

<b>Principal Investigator</b>	<b>ALTUCCI LUCIA</b>
<b>Institute of Affiliation</b>	Università degli Studi della Campania Luigi Vanvitelli
<b>Title of the proposed project:</b>	Advancing Novel Epigenetic-Based Strategies to Target CRC
<b>Short description of the project</b>	<p>Epigenetic dysregulation is increasingly recognized as a fundamental driver of cancer development and progression. Among epigenetic regulators, Chromobox protein homolog 2 (CBX2), a key component of the Polycomb Repressive Complex 1 (PRC1), has emerged as a critical epigenetic reader capable of reshaping chromatin organization and oncogenic gene expression programs. Deregulation of CBX2 has been associated with multiple cancer types and may profoundly alter cellular processes linked to tumorigenesis. However, the exact mechanisms underlying its oncogenic role remain largely unknown, particularly in colorectal cancer (CRC). This PhD project aims to elucidate the molecular and functional role of CBX2 in CRC and to explore its potential as a therapeutic target within precision oncology approaches. Aim 1 is to define the molecular mechanisms through which CBX2 contributes to colorectal tumorigenesis, with a particular focus on downstream signaling pathways, chromatin regulation, and cancer-associated cellular programs that represent actionable therapeutic vulnerabilities. Aim 2 is to investigate the upstream mechanisms responsible for CBX2 deregulation in CRC, determining their biological and clinical relevance through the comprehensive analysis of epigenetic and transcriptional regulatory networks. Aim 3 is to exploit these findings to evaluate innovative therapeutic strategies targeting CBX2 in CRC, identifying and characterizing promising compounds capable of modulating its activity and assessing their efficacy in preclinical models. By combining molecular biology, epigenomics, and translational cancer research approaches, this project will generate novel mechanistic insights into CBX2-driven oncogenesis and provide a robust rationale for the development of targeted therapeutic interventions aimed at improving outcomes for CRC patients.</p>
<b>Main research area for the project</b>	Molecular Therapy
<b>5 key words for the project</b>	Target Therapy, Drug discovery and/or development, Epigenetics, Carcinogenesis, Gene regulation

<b>LAB INFO</b>	
<b>Main topic/s of the lab</b>	Cancer Epigenetics and Precision Medicine
<b>Short description of the lab activity</b>	The laboratory is a multidisciplinary research environment focused on investigating the epigenetic mechanisms underlying cancer development and progression, with a strong translational perspective. The group combines expertise across genomics, drug discovery, molecular and cellular biology, and

	<p>bioinformatics to address fundamental and clinically relevant questions in oncology. By integrating cutting-edge technologies and advanced experimental approaches, the laboratory aims to dissect the molecular mechanisms driving cancer and identify novel therapeutic opportunities. Through this integrated framework, the lab contributes to the development of innovative precision medicine strategies to improve cancer treatment.</p>
<p><b>Recent bibliography</b></p>	<ul style="list-style-type: none"> <li>- Longitudinal single-cell transcriptomics reveals distinct patterns of recurrence in acute myeloid leukemia. MOL CANCER 2022 Aug; 21: 166</li> <li>- CBX2 shapes chromatin accessibility promoting AML via p38 MAPK signaling pathway. MOL CANCER 2022 Jun; 21: 125</li> <li>- METTL16-mediated inhibition of MXD4 promotes leukemia through activation of the MYC-MAX axis. ONCOGENE 2025 Nov; 44: 4159</li> <li>- Glycolytic heterogeneity drives metabolic-targeted therapy in pancreatic ductal adenocarcinoma. SIGNAL TRANSDUCT TAR 2026 Jan; 11: 25</li> <li>- UVI5008: the first reversible, non-covalent Bruton's tyrosine kinase epi-inhibitor for B-cell malignancies. J HEMATOL ONCOL 2026 Feb; 19:</li> </ul>
<p><b>Group composition</b></p>	<p>The Altucci group comprises more than 20 members, including researchers, postdoctoral fellows, and PhD students from diverse international backgrounds, creating a highly multidisciplinary and collaborative research environment. Each researcher contributes specialized expertise across complementary research areas, including metabolomics, epigenetics, epitranscriptomics, mechanisms of cell death, genomics, bioinformatics, and targeted cancer therapies. This broad scientific expertise enables the group to address complex questions in cancer biology through integrated and translational approaches. Collaboration across disciplines fosters innovation and supports the development of novel precision medicine strategies. PhD students are directly mentored by Prof. Altucci in close collaboration with senior researchers, ensuring continuous scientific guidance, personalized training, and professional development throughout their research journey.</p>
<p><b>Institutional page link</b></p>	<p><a href="https://www.medicinadiprecisione.unicampania.it">https://www.medicinadiprecisione.unicampania.it</a></p>