

## **Curriculum vitae et studiorum**

### **Federica Polverino**

#### **Education**

PhD in Genetics and Molecular Biology; passed the final exam on 20-02-2020 (scored: very good); *Certificate id: 3015986*; Sapienza University of Rome, Italy; period of activity Nov 2016 – Oct 2020.

Master's of Science in Medical Biotechnology (LM-9); passed the final exam on 30-10-2015 (scored: 110/110 cum laude); *Certificate Id: 3015983*; Sapienza University of Rome, Italy; period of activity Jan 2014 - Oct 2015.

Bachelor's of Science in Biotechnology (L-2); passed the final exam on 24-07-2013 (scored: 104/110); n. protocol OL-CERT-2019/196609; Tor Vergata University of Rome, Italy; period of activity Oct 2010 - Jul 2013.

#### **Research experience**

May 2021 – October 2021 Post - Doctoral fellow, Department of Biochemical Sciences "A. Rossi Fanelli", Sapienza, Rome, Italy (Project title: "Saggi su linee cellulari di neuroblastoma dell'inibizione dell'interazione tra Aurora-A e N-Myc"; Supervisor prof. Alessandro Paiardini); n. protocol.123 del 02.02.2021 (SPC: 2021-1136-1354-173184).

Sep 2020 – Feb 2021 Post - Doctoral trainee, Institute of Molecular Biology and Pathology-CNR, Rome, Italy (Project title: "High content imaging per la validazione di farmaci anti-mitotici"; Supervisor Dr Francesca Degrassi); n. protocol AMMCEN n. 0044202/2020 del 07/07/2020.

May 2020 – July 2020 "Torno Subito" Fellow, Institute of Molecular Biology and Pathology-CNR, Rome, Italy. (Project title: "Studio della relazione tra orientamento della divisione cellulare e instabilità cromosomica nei tumori mediante approcci molecolari e di microscopia avanzata"; Supervisor Dr Giulia Guarguaglini); Certification letter from Dr Giulia Guarguaglini.

Nov 2019 – Apr 2020 "Torno Subito" Fellow, Department of Experimental Oncology, European Institute of Oncology, Milan, Italy. (Project title: "Studio della relazione tra orientamento della divisione cellulare e instabilità cromosomica nei tumori mediante approcci molecolari e di microscopia avanzata"; Supervisor Dr Marina Mapelli); Certification letter from Dr Marina Mapelli.

Nov 2016 – Oct 2019 PhD Fellow, Institute of Molecular Biology and Pathology-CNR c/o Department of Biology and Biotechnology "Charles Darwin", Sapienza University of Rome, Italy (Project title: Role of the Aurora-A kinase and its regulator TPX2 in control of spindle orientation in human cells; supervisor: Dr. Giulia Guarguaglini; external tutor: Dr Marina Mapelli); *Certificate Id: 3329053*.

July 2018 Visiting PhD fellow at the Department of Experimental Oncology (hosting lab: Dr Marina Mapelli), European Institute of Oncology, Milan, Italy; Certification letter from Prof. Fulvio Cruciani, coordinator of PhD school.

Feb – Aug 2016 Traineeship, Department of Cytochrome Signaling, Institut Pasteur, Paris,

France (Fellowship by Unipharma Graduates, Project title: Study of the mechanism of the therapeutic action of IFN- $\alpha$  on JAK2-V617F HSCs; lab head: Dr. Sandra Pellegrini); Certification letter from Dr. Sandra Pellegrini.

Oct 2013 – Feb 2016 Internship (Master of Science), Department of Hematology, Oncology and Molecular Medicine, National Institute of Health, Rome, Italy (Thesis title: Essential role of Interferon Regulatory Factor 1 in governing Treg depletion, Th1 polarization inflammasome activation and antitumor efficacy of Cyclophosphamide; supervisor: Dr Federica Moschella); n protocol 092013 del 06/09/2013

Feb – Jun 2013 Internship (Bachelor of Science), Department of Biology, Tor Vergata University of Rome, Italy.

### **Fellowships and awards**

Apr 2021 6-months Post-doctoral fellowship from Sapienza University. Ref: n. protocol.123 del 02.02.2021 (SPC: 2021-1136-1354-173184).

Sep 2020 6-months Post-doctoral traineeship from IBPM-CNR. Ref: n. protocol AMMCEN n. 0044202/2020 del 07/07/2020.

Nov 2019 9-months fellowship award from Torno Subito DiSco Regione Lazio. Ref: n. protocol 17694-16092019

Sep 2019 Travel grant from Associazione di Biologia Cellulare e del Differenziamento (ABCD). Ref: email from ABCD

April 2018 Best poster award at the National Ph.D. Meeting (Poster: “Role of the Aurora-A kinase and its regulator TPX2 in control of spindle orientation in human cells” by Polverino et al.). Ref: email from ABCD

Nov 2016 PhD Fellowship from Sapienza University. Certificate Id 3329053.

Feb 2016 6-months fellowship award from Unipharma Graduates for a stage at Pasteur Institut (Paris, FR). Ref: letter of acceptance

Dec 2015 Best Italian MSc thesis of 2015 in all fields, Banca di Credito Cooperativo

### **Courses and workshop**

Sep 2021 Corso di formazione online “Vedere per credere: scuola di microscopia – Edizione per ricercatori” (Fondazione Golinelli – G-LAB). Ref: certificate of participation

25 Mar 2021 Virtual Workshop “Artificial intelligence and automation meet cellular imaging in biomedical research” (IBPM- CNR \_ Regione Lazio). Ref: letter from organizers.

Apr 2020 “Introduction to R” (DataCamp – IEO). Ref: Statement of accomplishment

23-25 June 2019 Royal Society International Exchanges workshop “Optimizing allosteric inhibitors of the AURKA mitotic kinase to challenge its non- mitotic roles in oncogenesis” (University of Cambridge). Ref: certificate of participation.

04-08 Feb 2019 “Winter school of Molecular mechanism in mitosis” (University of Heidelberg, HBIGS). Ref: certificate of participation

14-15 Dec 2017 Corso di microscopia in campo chiaro e fluorescenza (Nikon/CNR). Ref: certificate of participation

17 July 2014 Handling Laboratory Animals (ISS). Ref: certification letter from Dr. Valeri, person responsible of laboratory animal welfare

Feb – Apr 2014 Laboratory Safety Training (ISS). Ref: certificate of participation

## Research interests and activity

My research experience started at the National Institute of Health in Rome where I contributed -as a Master Thesis student- to characterize the role exerted by a transcription factor, interferon regulatory factor-1, in mediating the synergism between chemo and immuno-therapy in a transplantable mouse tumor model (**3 in publication list**).

After this period, I was awarded a fellowship to work at the Pasteur Institut of Paris, where I studied the processes that determine the specificity of response of myeloproliferative neoplastic stem cells to interferon treatment.

From November 2016 to October 2019, I carried out my PhD project at the Institute of Molecular Biology and Pathology, National Research Council of Italy (IBPM-CNR) in Rome, with a short stage at the European Institute of Oncology (IEO) in Milan. My research focused on the understanding of the contribution of the Aurora-A/TPX2 complex in spindle orientation regulation. The main results obtained during this period show that Aurora-A and TPX2 contribute to correct spindle orientation by regulating both NuMA localization and microtubule stability, and reveal for the first time the interaction between NuMA and TPX2 (**2 in publication list; CNR and IEO press releases**). During the PhD I acquired expertise in the field of live/fixed cell imaging and analysis to study the contribution of mitotic defects to chromosomal instability and cancer, focusing on the AURKA kinase. Importantly, I grew enthusiastic interest into the spindle orientation process and its potential impact in the cell-tissue architecture in pathological contexts such as 3D cancer cell models. Thanks to the fellowship obtained by the Torno Subito project, I had the possibility pursue these interests carrying out my research activity between two laboratories, at IBPM-CNR and IEO: results demonstrated an interesting link between spindle orientation and chromosome segregation fidelity.

From September 2020 to February 2021 I was awarded a post-doctoral traineeship to work at IBPM-CNR, mainly at the Nikon-IBPM microscopy platform. The research activity was focused on developing automated microscopy workflows for image acquisition and analyses in both live and fixed samples to evaluate cellular responses to anti mitotic drugs. This research activity led to the generation of **tutorials** for automated image acquisition and analyses pipelines that have been made available on the Nikon-

IBPM microscopy platform website and reported in Bionova Technologies srl social media. An application of such workflows has provided relevant information in localizing protein interactions relevant to skeletal muscle homeostasis and regeneration in mouse fibro-adipogenic progenitors (*1 in publication list*).

Currently I am working as a post-doctoral fellow on a collaborative project between the Department of Biochemical Sciences “A.Rossi Fanelli”, Sapienza and IBPM-CNR to study the cell fate and cellular responses to the inhibition of AURKA/N-MYC interaction in neuroblastoma cell lines.

## SKILLS AND ABILITIES

### *Technical skills*

Cell biology: isolation of PBMC; 2D cell culture and basics of 3D cell culture (mammospheres growth and quantification); cryopreservation of cells; cell transfection with plasmid or siRNA; isolation of transfected clones; cell cycle synchronization; fundamentals of flow cytometry; immunofluorescence; *in situ* proximity ligation assay.

Molecular biology and biochemistry: cell lysis; tissue homogenization; plasmid and cosmid DNA purification, transformation and amplification; RNA and protein purification from tissues and cells; quantification of DNA, RNA and protein; reverse transcription; real-time PCR; PCR; gel electrophoresis; capillary electrophoresis; western blot; ELISA assays; site-directed mutagenesis.

Animal model (mice): tumor growth measurements with caliper, intraperitoneal inoculation, subcutaneous inoculation, gavage, removal and processing of the spleen and bone marrow.

Microscopy: High resolution fluorescence and transmitted-light (phase contrast, DIC) image acquisition on fixed samples and in time-lapse video recording experiments; qualitative and quantitative (geometric measures, intensity measures) image analysis; generation of pipelines for automated image acquisition and analysis with specialized softwares; use of machine-learning based algorithms for phenotype recognition and quantification.

Data analysis: graphical representation of data and models (excel, prism, graphpad, BioRender), statistical analyses of biological data (Prism, R), image elaboration and analysis (Adobe Photoshop, Adobe Illustrator, Nis Elements, ImageJ, Ilastik).

### Language

English	Understanding	Speaking	Writing
	C1	C1	B2

## TUTORIALS

Automated image acquisition (<https://www.imagingplatformibpmcncr.it/tutorials>)

Automated image analysis (<https://www.imagingplatformibpmcncr.it/tutorials>)

## **PUBLICATIONS**

### **Accademic publications**

1. Polverino F. (2020). PhD thesis, Sapienza University of Rome. Title: Spindle orientation is regulated by the Aurora-A/TPX2 axis and contributes to faithful chromosome segregation.
2. Polverino. F (2015). Master thesis, Sapienza University of Rome. Title: Ruolo essenziale di IRF - 1 nel regolare l'attività immunomodulatoria della circolazione della cicloflamide: implicazioni per lo sviluppo di strategie di chemioimmunoterapia nel cancro.
3. Polverino F. (2013). Bachelor thesis, Tor Vergata University of Rome. Effetto della spermidina nella opacizzazione del cristallino mediata dalla transglutaminasi

### **Articles published in peer reviewed journals**

1. B. Biferali, V. Bianconi, D. Fernandez Perez, S. Pöhle Kronawitter, F. Marullo, R. Maggio, T. Santini, **F. Polverino**, S. Biagioni, V. Summa, C. Toniatti, D. Pasini, S. Stricker, R. Di Fabio, F. Chiacchiera, G. Peruzzi, C. Mozzetta (2021). Prdm16-mediated H3K9 methylation controls Fibro- Adipogenic Progenitors identity during skeletal muscle repair. Science Advances 2021 Jun 7;(23): eabd9371. doi: 10.1126/sciadv.abd937. Impact factor 12.5
2. **F. Polverino**, F.D. Naso, I.A. Asteriti, V. Palmerini, D. Singh, D. Valente, A. Bird, A. Rosa, M. Mapelli, and G. Guarguaglini (2020). The Aurora-A/TPX2 axis directs spindle orientation in adherent human cells by regulating NuMA and microtubule stability. Current Biology 2020 Nov 25; S0960-9822(20)31673-0. doi: 10.1016/j.cub.2020.10.096. Impact factor 9.6
3. C. Buccione, A. Fragale, **F. Polverino**, G. Ziccheddu, Aricò E, F. Belardelli, E. Proietti, A. Battistini and F. Moschella (2017). Role of interferon regulatory factor 1 in governing Treg depletion, Th1 polarization, inflammasome activation and antitumor efficacy of cyclophosphamide. International Journal of Cancer. 2018 Mar 1;142(5):976-987. doi: 10.1002/ijc.31083. Epub 2017 Oct 16. Impact factor 5.145

### **Manuscripts submitted to peer reviewed journals and in preparation**

1. D. Boi, F. Souvalidou, R.Montanari, **F. Polverino**, G. Marini, D. Capelli, G. Pochetti, A. Tramonti, R. Contestabile, D. Trisciuglio, P. Carpinelli, C. Ascanelli, C. Lindon, A. De Leo, M. Saviano, R. Di Santo, R. Costi, G. Guarguaglini, A. Paiardini. PHA-680626 is an Effective Inhibitor of the Interaction between Aurora-A and N-Myc. Submitted to: International journal of molecular sciences.
2. I. A. Asteriti\*, **F. Polverino\***, et al., Aurka nuclear localization is regulated by TPX2 and protein degradation. \* Co-first author. In preparation.

3. F. D. Naso\*, **F. Polverino**\* et al., AurkA kinase requires TPX2 co-overexpression to affect genome stability in non-transformed human cells. \* Co-first author. In preparation.
4. Faienza, **F. Polverino**, Z. Hu, S. Rizza, M. Antonioli, F. Strappazzon, V. Cianfanelli, B. Colella, G. M. Fimia, G. Guarguaglini, J. Dengjel, G. Filomeni, S. Di Bartolomeo and F. Cecconi. AMBRA1 phosphorylation by CDK1 and PLK1 regulates mitotic spindle orientation. In preparation.

**Posters and communications in national and international meeting and conferences**  
**F. Polverino**, F.D. Naso, A. Paiardini, M. Mapelli, G. Guarguaglini, Spindle orientation is regulated by the Aurora-A/TPX2 axis and contributes to faithful chromosome segregation. (ABCD, Bologna, Italy, 18-21 September 2019.) **Selected for oral presentation in the ABCD pre-meeting.**

**F. Polverino**, V. Palmerini, A. Paiardini, A.W. Bird, M. Mapelli, G. Guarguaglini. Spindle orientation is regulated by the Aurora-A/TPX2 axis and contributes to faithful chromosome segregation. “Chromosome segregation and aneuploidy” (Cascais, Portugal 11-15 May 2019).

**F. Polverino**, V. Palmerini, A. Paiardini, A.W. Bird, M. Mapelli, G. Guarguaglini. Spindle orientation is regulated by the Aurora-A/TPX2 axis and contributes to faithful chromosome segregation. “IBPM Annual Meeting: from model system to therapy” (Rome, Italy, 9 May 2018)

**F. Polverino**, V. Palmerini, A. Paiardini, A.W. Bird, M. Mapelli, G. Guarguaglini. Spindle orientation is regulated by the Aurora-A/TPX2 axis and contributes to faithful chromosome segregation. “Mitotic and Meiotic cell cycle control and execution”. (Roscoff, France 8-12 April 2019)

**F. Polverino**, F.D. Naso, A. Paiardini, M. Mapelli, G. Guarguaglini, Role of the Aurora-A kinase and its regulator TPX2 in control of spindle orientation in human cells. “Winter school of Molecular mechanism in mitosis” (Heidelberg, Germany 04-08 February 2019)

**F. Polverino**, V. Palmerini, A. Paiardini, M. Mapelli, G. Guarguaglini, Role of the Aurora-A kinase and its regulator TPX2 in control of spindle orientation in human cells. “XV FISV Congress 2018” (Rome, Italy 18-21 September 2018).

I. A. Asteriti, F. D. Naso, V. Sterbini, E. Crecca, **F. Polverino**, A. Rosa, G. Colotti, A. Paiardini, G. Guarguaglini. Investigation of the Aurora-A/TPX2 complex in cell division and cancer. “IBPM Annual Meeting: Health, disease and environmental research: biology, tools and applications” (Rome, Italy, 8 May 2018)

**F. Polverino**, A. Paiardini, M. Mapelli, G. Guarguaglini. Role of the Aurora-A kinase and its regulator TPX2 in control of spindle orientation in human cells. “National Ph.D. Meeting” (Salerno, Italy, 22-24 March 2018).

F. Faienza, **F. Polverino**, G. Guarguaglini, Z. Hu, J. Dengjel, V. Cianfanelli, F. Strappazzon, M. Antonioli, G.M. Fimia, F. Cecconi, S. Di Bartolomeo. AMBRA1 is phosphorylated at mitosis by mitotic kinases CDK1 and PLK1. "The biennial congress of the Italian Association of Cell Biology and Differentiation" (ABCD, Bologna, Italy, 21-23 September 2017.)

C. Buccione, A. Fragale, **F. Polverino**, G. Ziccheddu, F. Belardelli, E. Proietti, A. Battistini and F. Moschella. Il fattore di regolazione dell'interferone-1 (IRF-1) è indotto dalla ciclofosfamide e controlla diversi aspetti delle sue attività immunomodulanti. "Le nuove frontiere nell'immunoterapia dei tumori: realtà e prospettive" (Assobiotech, Istituto Superiore di Sanità, Roma, Italy October-2015).

Consenso al trattamento dei dati personali

La sottoscritta dichiara di essere informata che, ai sensi e per gli effetti di cui all'art. 132 del DL 196/2003, i dati raccolti saranno trattati, anche con strumenti informatici, esclusivamente nell'ambito del procedimento per il quale la presente dichiarazione viene resa.

*(\*) ai sensi dell'art. 15, comma 1 della Legge 12/11/2011, n. 183 le certificazioni rilasciate dalla P.A. in ordine a stati, qualità personali e fatti sono valide e utilizzabili solo nei rapporti tra privati; nei rapporti con gli Organi della Pubblica Amministrazione e i gestori di pubblici servizi, i certificati sono sempre sostituiti dalle dichiarazioni sostitutive di certificazione o dall'atto di notorietà di cui agli artt. 46 e 47 del DPR 445/2000*