TO MAGNIFICO RETTORE OF UNIVERSITA' DEGLI STUDI DI MILANO **ID CODE 6122**

I the undersigned asks to participate in the public selection, for qualifications and examinations, for the awarding of a type B fellowship at **Dipartimento di Bioscienze**

Scientist-in-charge: **Prof. Roberto Mantovani**

CURRICULUM VITAE

PERSONAL INFORMATION

Surname	BERNARDINI
Name	ANDREA

PRESENT OCCUPATION

Appointment	Structure
Post-doctoral Researcher	Developmental Biology and Stem Cells Department, *Institut de Génétique et de Biologie Moléculaire et Cellulaire* (IGBMC), Illkirch-Graffenstaden (FR)

EDUCATION AND TRAINING

Degree	Course of studies	University	year of achievement of the degree
Degree (Master's degree)	Biologia Molecolare della Cellula (LM-6)	Università degli Studi di Milano	25/07/2014 (110/110 with merit)
Specialization	-	-	-
PhD	Biologia Molecolare e Cellulare	Università degli Studi di Milano	18/05/2018
Master	-	-	-
Degree of medical specialization	-	-	-
Degree of European specialization	-	-	-
Other (Bachelor's degree)	Scienze Biologiche (L-13)	Università degli Studi di Siena	10/10/2012 (110/110 with merit)

REGISTRATION IN PROFESSIONAL ASSOCIATIONS

Date of registration	Association	City
-	-	-

FOREIGN LANGUAGES

Languages	level of knowledge
English	Proficient (C1)
French	Beginner (A2)

AWARDS, ACKNOWLEDGEMENTS, SCHOLARSHIPS

Year	Description of award
2021	Awarded by ARC Foundation with a 2-year post-doctoral fellowship (*Foundation ARC pour la recherche sur le cancer, Postdoctorat Retour de l'Étranger 2021, ARCPOST-DOC2021080004113*)
2021	Best Poster Award: *Student & Postdoc Board Meeting* (IGBMC)
2016	Best Poster Award: *5th PhD Workshop* – Biologia Molecolare e Cellulare PhD course (UNIMI)
2014	Study merit award "*Migliori laureati dei comuni della Valtiberina Toscana*" – Rotary Club (https://www.rotarysansepolcro.it/premio-i-migliori-laureati.html)
2010	Study merit award *"Borsa di studio alla memoria di Daniela Purita"*– Università degli Studi di Siena (D.R. 1745/08-09)

TRAINING OR RESEARCH ACTIVITY

Jan 2021 – present: **Post-doctoral researcher** at the Development & Stem Cells Department, IGBMC (FR) Lab: Dynamics of chromatin structure and transcription regulation | Supervisor: Dr. László Tora

Full-time research activity and training on large multiprotein complexes involved in the regulation of gene transcription in mammalian cells (see project activity section).

Jun 2018 – Dec 2020: **Post-doctoral fellow** (Assegnista) at Dipartimento di Bioscienze, Università degli Studi di Milano | Lab: Human Molecular Genetics | Supervisor: Prof. Roberto Mantovani

Full-time research activity and training on human transcription factors cooperativity, evolution and interactions with DNA.

Nov 2014 – May 2018: **PhD course in Molecular and Cellular Biology** at Dipartimento di Bioscienze, Università degli Studi di Milano | Supervisor: Prof. Nerina Gnesutta

Research activity and training on the DNA-binding modulation in transcription factors through signaling and cooperativity *in vitro* and *in vivo*. Training in the context of the PhD program.

Sep 2013 – Jul 2014: **Undergraduate research activity and training** during Master's degree internship (10 months) at Dipartimento di Bioscienze, Università degli Studi di Milano | Supervisor: Prof. Nerina Gnesutta

Experimental thesis entitled "*Mutational analysis of NF-YA phosphorylation sites*". Cloning, purification and molecular characterization of a series of human transcription factor point mutants *in vitro* and in cells.

Feb 2012 – Jul 2012: **Bachelor's degree internship** (6 months) at Dipartimento di Biotecnologie, Università degli Studi di Siena | Supervisor: Prof. Salvatore Oliviero

Experimental thesis entitled "*Expression, purification and interaction assays on different AEBP2 protein isoforms with c-MYC transcription factor*". Applied recombinant protein purification and interaction methods to epigenetic regulators.

PROJECT ACTIVITY

Year	Project
2023 - present	*Role of a newly evolved human-specific TATA-box Associated Factor (TAF) isoform in the assembly and function of the general transcription factor TFIID in glioblastoma.* In preparation.
2021-2023	*Systematic dissection of mRNA-guided assembly pathways of large multiprotein complexes involved in transcriptional regulation in mammalian cells using molecular and imaging approaches.* Published in 2 research articles and 1 review (2023).
2018-2020	*Investigate the genomic distribution and interplay between human transcription factors across repeated DNA elements using gene-silencing, ChIP-seq and RNA-seq experiments on a panel of human and murine cell lines.* Published in 1 research article (2020); second research article in preparation.
2019-2020	*Exploration of subunits interactions, stoichiometry and nuclear dynamics of the NF-Y complex in living cells using advanced microscopy methods.* Collaboration with Dr. E. Hinde, University of Melbourne. Published in 1 research article (2021).
2020-2021	*Reconstruction of the phylogeny of the NF-YA transcription factor across vertebrate evolution, with a special focus on the evolutionary trace of the activation domain splicing isoforms.* Published in 2 research articles (2022, 2023).
2016-2020	*Dissection of the DNA-binding cooperativity and synergistic gene activation mechanisms between NF-Y and USF1 human transcription factors on different DNA configurations using reporter gene assays, DNA-binding assays with recombinant proteins and reconstitution of protein/DNA complexes for cryo-electron microscopy.* Published in 1 research article (2021).
2014-2018	*Define the role of key mitotic phosphorylation events on the activity and DNA-binding properties of the transcription factor NF-YA.* Published in 1 research article (2019).
2017-2020	I co-authored other publications by performing specific experiments, producing unique reagents, analyzing the data and actively collaborating in several additional projects. Published in 7 research articles (2019-2021).

PATENTS

Patent
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CONGRESSES AND SEMINARS

Date	Title	Place
4 Sept 2023	*Gene Regulation Workshop* (University of Lausanne)	Lausanne (CH)
21-22 Nov 2022	*Young researchers in oncology meeting 2022* (Foundation ARC pour la recherche sur le cancer)	Paris (FR)
28 Sept – 2 Oct 2022	*Transcriptional Regulation: Chromatin and RNA Polymerase II* (ASBMB - American Society for Biochemistry and Molecular Biology); poster presentation	Snowbird (US)

1-3 May 2022	*Protein Folding on the Ribosome* conference (Johns Hopkins University); oral presentation (online flash talk)	Baltimore (US)
1, 8, 15, 22, 29 March 2022	*ImageJ Macro Programming Workshop* course (QuESt IBiSA platform, IGBMC)	Illkirch (FR)
26-27 Nov 2021	*Introduction to bio-image processing and analysis with Fiji/ImageJ* course (QuESt IBiSA platform, IGBMC)	Illkirch (FR)
11-13 Oct 2021	*Introduction to Machine Learning from Biology to Health* course (INSERM)	Online
24 Sept 2021	*Second Annual Meeting on Advances on Nuclear Topology and 3D Chromatin Architecture in Cancer* virtual symposium (New York University Langone)	Online
25-28 May 2021	*High Throughput Screening and Image Analysis for BioSciences* online course (i3S Instituto de Investigação e Inovação em Saúde)	Online
23-26 Sept 2019	*Intrinsically disordered proteins (IDPs) - From physical chemistry to pathogenic mechanisms* (Lake Como Schools of Advanced Studies); short talk	Como (IT)
9-15 June 2019	*Functional Imaging of Nuclear Organization and Signalling* FEBS Advanced Practical Course (van Leeuwenhoek Centre of Advanced Microscopy)	Amsterdam (NL)
15-17 Apr 2018	*Lombardy young researchers meeting* (Italian Society of Biochemistry), oral and poster presentation	Gargnano (IT)
22-23 Jun 2017	*6th PhD Workshop in Molecular and Cellular Biology* (Università degli Studi di Milano); oral presentation	Milano (IT)
27-30 Aug 2016	*Transcription and Chromatin* conference (EMBL); poster presentation	Heidelberg (DE)
23-24 Jun 2016	*5th PhD Workshop in Molecular and Cellular Biology* (Università degli Studi di Milano); poster presentation	Milano (IT)

PUBLICATIONS

Books
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Articles in reviews
Bernardini A*, Tora L*. Co-translational Assembly Pathways of Nuclear Multiprotein Complexes Involved in the Regulation of Gene Transcription. *J Mol Biol*. Published online December 5, 2023. doi:10.1016/j.jmb.2023.168382 *co-corresponding authors
Yayli G, Bernardini A, Mendoza Sanchez PK, Scheer E, Damilot M, Essabri K, Morlet B, Negroni L, Vincent SD, Timmers HTM, Tora L. ATAC and SAGA co-activator complexes utilize co-translational assembly, but their cellular localization properties and functions are distinct. *Cell Rep*. 2023;42(9):113099. doi:10.1016/j.celrep.2023.113099
Gallo A, Dolfini D, Bernardini A, Gnesutta N, Mantovani R. NF-YA isoforms with alternative splicing of exon-5 in Aves. *Genomics*. 2023;115(5):110694. doi:10.1016/j.ygeno.2023.110694

Bernardini A, Hollinger C, Willgenss D, Müller F, Devys D, Tora L. Transcription factor IID parks and drives preinitiation complexes at sharp or broad promoters. *Trends Biochem Sci*. 2023;48(10):839-848. doi:10.1016/j.tibs.2023.07.009
Bernardini A, Mukherjee P, Scheer E, Kamenova I, Antonova S, Mendoza Sanchez PK, Yayli G, Morlet B, Timmers HTM, Tora L. Hierarchical TAF1-dependent co-translational assembly of the basal transcription factor TFIID. *Nat Struct Mol Biol*. 2023;30(8):1141-1152. doi:10.1038/s41594-023-01026-3
Bernardini A*, Gallo A, Gnesutta N, Dolfini D, Mantovani R*. Phylogeny of NF-YA trans-activation splicing isoforms in vertebrate evolution. *Genomics*. 2022;114(4):110390. doi:10.1016/j.ygeno.2022.110390 *co-corresponding authors
Bernardini A, Lorenzo M, Chaves-Sanjuan A, Swuec P, Pigni M, Saad D, Konarev PV, Graewert MA, Valentini E, Svergun DI, Nardini M, Mantovani R, Gnesutta N. The USR domain of USF1 mediates NF-Y interactions and cooperative DNA binding. *Int J Biol Macromol*. 2021;193(Pt A):401-413. doi:10.1016/j.ijbiomac.2021.10.056
Scheer E, Luo J, Bernardini A, Ruffenach F, Garnier JM, Kolb-Cheynel I, Gupta K, Berger I, Ranish J, Tora L. TAF8 regions important for TFIID lobe B assembly or for TAF2 interactions are required for embryonic stem cell survival. *J Biol Chem*. 2021;297(5):101288. doi:10.1016/j.jbc.2021.101288
Bernardini A*, Priest DG*, Lou J, Mantovani R, Hinde E. Live cell dynamics of the NF-Y transcription factor. *Sci Rep*. 2021;11(1):10992. doi:10.1038/s41598-021-90081-1 *equal contribution
Bezzecchi E, Bernardini A, Ronzio M, Miccolo C, Chiocca S, Dolfini D, Mantovani R. NF-Y Subunits Overexpression in HNSCC. *Cancers* (Basel). 2021;13(12):3019. doi:10.3390/cancers13123019
Chaves-Sanjuan A, Gnesutta N, Gobbini A, Martignago D, Bernardini A, Fornara F, Mantovani R, Nardini M. Structural determinants for NF-Y subunit organization and NF-Y/DNA association in plants. *Plant J*. 2021;105(1):49-61. doi:10.1111/tpj.15038
Ronzio M, Bernardini A, Pavesi G, Mantovani R, Dolfini D. On the NF-Y regulome as in ENCODE (2019). *PLoS Comput Biol*. 2020;16(12):e1008488. doi:10.1371/journal.pcbi.1008488
Nardone V, Chaves-Sanjuan A, Lapi M, Airoldi C, Saponaro A, Pasqualato S, Dolfini D, Camilloni C, Bernardini A, Gnesutta N, Mantovani R, Nardini M. Structural Basis of Inhibition of the Pioneer Transcription Factor NF-Y by Suramin. *Cells*. 2020;9(11):2370. doi:10.3390/cells9112370
Libetti D, Bernardini A, Sertic S, Messina G, Dolfini D, Mantovani R. The Switch from NF-YAl to NF-YAs Isoform Impairs Myotubes Formation. *Cells*. 2020;9(3):789. doi:10.3390/cells9030789
Gnesutta N, Chiara M, Bernardini A, Balestra M, Horner DS, Mantovani R. The Plant NF-Y DNA Matrix *In Vitro* and *In Vivo*. *Plants (Basel)*. 2019;8(10):406. doi:10.3390/plants8100406
Bernardini A, Lorenzo M, Nardini M, Mantovani R, Gnesutta N. The phosphorylatable Ser320 of NF-YA is involved in DNA binding of the NF-Y trimer. *FASEB J*. 2019;33(4):4790-4801. doi:10.1096/fj.201801989R
Libetti D, Bernardini A, Chiaramonte ML, Minuzzo M, Gnesutta N, Messina G, Dolfini D, Mantovani R. NF-YA enters cells through cell penetrating peptides. *Biochim Biophys Acta Mol Cell Res*. 2019;1866(3):430-440. doi:10.1016/j.bbamcr.2018.10.004
Bernardini A. Modulation of DNA-binding in transcription factors: the case of NF-Y and USF1. Doctoral Thesis, Dipartimento di Bioscienze, 2018 May 18. 30. ciclo, Anno Accademico 2017. 10.13130/bernardini-andrea_phd2018-05-18

Congress proceedings

OTHER INFORMATION

Peer Review activity in international journals

Science Advances (Dec 2023, assisted in peer review activity)

Developmental Cell (Dec 2023, assisted in peer review activity)

EMBO Journal (Sep 2023, assisted in peer review activity)

Nature Communications (Jan 2023, assisted in peer review activity)

Biology Direct (Sep 2022, reviewer)

Biomolecules (Mar 2021, reviewer)

International Journal of Molecular Sciences (Jul 2021, reviewer)

Genes (Aug 2020, reviewer)

Technical Expertise

Molecular Biology: extraction and manipulation of DNA and RNA, molecular cloning methods, site-directed mutagenesis, PCR and RT-qPCR, chromatin immunoprecipitation (ChIP), RNA immunoprecipitation (RIP), fluorescence electromobility shift assays (fEMSA) and variants, recombinant DNA constructs and oligonucleotides design, CRISPR-based gene editing.

Protein Biochemistry: SDS-PAGE, western-blotting, purification of antibodies through affinity chromatography and validation, recombinant proteins expression in *E. coli*, chromatographic techniques (affinity, ion-exchange and size-exclusion chromatography), use of automated FPLC systems (ÄKTA systems). Protein crosslinking, proteolytic cleavage, pull-down assays. Preparation and isolation strategies for multiprotein complexes bound to DNA for structural or biochemical studies. Preparation of cell extracts, subcellular fractionation and co-immunoprecipitation (co-IP) for mass-spectrometry analyses.

Cell Biology: human and murine immortalized or transformed cell lines culture and manipulation, transfection (calcium phosphate-based, lipofection, nucleofection), luciferase reporter assays, production of recombinant lentiviral particles and transduction, selection and amplification of stable cellular clones, preparation and analysis of cellular samples through flow cytometry (FACS) for cell-cycle assessment, gene-silencing through RNAi, preparation of cellular samples for fluorescence microscopy, immunofluorescence, single-molecule RNA FISH, confocal line-scanning and spinning-disk microscopy image acquisition and analysis.

Bioinformatics: information retrieval from the main databases of biological data (e.g. NCBI, Ensembl, UCSC Genome Browser, UniProt, DisProt, PhosphoSitePlus, PDB, Prosite, Biogrid, Gene Expression Atlas, GTEx, TCGA), sequence analysis with molecular cloning software (SerialCloner, EnzymeX, SnapGene, Benchling), motif discovery (MEME Suit), multiple sequence alignments (Jalview), phylogenetic tree building (PhyML), protein structural disorder prediction, molecular structure prediction, visualization and analysis (AlphaFold2, UCSF-ChimeraX, VMD), rudiments in structural homology modelling and molecular dynamics simulations, microscopy image analysis and quantification (ImageJ, CellProfiler), statistical analysis software (GraphPad Prism), data manipulation and plotting in R.

Declarations given in the present curriculum must be considered released according to art. 46 and 47 of DPR n. 445/2000.

The present curriculum does not contain confidential and legal information according to art. 4, paragraph 1, points d) and e) of D.Lgs. 30.06.2003 n. 196.

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Place and date: Strasbourg, 20/12/2023