

SABRINA ZEMA

RESEARCH INTEREST

My major research interest is the study of molecular mechanisms, especially related to human diseases including cancer, focusing to the development of new therapeutic strategies.

EDUCATION

<i>October 2019</i>	PhD: Molecular Medicine , Sapienza University
<i>July 2016</i>	Master of Science: Genetic and Molecular Biology , Sapienza University Mark of the degree: 110/110 cum laude
<i>December 2013</i>	Bachelor of Science: Biology Sciences , Sapienza University Mark of the degree: 103/110

RESEARCH EXPERIENCE

<i>March 2020 – March 2021</i>	Research Fellowship , Sapienza University “Molecular basis of Notch3-Pin1 functional cross-talk in aggressive female tumors: therapeutic targeting implications in ovarian cancer treatment” (MED/04)
<i>May 2019- September 2019</i>	Visiting PhD student at Biochemistry Department of the Justus-Liebig University (JLU), Giessen, Germany- Professor Tilman Borggreffe Laboratory (Fellowships ERASMUS+ Program- Student Mobility for Traineeship 2018/2019)
<i>November 2016 – October 2019</i>	PhD student - Molecular Medicine Department , Sapienza University Thesis: “Notch Signalling in Development and Disease: Maml1 and Jagged1 not always on the shadow of Notch”
<i>March 2015 – July 2016</i>	Graduate Trainee - Molecular Medicine Department , Sapienza University Thesis: “Il ruolo della proteina Jagged1 nel sostenere la progressione del cancro al colon retto” (The role of Jagged1 protein in sustaining the progression of colorectal cancer)

- My main project was focused on the role of Maml1 to shed light on the molecular mechanism that regulates the stability and activity of Gli1 mediated by Maml1, to provide a new integrated level of regulation in Shh/Gli pathway.
- The traineeship period performed at Justus-Liebig University (Giessen, Germany) was focused on understanding the molecular mechanisms of Notch signal transduction during the tumorigenesis in lung cancer, under the supervision of Prof. Tilman Borggreffe. Several lung cancer cell lines were treated for 48h with different chemical compounds. After the pharmacological treatment the cells were collected and analysed to observe any change in transcriptional or protein levels of Notch target genes. Furthermore, two different cell lines were used to perform CRISPR/Cas9 technique to delete mam1 gene.
- I studied the existence of a Kras/Erk/ADAM17/Jagged1 signalling axis, where Jagged1 protein is a novel substrate of Kras signalling pathway. Therefore, we demonstrated that Jagged1 role may go beyond its effect on canonical Notch activation and provided new mechanistic insights demonstrating that Jag1-ICD is necessary to enhance CRC development and carcinogenesis both in vitro and in vivo (Pelullo et al., 2019).
- I studied Mastermind-like 1 (Maml1) as a novel regulator of the Shh signaling since it interacts with Gli proteins, working as a potent transcriptional coactivator (Quaranta et al., 2017)

TEACHING EXPERIENCE

<i>November 2016 – present</i>	Undergraduate and graduate students' supervisor - Molecular Medicine Department, Sapienza University Preparing materials, solutions and chemicals, explaining to undergraduate students how to use the instruments in the correct way and supervising them.
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PUBLICATIONS

- **A Dynamic Role of Mastermind-Like 1: A Journey Through the Main (Path)ways Between Development and Cancer.** Zema S, Pelullo M, Nardoza F, Felli MP, Screpanti I, Bellavia D. *Front Cell Dev Biol.* 2020 Dec 21;8:613557. doi: 10.3389/fcell.2020.613557
- **Kras/ADAM17-Dependent Jag1-ICD Reverse Signaling Sustains Colorectal Cancer Progression and Chemoresistance.** Pelullo M*, Nardoza F*, Zema S*, Quaranta R, Nicoletti C, Besharat ZM, Felli MP, Cerbelli B, d'Amati G, Palermo R, Capalbo C, Talora C, Di Marcotullio L, Giannini G, Checquolo S, Screpanti I, Bellavia D. *Cancer Res.* 2019 Nov 1;79(21):5575-5586. doi: 10.1158/0008-5472.CAN-19-0145. Epub 2019 Sep 10.
***the authors equally contribute**
- **Wnt, Notch, and TGF- β Pathways Impinge on Hedgehog Signaling Complexity: An Open Window on Cancer.** Pelullo M, Zema S, Nardoza F, Checquolo S, Screpanti I, Bellavia D. *Front Genet.* 2019 Aug 21;10:711. doi: 10.3389/fgene.2019.00711
- **Mam11 acts cooperatively with Gli proteins to regulate sonic hedgehog signaling pathway.** Quaranta R, Pelullo M, Zema S, Nardoza F, Checquolo S, Lauer DM, Bufalieri F, Palermo R, Felli MP, Vacca A, Talora C, Di Marcotullio L, Screpanti I, Bellavia D. *Cell Death Dis.* 2017 Jul 20;8(7):e2942. doi: 10.1038/cddis.2017.326.

RESEARCH SKILLS

- Cell Culture (cell lines, primary cells and co-cultures), Cell Proliferation Assay, Invasion Assay, Transfection, Generation of CRISPR/Cas9 Mam11 KO cell lines.
- Bacterial Culture, Cloning, Plasmid Extraction, GST-proteins Purification.
- Protein Extraction, Fractionations, Immunoprecipitation, GST Pull-down, Ubiquitination assay, Western Blot, Chromatin Immunoprecipitation, Luciferase Assay.
- DNA Extraction, RNA Extraction, PCR, RT-PCR, qPCR.
- Immunofluorescence, *In situ* Proximity Ligation Assay, Proliferative Assay BrDU, MTT, Citofluorimetry.
- Animal Care, Mice Models, Transgenic Mice.

CONFERENCE/MEETING ATTENDANCE

The Notch Meeting XI (6-10 October 2019, Athens, Greece) Poster: “**Jag1-ICD reverse signalling sustains colorectal cancer progression and chemoresistance**”. Authors: F. Nardoza, M. Pelullo, **S. Zema**, I. Screpanti, D. Bellavia

ABCD Congress 2019 (19-21 September 2019, Bologna, Italy) Poster: “**Maml1, not only a transcriptional co-activator of Gli1**”. Authors: **S. Zema**, M. Pelullo, F. Nardoza, M. Serafini, I. Screpanti, D. Bellavia

ABCD Congress 2019 (19-21 September 2019, Bologna, Italy) Poster: “**Jag1-ICD reverse signalling sustains colorectal cancer progression and chemoresistance**”. Authors: F. Nardoza, M. Pelullo, **S. Zema**, I. Screpanti, D. Bellavia

9th BeMM Symposium (13th November 2018, University “La Sapienza” of Rome), **Member of the Scientific Committee**

The Notch Meeting X (1-5 October 2017, Athens, Greece) Poster: “**Maml1 acts cooperatively with Gli proteins to regulate Sonic Hedgehog signaling pathway**”. Authors: **Sabrina Zema**, Roberta Quaranta, Maria Pelullo, Francesca Nardoza, Saula Checquolo, Lucia Di Marcotullio, Isabella Screpanti, Diana Bellavia

29th Annual Conference of Italian Association of Cell Cultures (Onlus-AICC), (23-25 November 2016, L’Aquila, Italy). Poster: “**The emerging role of Jagged1 in sustaining colorectal cancer aggressiveness**” Authors: M. Pelullo, **S. Zema**, R. Quaranta, I. Screpanti e D. Bellavia

29th Annual Conference of Italian Association of Cell Culture (Onlus-AICC), (23-25 November 2016, L’Aquila, Italy) Poster: “**MAML1 acts cooperatively with Gli proteins to regulate Sonic hedgehog signaling pathway**” Authors: Quaranta R., Pelullo M., Nardoza F., **Zema S.**, Di Marcotullio L., Screpanti I., Bellavia D.

The Notch Meeting IX (4-8 October 2015, Athens, Greece). Poster:” “**The emerging role of Jagged1 in sustaining colorectal cancer aggressiveness: it does not always act in the shadow of Notch**” Authors: M. Pelullo, R. Quaranta, **S. Zema**, S. Delle Vigne, I. Screpanti e D. Bellavia

GRANTS/AWARDS/FELLOWSHIPS

- Research Grant “**Avvio alla Ricerca 2020**” from Sapienza University. Project title: “Identificazione di un nuovo ruolo di Maml1 nel regolare l'attività della E3 ubiquitina ligasi Itch”;
- Fellowships ERASMUS+ Programm-Student Mobility for Traineeship 2018/2019;
- Research Grant “**Avvio alla Ricerca 2018**” from Sapienza University. Project title: “Maml1: non solo un cofattore trascrizionale nella via di Sonic Hedgehog”;
- Research Grant “**Avvio alla Ricerca 2017**” from Sapienza University. Project title: “Il ruolo della proteina Jagged1 nel sostenere la progressione del cancro del colon retto”.

ADDITIONAL SKILLS

Languages	Italian (native language), English (fluent)
Informatics skills	MacOS, Windows, Ubuntu, Genomatix, Blast, Word, Power Point, Excel

F.to Sabrina Zema