
BIOGRAPHICAL SKETCH

NAME de Candia Paola	POSITION TITLE Researcher at Polo Scientifico e Tecnologico, Multimedica, Milan
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Education and Training

INSTITUTION AND LOCATION	DEGREE	MM/YY	FIELD OF STUDY
University of Naples "Federico II", Italy	Baccalaureate	07/1997	Molecular Biology
University of Naples "Federico II", Italy	PhD	02/2002	Biochemistry and Medical Biotechnology
Memorial Sloan-Kettering Cancer Center, New York City, USA.	Postdoctoral training	02/2005	Tumour Biology
Department of Human Genetics at Univeristy of Chicago, USA.	Postdoctoral training	05/2007	Human evolution

Research and Professional Experience

1996-2000: Graduate Research Student in the laboratory of Prof. Tommaso Russo, Department of Biochemistry at Medical School, University of Naples "Federico II", Italy. *Biochemical approach for the characterization of protein-protein interactions centered on the Alzheimer disease Amyloid Precursor Protein cytosolic domain.*

1996 (August and September): Summer student in the laboratory of Prof. Marius Sudol, Department of Biochemistry at Mount Sinai School of Medicine, New York City, USA. *Biochemical approach for the identification of protein-protein interactions involving the WW domain.*

2002-2005. Post-doctoral Fellow in the laboratory of Dr. Robert Benezra at Memorial Sloan-Kettering Cancer Center, New York City, USA.

2000 –2002. Graduate Research Assistant in the laboratory of Dr. Robert Benezra at Memorial Sloan-Kettering Cancer Center, New York City, USA. *Analysis of the role of Id proteins in the neovascularization using murine models of breast cancer.*

2005-2007. Post-doctoral Fellow in the laboratory of Dr. Yoav Gilad, Department of Human Genetics at University of Chicago, USA. *Quantitative molecular evolution of transcription factors in humans.*

2008-2010. Italbionet fellowship recipient in the laboratory of Prof. Lilia Alberghina, Department of Biotechnology and Bioscience at University of Milan Bicocca, Italy. *Metabolic pathways in cancer cells.*

2010-2015. Researcher at INGM (Istituto Nazionale Genetica Molecolare), Unit of Immunology, Milan, Italy. *Extracellular microRNAs as biomarkers of immune system activation.*

2016. Researcher at Polo Scientifico e Biotechnologico_MULTIMEDICA, Milan, Italy. *T regulatory cell and T regulatory cell-derived Extracellular vesicle function in metabolic syndromes, obesity and diabetes.*

Associate professor Qualification:

- Teaching areas: 1. Applied Biology; 2. Biochemistry.

Translational spin-off of research activity

1. The analysis of the effect of knocking down Id genes on the capacity of tumors to create new vessels in a mouse model of mammary gland adenocarcinoma, and preclinical experiments helping to demonstrate that the use of an antisense molecule for Id1 linked to a peptide known to home

specifically to tumor neovessels is indeed able to downregulate Id1 effectively in tumor endothelial cells in vivo (work developed in the years 2000-2005 in the laboratory of Doctor Robert Benezra at Sloan Kettering Cancer Center), among other people's work, have been instrumental in the growth and development of AngioGenex Inc., a biopharmaceutical company, funded by Doctor Benezra and based in New York City, that aims at advancing cancer care by targeting the Id pathway.

2. The experimental effort of the last years at the National Institute of Molecular Genetics, regarding the profiling serum circulating microRNAs in healthy donors (adults and infants) before and after a variety of different vaccinations is the main basis for a filed European patent application (EP 164 436.3; inventors: Paola de Candia and Sergio Abrignani; status: pending) entitled: Immune Response Biomarkers.

Funded Research Projects:

- Dia.Pro: "Exosomes assessment in human serum" (Principal Investigator).

- Institut Merieux: "Serum microRNAs released by human CD4+ T cell subsets as biomarkers of vaccine efficacy and adverse events" (24 months): Researcher (PI: Sergio Abrignani)

- Fondazione CARIPLO: "Improving vaccines for the developing world by means of new adjuvants potentiating effector and memory responses" (36 months): Researcher (PI: Sergio Abrignani)

European Research Council (ERC advanced grants 2010)

- "i-MIRNOME Lymphocyte microRNAs in health and disease: Understanding lymphocyte functions through the identification of microRNA target genes and exploiting serum microRNA signatures to monitor immune responses" (60 months): Researcher (PI: Sergio Abrignani)

- ITALBioNet Fellowship for the project titled: "Methods for the quantitative analysis of cellular components in normal and transformed mammalian cells". (24 months): Fellowship Recipient

-R01 GM077959 (NIH/NIGMS): " Natural Selection on Gene Regulation in Humans" (60 months): Researcher (PI: Yoav Gilad)

-P01 CA 94060 (NIH/NCI) Breast Cancer Research Foundation: "Role of Id genes in vascularization of breast cancer"

(60 months): Researcher (PI: Robert Benezra)

-American-Italian Cancer Foundation Fellowship for the project titled: "The role of Id1 and Id3 proteins in MMTV-neu mice".

(24 months): Fellowship Recipient

-EC- V Framework Program QLK6-1999-02238 "The Fe65-APP-X11 protein-protein interaction network"(GRASPING ALZHEIMER Consortium)

(36 months): Researcher (PI: Tommaso Russo)

Communications at international congresses (last 3 years):

- International Society of Extracellular Vesicles (ISEV) Research Seminar: *Extracellular vesicle-associated RNA: is there a purpose?* Utrecht, The Netherlands, September 24-25, 2015
- 4th Meeting of the International Society of Extracellular Vesicles (ISEV), Bethesda, USA, April 23-26 2015
- 3rd Meeting of the International Society of Extracellular Vesicles (ISEV), Rotterdam, The Netherlands, April 29 May 3 2014
- 15th International Congress of Immunology (ICI), Milano, August 22-27 2013
- 1st Meeting of the International Society of Extracellular Vesicles (ISEV), Goteborg, Sweden, April 18-21 2012

Seminars (last 3 years):

December 15th 2014; CROM (Centro Ricerche Oncologiche Mercogliano, Avellino, Italy). Title: "Lymphocyte-derived extracellular microRNAs: new perspectives on monitoring immune system activation".

October 16th 2013; INGM-Policlinico 1st Research day, Milan, Italy. Title: "Serum circulating microRNAs as biomarkers of immune system activation".

July 7th 2013; TIGEM (Telethon Institute of Genetics and Medicine), Naples, Italy. Title: "Extracellular microRNAs: searching for a signature of lymphocyte activation".

June 28th 2013; Institute of Protein Biochemistry (CNR), Naples, Italy. Title: "Extracellular microRNAs: searching for a signature of lymphocyte activation".

June 5th 2013; Hematology Unit at Policlinico S. Orsola Malpighi di Bologna; Italy. Title: "Extracellular microRNAs: searching for a signature of lymphocyte activation".

Student Mentorship:

1. Mentorship for PhD thesis work entitled: “Single Nucleotide Polymorphisms and circulating microRNAs for monitoring HCV disease progression: an integrated approach”. School of Medicine and Faculty of Science (Università degli Studi Milano-Bicocca, Milan, Italy) Academic Year: 2009-2010.
2. Assistant Supervisor for the thesis work entitled: “Study of GSK3 β (Glycogen Synthase Kinase 3 β) in *K-ras* transformed mouse fibroblasts NIH3T3 in conditions of different glucose availability”. Specialistic Degree in Industrial Biotechnologies (Università degli Studi Milano-Bicocca, Milan, Italy) Academic Year: 2008-2009.
3. Mentorship for PhD thesis work entitled: “The transcriptional basis for metastatic colonization in tumor and stroma”. (University of Chicago, Department of Human Genetics) Academic Year: 2006-2007.
4. Mentorship for the thesis work entitled: “Functional Characterization of the WW domain of the molecular adaptor Fe65”. Specialistic Degree in Biotechnologies (Università degli Studi di Napoli Federico II, Italy) Academic Year: 2001-2002.
5. Mentorship for the thesis work entitled: “Analysis of intracellular localization of the adaptor protein Fe65 through GFP-Fe65 fusion proteins”. Specialistic Degree in Biotechnologies (Università degli Studi di Napoli Federico II, Italy) Academic Year: 2000-2001.

Publications

Focus on Extracellular Vesicles: New Frontiers of Cell-to-Cell Communication in Cancer.

Ciardiello C, Cavallini L, Spinelli C, Yang J, Sobreiro MR, **de Candia P**, Minciacchi V, and Di Vizio D.

In press

The circulating microRNome demonstrates distinct lymphocyte subset-dependent signatures.

de Candia P§, Torri A, Fedeli M, Viganò V, Carpi D, Gorletta T, Casorati G, Pagani M, Dellabona P, Abrignani S.

Eur J Immunol. 2015 Dec 7. doi: 10.1002/eji.201545787.

§ corresponding author.

Normalization of circulating microRNA expression data obtained by quantitative real-time RT-PCR.

Marabita F, **de Candia P**, Torri A, Tegnér J, Abrignani S, Rossi RL.

Brief Bioinform. 2015 Aug 3. pii: bbv056.

Serum microRNAs as Biomarkers of Human Lymphocyte Activation in Health and Disease.

de Candia P§, Torri A, Pagani M, Abrignani S.

Front Immunol. 2014 Feb 10;5:43. eCollection 2014. Review.

§ corresponding author.

Intracellular modulation, extracellular disposal and serum increase of MiR-150 mark lymphocyte activation.

de Candia P§, Torri A, Gorletta T, Fedeli M, Bulgheroni E, Cheroni C, Marabita F, Crosti M, Moro M, Pariani E, Romanò L, Esposito S, Mosca F, Rossetti G, Rossi RL, Geginat J, Casorati G, Dellabona P, Pagani M, Abrignani S.

PLoS One. 2013 Sep 26;8(9):e75348. doi: 10.1371/journal.pone.0075348. eCollection 2013.

§ corresponding author.

Large oncosomes mediate intercellular transfer of functional microRNA.

Morello M, Minciacchi VR, **de Candia P**, Yang J, Posadas E, Kim H, Griffiths D, Bhowmick N, Chung LW, Gandellini P, Freeman MR, Demichelis F, Di Vizio D.

Cell Cycle. 2013 Nov 15;12(22):3526-36. doi: 10.4161/cc.26539.

Role of microRNAs and long-non-coding RNAs in CD4(+) T-cell differentiation.

Pagani M, Rossetti G, Panzeri I, **de Candia P**, Bonnal RJ, Rossi RL, Geginat J, Abrignani S.

Immunol Rev. 2013 May;253(1):82-96. doi: 10.1111/imr.12055. Review.

Nutritional limitation sensitizes mammalian cells to GSK-3β inhibitors and leads to growth impairment.

de Candia P§, Minopoli G, Verga V, Gargiulo A, Vanoni M, Alberghina L.

Am J Pathol. 2011 Apr;178(4):1814-23. doi: 10.1016/j.ajpath.2010.12.047.

§ corresponding author.

Copy number variation of CCL3-like genes affects rate of progression to simian-AIDS in Rhesus Macaques (Macaca mulatta).

Degenhardt JD, de Candia P, Chabot A, Schwartz S, Henderson L, Ling B, Hunter M, Jiang Z, Palermo RE, Katze M, Eichler EE, Ventura M, Rogers J, Marx P, Gilad Y, Bustamante CD.

PLoS Genet. 2009 Jan;5(1):e1000346. doi: 10.1371/journal.pgen.1000346.

A combination of genomic approaches reveals the role of FOXO1a in regulating an oxidative stress response pathway.

de Candia P§, Blekhman R, Chabot AE, Oshlack A, Gilad Y.

PLoS One. 2008 Feb 27;3(2):e1670. doi: 10.1371/journal.pone.0001670.

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Peptide-conjugated antisense oligonucleotides for targeted inhibition of a transcriptional regulator in vivo.

Henke E, Perk J, Vider J, de Candia P, Chin Y, Solit DB, Ponomarev V, Cartegni L, Manova K, Rosen N, Benezra R.

Nat Biotechnol. 2008 Jan;26(1):91-100. doi: 10.1038/nbt1366.

ID genes mediate tumor reinitiation during breast cancer lung metastasis.

Gupta GP, Perk J, Acharyya S, de Candia P, Mittal V, Todorova-Manova K, Gerald WL, Brogi E, Benezra R, Massagué J.

Proc Natl Acad Sci U S A. 2007 Dec 4;104(49):19506-11.

Reassessment of id1 protein expression in human mammary, prostate, and bladder cancers using a monospecific rabbit monoclonal anti-id1 antibody.

Perk J, Gil-Bazo I, Chin Y, **de Candia P**, Chen JJ, Zhao Y, Chao S, Cheong W, Ke Y, Al-Ahmadie H, Gerald WL, Brogi E, Benezra R.

Cancer Res. 2006 Nov 15;66(22):10870-7.

Induction of complete regressions of oncogene-induced breast tumors in mice.

Benezra R, Henke E, Ciarrocchi A, Ruzinova M, Solit D, Rosen N, Nolan D, Mittal V, **de Candia P**.

Cold Spring Harb Symp Quant Biol. 2005;70:375-81.

Id4 messenger RNA and estrogen receptor expression: inverse correlation in human normal breast epithelium and carcinoma.

de Candia P, Akram M, Benezra R, Brogi E.

Hum Pathol. 2006 Aug;37(8):1032-41.

A role for Id proteins in mammary gland physiology and tumorigenesis.

de Candia P, Benera R, Solit DB.

Adv Cancer Res. 2004;92:81-94. Review.

Angiogenesis impairment in Id-deficient mice cooperates with an Hsp90 inhibitor to completely suppress HER2/neu-dependent breast tumors.

de Candia P, Solit DB, Giri D, Brogi E, Siegel PM, Olshen AB, Muller WJ, Rosen N, Benezra R.

Proc Natl Acad Sci U S A. 2003 Oct 14;100(21):12337-42.

A genetic approach to understanding tumor angiogenesis.

Benezra R, **de Candia P**, Li H, Romero E, Lyden D, Rafii S, Ruzinova M.

Cold Spring Harb Symp Quant Biol. 2002;67:249-54. No abstract available.

Id-1 is not expressed in the luminal epithelial cells of mammary glands.

Uehara N, Chou YC, Galvez JJ, **de Candia P**, Cardiff RD, Benezra R, Shyamala G.

Breast Cancer Res. 2003;5(2):R25-9.

The beta-amyloid precursor protein functions as a cytosolic anchoring site that prevents Fe65 nuclear translocation.

Minopoli G, **de Candia P**, Bonetti A, Faraonio R, Zambrano N, Russo T.

J Biol Chem. 2001 Mar 2;276(9):6545-50.

Proteins implicated in Alzheimer disease. The role of FE65, a new adapter which binds to beta-amyloid precursor protein.

Ermeikova KS, Chang A, Zambrano N, **de Candia P**, Russo T, Sudol M.

Adv Exp Med Biol. 1998;446:161-80. Review.

Fe65 and the protein network centered around the cytosolic domain of the Alzheimer's beta-amyloid precursor protein.

Russo T, Faraonio R, Minopoli G, **de Candia P**, De Renzis S, Zambrano N.

FEBS Lett. 1998 Aug 28;434(1-2):1-7. Review.

The Fe65 adaptor protein interacts through its PID1 domain with the transcription factor CP2/LSF/LBP1.

Zambrano N, Minopoli G, **de Candia P**, Russo T.

J Biol Chem. 1998 Aug 7;273(32):20128-33.

Interaction of the phosphotyrosine interaction/phosphotyrosine binding-related domains of Fe65 with wild-type and mutant Alzheimer's beta-amyloid precursor proteins.

Zambrano N, Buxbaum JD, Minopoli G, Fiore F, **de Candia P**, De Renzis S, Faraonio R, Sabo S, Cheetham J, Sudol M, Russo T.

J Biol Chem. 1997 Mar 7;272(10):6399-405.