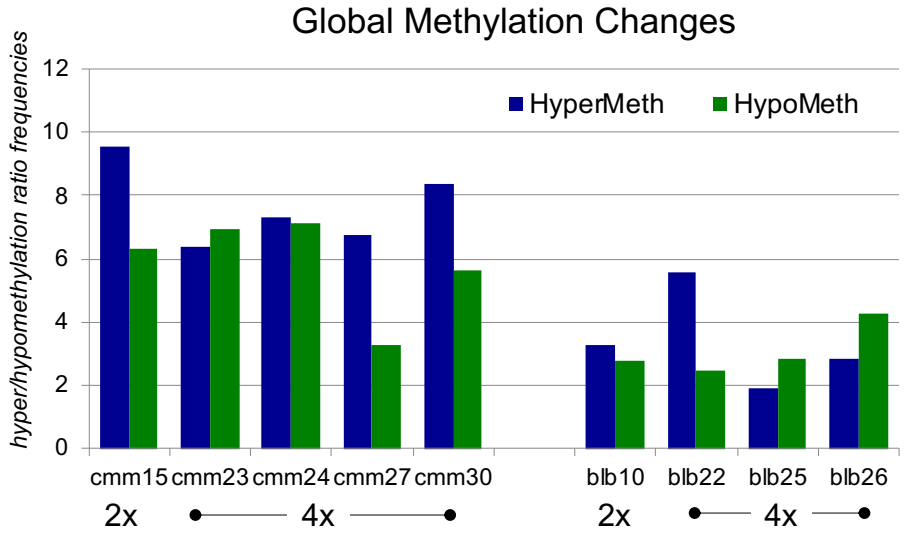
Journal of Experimental Botany, Vol. 64, No. 2, pp. 625–635, 2013
doi:10.1093/jxb/ers357
This paper is available online free of all access charges (see http://jxb.oxfordjournals.org/open_access.html for further details)

Journal of Experimental Botany
www.jxb.oxfordjournals.org

RESEARCH PAPER

Stochastic changes affect *Solanum* wild species following autopolyploidization

Riccardo Aversano[1], Immacolata Caruso[1], Giovanna Aronne[2], Veronica De Micco[2], Nunzia Scognamiglio[1] and Domenico Carputo[1,*]



@UNINA: METILAZIONE E PMI

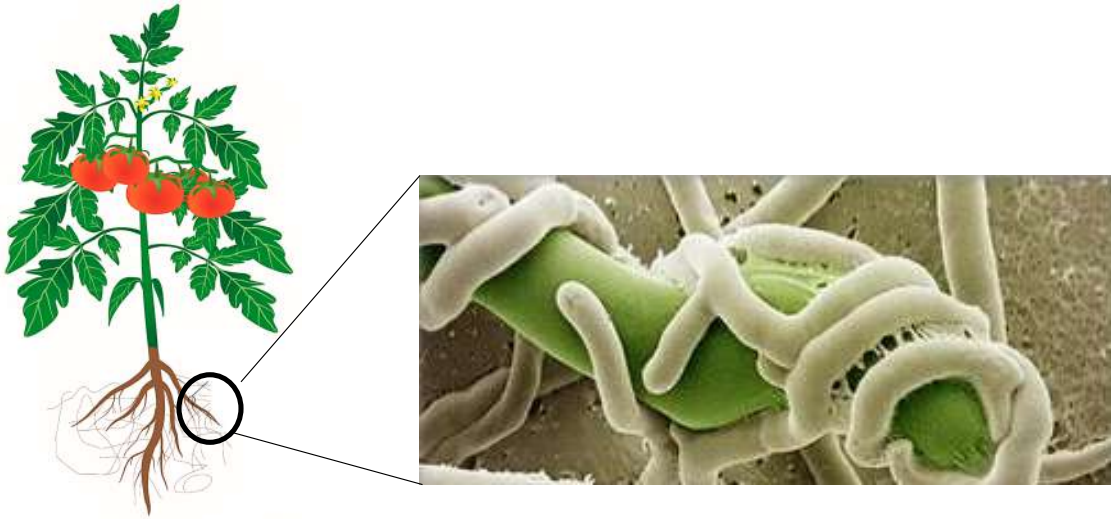
De Palma et al. *Horticulture Research* (2019)6:5
DOI 10.1038/s41438-018-0079-1

Horticulture Research
www.nature.com/hortres

ARTICLE Open Access

Transcriptome reprogramming, epigenetic modifications and alternative splicing orchestrate the tomato root response to the beneficial fungus *Trichoderma harzianum*

Monica De Palma[1], Maria Salzano[1], Clizia Villano[2], Riccardo Aversano[2], Matteo Lorito[2], Michelina Ruocco[3], Teresa Docimo[1], Anna Lisa Piccinelli[4], Nunzio D'Agostino[5] and Marina Tucci[1]



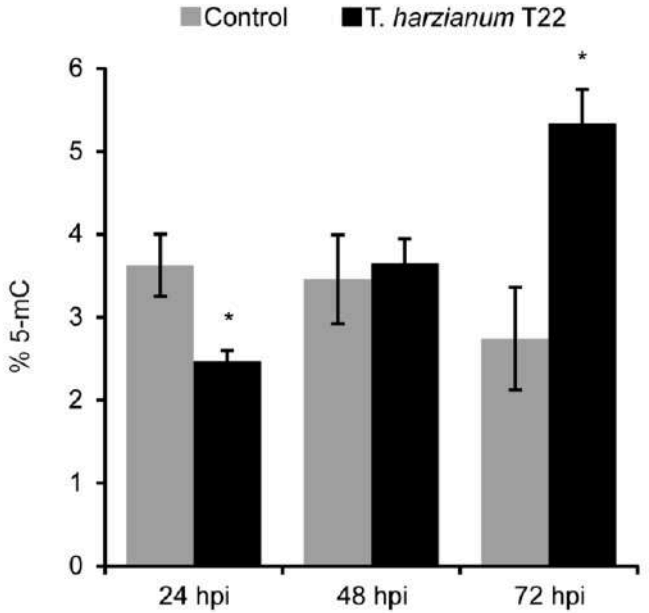


Fig. 4 Absolute levels of global DNA methylation in control and *Trichoderma*-treated tomato roots. DNA methylation was assessed across the interaction period (24, 48 and 72 hpi) and reported as percent content of 5-methylCytosine (% 5-mC) using an antibody-based colorimetric detection kit. Methylation levels significantly different from the corresponding control are indicated by $*p < 0.05$

@UNINA: METILAZIONE E SHELF-LIFE

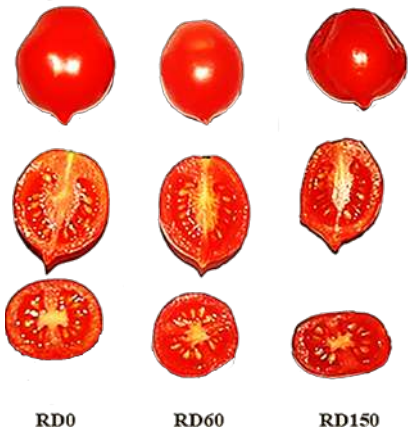
Horticulture Research

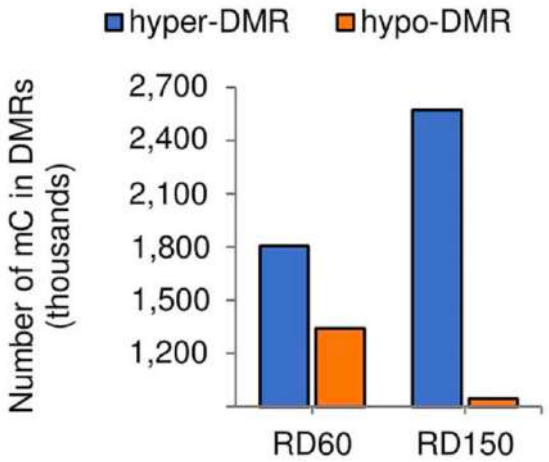
Horticulture Research, 2022, 9: uhab042
https://doi.org/10.1093/hortre/uhab042

Article

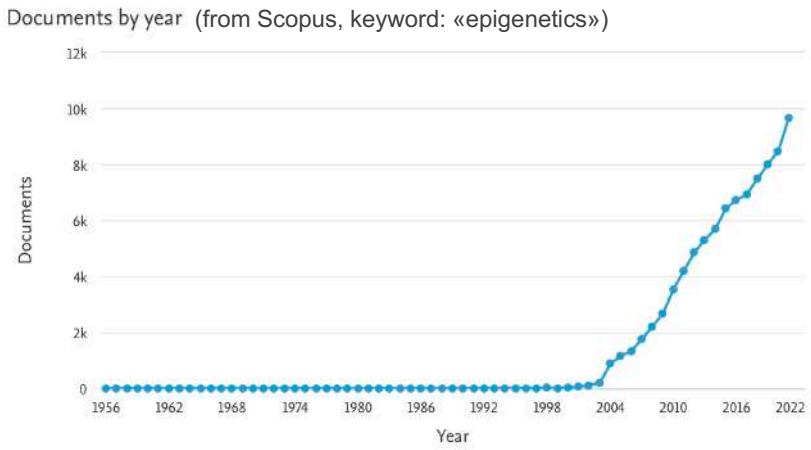
Multi-omics data integration provides insights into the post-harvest biology of a long shelf-life tomato landrace

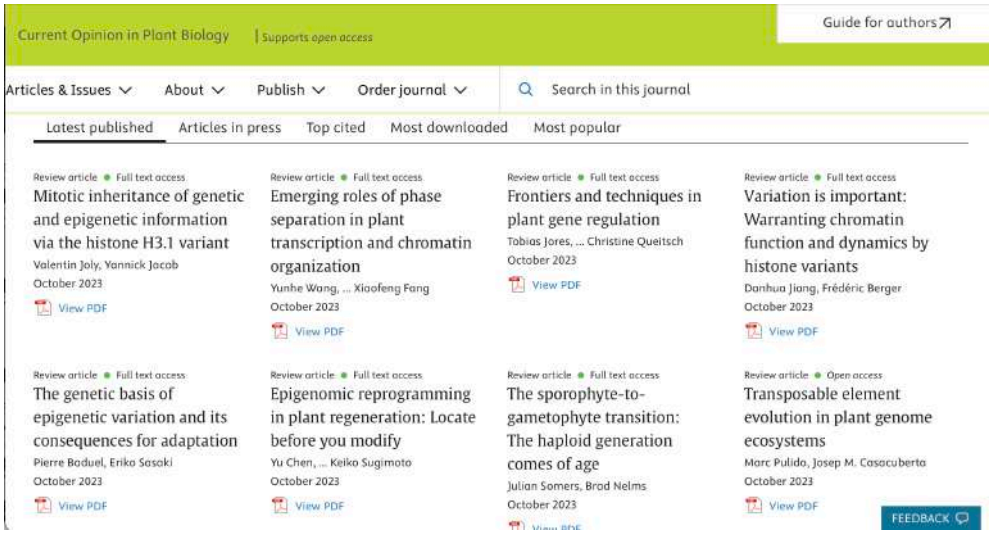
Riccardo Aiese Cigliano[1,†], Riccardo Aversano[2,†], Antonio Di Matteo[2,†], Samuela Palombieri[3,†], Pasquale Termolino[3,†], Claudia Angelini[4], Hamed Bostan[2], Maria Cammareri[3], Federica Maria Consiglio[3], Floriana Della Ragione[5], Rosa Paparo[3], Vladimir Totev Valkov[6], Antonella Vitiello[3], Domenico Carputo[2], Maria Luisa Chiusano[2], Maurizio D'Esposito[5,♦], Silvana Grandillo[3], Maria Rosaria Matarazzo[5], Luigi Frusciante[2], Nunzio D'Agostino[2,*] and Clara Conicella[3,*]

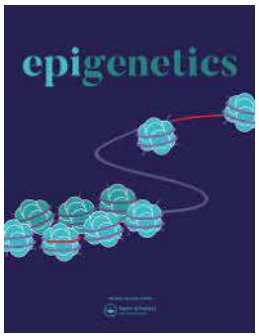


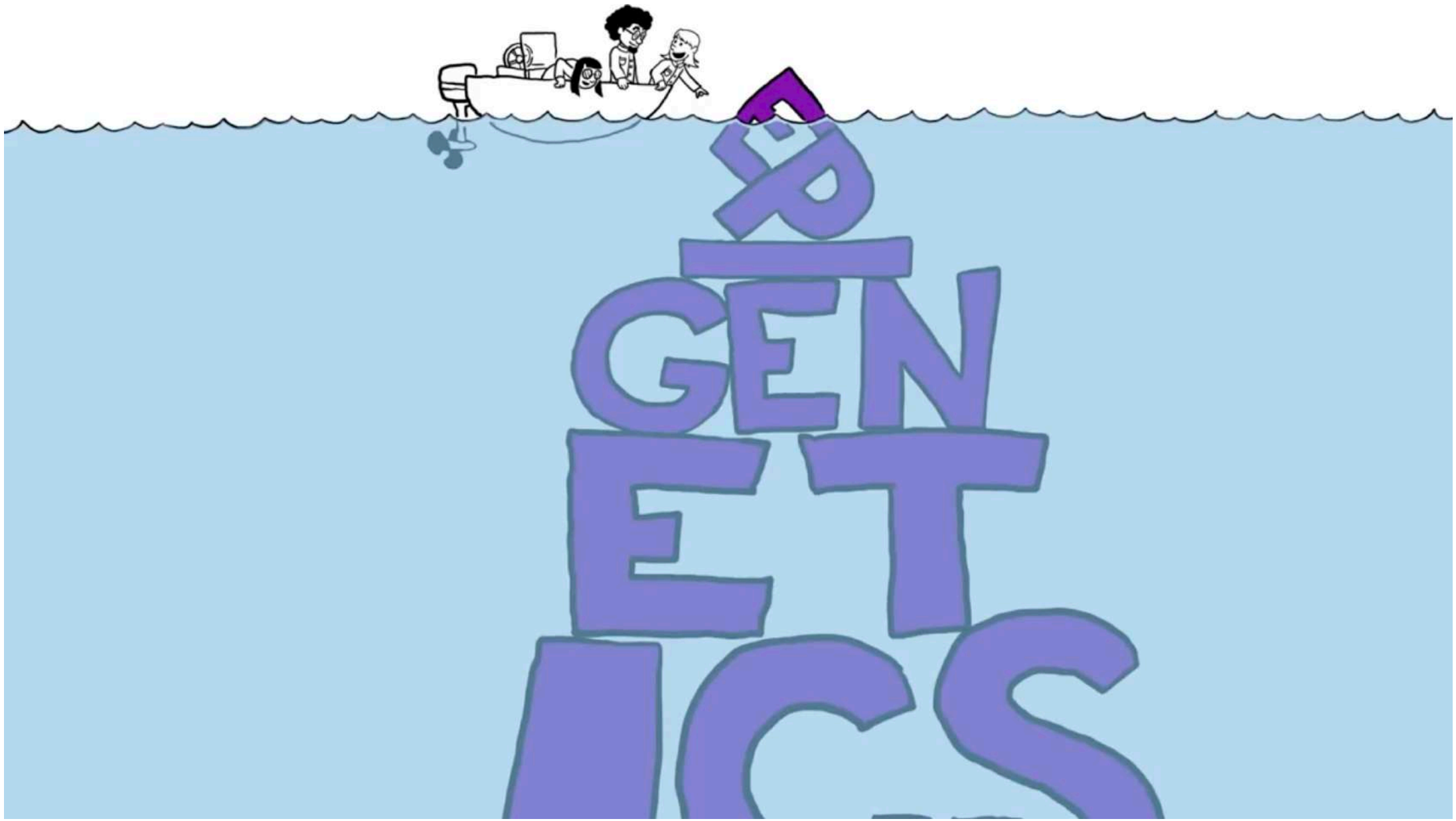


UNA SCIENZA IN CONTINUA CRESCITA








GENETICS

CHI SIAMO

Domenico
Carputo

Clizia
Villano

Vincenzo
D'Amelia*

Raffaele
Garramone

Annalisa
Staiti

Ermanno
Di Serio

Luca
Cimmino

Alessia
Gallucci

Roberta
Smimmo

*@ CNR - IBBR

IL caffè SCIENTIFICO

HOW'S NEXT

18 ottobre 2023

Federico Infascelli - C'era una volta il latte

ORE 14:30
Piattaforma TEAMS