

## **CHIARUGI, PAOLA Ph.D**

### PRESENT APPOINTMENT

Full Professor of Biochemistry  
Department of Biochemical Sciences  
University of Florence  
Viale Morgagni 50,  
50134 Firenze, Italy  
tel: 00-11-39-055-4598343  
fax: 00-11-39-055-4598905  
e-mail: [paola.chiarugi@unifi.it](mailto:paola.chiarugi@unifi.it)

### CURRICULUM VITAE

1965- Born in September 5th in Florence.  
1989 Degree in Biological Sciences to the University of Florence.  
1990- Married with two daughters.  
1989-90 Assistant to The Department of Animal Biology and Genetics of the University of Florence.  
1990-1998 Assistant of Biological Chemistry in The Faculty of Medicine and Surgery of the University of Florence.  
1994-PhD in Biochemistry.  
1998-Specialist in Biochemistry and Clinical Chemistry.  
1998-Researcher of Biochemistry to the Faculty of Medicine and Surgery in the University of Florence.  
2001-Assistant Professor in Biochemistry to the Faculty of Medicine and Surgery in the University of Florence.  
2005- Full Professor in Biochemistry to the Faculty of Medicine and Surgery in the University of Florence.

### ACTUAL POSITION

Paola Chiarugi is Full Professor of Biochemistry in the Faculty of Medicine and Surgery at the University of Florence.

She is member of the Excellence and Research Centre for Transfer and High Formation: Studies at Molecular and Clinical Level of Chronic, Inflammatory, Degenerative and Neoplastic Diseases and of the Faculty of 1000 Evaluation System. She is member of the Italian Society of Biochemistry and Molecular Biology (SIB), Italian Cancer Society and of the Protein Society (USA).

### MAIN SCIENTIFIC INTERESTS

Prof. Chiarugi has studied for up to 15 years the structure-function relationship of tyrosine phosphatases. Her studies contributed to the elucidation of the mechanism of action of these enzymes with mutagenesis techniques and then to the definition of their role in the control of cell proliferation, adhesion and motility.

Her interests moved toward the redox regulation of oxidant-sensitive proteins during cell proliferation and cell adhesion to extracellular matrix, particularly focusing on the role of tyrosine phosphorylation on chemo-attractant and chemo-repulsive receptor signalling.

More recently she is interested in the epigenetic control of plasticity of cancer cell motility due to epithelial-mesenchymal or mesenchymal-amoeboid transitions, due to stromal fibroblasts/macrophages or hypoxia. At present, she is interested in tumor metabolic deregulation

due to environmental conditioning and she contributed key information about the ability reverse-Warburg metabolism of tumors due to stromal cells contact or inflammatory events.

#### ORGANISATION SKILLS AND TUTORIAL

- At present she coordinates the Biotechnology and Cell Biology group of the Department of Biochemical Sciences in Florence. She coordinates since up to 8 years her research group composed by 2 assistant professors, up to 6 postDocs (either Italian or from abroad), 1 technician, as well PhD and undergraduate students.
- She teaches since 1998 to hundreds of students of the faculty of Medicine and Surgery and the Faculty of Biotechnologies, as well as the Doctorate High School of Biochemistry and Applied Biology.
- She coordinated different projects of the MIUR Italian Ministry, for CIB (Italian Biotechnology Consortium), for ITT (Tuscan Tumour Institute), for Tuscany Region, (AIRC) Italian Association for Cancer Research, and EU-PorCreo.
- She has been involved in several evaluation grant proposal committees, including Prostate Cancer Association, Association for International Cancer Research, Italian Ministry for University and Research, The UK Prostate Cancer Charity, University of Florence Internal Resources Allocation, Spanish Institute for Research in Biomedicine.

#### Tutorial:

- Invited Tutorial, EMBO Workshop on Redox Regulation in Health and Diseases, Rome 2006
- Faculty Member, 3D Microscopy of Living Cells, University of Florence 2005-2008
- Invited Tutorial, Course on High-Content Analysis, Society for Biomolecular Sciences Conference, Geneva, 2005
- Co-organizer international APRO training course on Techniques for the Study of Cell Motility, Monash University 2007
- Chief Tutorial, 3D Microscopy of Living Cells, University of Florence 2009-2010

#### SCIENTIFIC PRODUCTION

The scientific production of Paola Chiarugi counts more than 100 original manuscripts and reviews in international peer-reviewed journals. The Global and the Medium Impact Factor are respectively 610 and 6,4.

She contributed to the new edition of “Medical Biochemistry”, currently adopted textbook for the course of Biochemistry and Molecular Biology for the Faculty of Medicine.

#### EDITORIAL ACTIVITY

She is in the Editorial Board of Journal of Molecular Medicine, Frontiers in Cancer Molecular Targets and Therapeutics and Cell Communications and Signalling.

She edited or co-edited some special issues of Antioxidant and Redox Signalling and Journal of Signal Transduction.

She is a referee for several scientific journals (e.g. Nature, J. Cell Science, Antioxidant and Redox Signalling, Biochem. J., Biochemistry, FEBS Lett., Eur. J. Biochem., J. Mol. Med., Biochim. Biophys. Acta, etc)

#### PARTICIPATION TO PRESTIGIOUS ACADEMIES

Member of the Advisory Board of the Institute Marie Curie, Paris

Member of the Advisory Board of the Breakthrough Breast Cancer Research Unit, University of Manchester

Member of the Assessment Review Panel of Tuscany Tumor Institute

## GRANTS

- **MIUR-PRIN 2004-2006.** Stress ossidativo, cancro e crescita metastatica: ruolo della regolazione redox
- **MIUR-PRIN 2008-2010.** Radicali dell'Ossigeno (ROS) e metabolismo energetico come determinanti della malignità e della chemioresistenza tumorale
- **Associazione Italiana per la Ricerca sul Cancro (2002-2005).** Redox regulation of different phosphotyrosine protein phosphatases during cell adhesion and invasive growth
- **Associazione Italiana per la Ricerca sul Cancro (2006-2009).** The role of Ephrin Kinases in the regulation of cancer progression and invasiveness
- **Associazione Italiana per la Ricerca sul Cancro (2009-2012).** Tumor microenvironment and cancer cell plasticity
- **Consorzio Inter-Universitario Biotecnologie (2006).** Il ruolo dei ROS nella regolazione della crescita invasiva: meccanismi molecolari e modulazione farmacologia
- **Regione Toscana-Progetto TRESOR (2006-2010).** Nuove applicazioni terapeutiche degli agonisti del recettore per gli attivatori della proliferazione dei perossisomi PPAR- $\gamma$
- **Istituto Toscano Tumori (2008-2010).** Redox regulation of metastasis spread and outgrowth
- **Istituto Toscano Tumori (2012-2015).** Stromal conditioning of prostate carcinoma progression
- **Association Myopathies Francais (2009-2012).** Resident and non-resident stem cells in Muscle regeneration: role of sphingosine 1-P and adiponectin
- **EU- POR CREO FESR 2008-2011.** Identification and validation of new protein targets for diagnosis and therapy of tumors
- **EU- POR CREO FESR 2012-2014.** Biological and functional characterization of new tumor markers aimed at improving tumor immunotherapy.

## PUBLICATIONS OF THE LAST 5 YEARS

1. Parri M, Chiarugi P. Redox molecular machines involved in tumor progression. *Antioxid Redox Signal.* 2012 Nov 12.
2. Calvani M, Comito G, Giannoni E, Chiarugi P. Time-dependent stabilization of hypoxia inducible factor-1 $\alpha$  by different intracellular sources of reactive oxygen species. *PLoS One.* 2012;7(10):e38388.
3. Serrati S, Chillà A, Laurenzana A, Margheri F, Giannoni E, Magnelli L, Chiarugi P, Dotor J, Feijoo E, Bazzichi L, Bombardieri S, Kahaleh B, Fibbi G, Del Rosso M. Systemic sclerosis endothelial cells recruit and activate dermal fibroblasts by induction of a CTGF(CCN2)/TGF-beta-dependent mesenchymal-to mesenchymal transition. *Arthritis Rheum.* 2012 Sep 12.
4. Giannoni E, Taddei ML, Parri M, Bianchini F, Santosuosso M, Grifantini R, Fibbi G, Mazzanti B, Calorini L, Chiarugi P. EphA2-mediated mesenchymal-amoeboid transition induced by endothelial progenitor cells enhances metastatic spread due to cancer-associated fibroblasts. *J Mol Med (Berl).* 2012 Aug 19.
5. Fiaschi T, Marini A, Giannoni E, Taddei ML, Gandellini P, De Donatis A, Lanciotti M, Serni S, Cirri P, Chiarugi P. Reciprocal Metabolic Reprogramming through Lactate Shuttle Coordinately Influences Tumor-Stroma Interplay. *Cancer Res.* 2012 Oct 1;72(19):5130-40.
6. Fiaschi T, Chiarugi P. Oxidative stress, tumor microenvironment, and metabolic reprogramming: a diabolic liaison. *Int J Cell Biol.* 2012;2012:762825.
7. Comito G, Giannoni E, Di Gennaro P, Segura CP, Gerlini G, Chiarugi P. Stromal fibroblasts synergize with hypoxic oxidative stress to enhance melanoma aggressiveness. *Cancer Lett.* 2012 Nov 1;324(1):31-41.

8. Fiaschi T, Giannoni E, Taddei ML, Chiarugi P. Globular adiponectin activates motility and regenerative traits of muscle satellite cells. *PLoS One*. 2012;7(5):e34782.
9. Retta SF, Chiarugi P, Trabalzini L, Pinton P, Belkin AM. Reactive oxygen species: friends and foes of signal transduction. *J Signal Transduct*. 2012;2012:534029.
10. Bianchini F, Giannoni E, Serni S, Chiarugi P, Calorini L. 22 : 6n-3 DHA inhibits differentiation of prostate fibroblasts into myofibroblasts and tumorigenesis. *Br J Nutr*. 2012 Mar 6:1-9.
11. Crescioli C, Sottili M, Bonini P, Cosmi L, Chiarugi P, Romagnani P, Vannelli GB, Colletti M, Isidori AM, Serio M, Lenzi A, Di Luigi L. Inflammatory response in human skeletal muscle cells: CXCL10 as a potential therapeutic target. *Eur J Cell Biol*. 2012 Feb;91(2):139-49. Epub 2011 Dec 15.
12. Cirri P, Chiarugi P. Cancer-associated-fibroblasts and tumour cells: a diabolic liaison driving cancer progression. *Cancer Metastasis Rev*. 2012 Jun;31(1-2):195-208.
13. Taddei ML, Giannoni E, Raugei G, Scacco S, Sardanelli AM, Papa S, Chiarugi P. Mitochondrial Oxidative Stress due to Complex I Dysfunction Promotes Fibroblast Activation and Melanoma Cell Invasiveness. *J Signal Transduct*. 2012;2012:684592.
14. Fiaschi T, Cozzi G, Chiarugi P. Redox Regulation of Nonmuscle Myosin Heavy Chain during Integrin Engagement. *J Signal Transduct*. 2012;2012:754964.
15. Crescioli C, Sottili M, Bonini P, Cosmi L, Chiarugi P, Romagnani P, Vannelli GB, Colletti M, Isidori AM, Serio M, Lenzi A, Di Luigi L. Inflammatory response in human skeletal muscle cells: CXCL10 as a potential therapeutic target. *Eur J Cell Biol*. 2012;91(2):139-49.
16. Cancer associated fibroblasts: the dark side of the coin. Cirri P, Chiarugi P. *Am J Cancer Res*. 2011;1(4):482-97.
17. HIF-1 $\alpha$  stabilization by mitochondrial ROS promotes Met-dependent invasive growth and vasculogenic mimicry in melanoma cells, G. Comito, M. Calvani, E. Giannoni, F. Bianchini, L. Calorini, E. Torre, C. Migliore, S. Giordano and P. Chiarugi, *Free Radical Biology and Medicine*, 2011, Aug 15;51(4):893-904.
18. Cancer Associated Fibroblasts Exploit Reactive Oxygen Species Through a Proinflammatory signature leading to EMT and stemness. Giannoni E, Bianchini F, Calorini L, Chiarugi P. *Antioxid Redox Signal*. 2011 Jun 15;14(12):2361-71.
19. EphA2 induces metastatic growth regulating amoeboid motility and clonogenic potential in prostate carcinoma cells. Taddei ML, Parri M, Angelucci A, Bianchini F, Marconi C, Giannoni E, Raugei G, Bologna M, Calorini L, Chiarugi P. *Mol Cancer Res*. 2011 Feb;9(2):149-60.
20. Escaping from, moving towards, following a path, squeezing through: lots of opportunities for moving cells. Chiarugi P. *Cell Commun Signal*. 2010 Sep 7;8:25.
21. Rac and Rho GTPases in cancer cell motility control. Parri M, Chiarugi P. *Cell Commun Signal*. 2010 Sep 7;8:23.
22. Reciprocal activation of prostate cancer cells and cancer-associated fibroblasts stimulates epithelial-mesenchymal transition and cancer stemness. Giannoni E, Bianchini F, Masieri L, Serni S, Torre E, Calorini L, Chiarugi P. *Cancer Res*. 2010 Sep 1;70(17):6945-56.
23. Src redox regulation: again in the front line. Giannoni E, Taddei ML, Chiarugi P. *Free Radic Biol Med*. 2010 Aug 15;49(4):516-27.
24. Metastasis: cancer cell's escape from oxidative stress. Pani G, Galeotti T, Chiarugi P. *Cancer Metastasis Rev*. 2010 Jun;29(2):351-78.
25. Globular adiponectin as a complete mesoangioblast regulator: role in proliferation, survival, motility, and skeletal muscle differentiation. Fiaschi T, Tedesco FS, Giannoni E, Diaz-Manera J, Parri M, Cossu G, Chiarugi P. *Mol Biol Cell*. 2010 Mar;21(6):848-59.
26. Adiponectin in health and diseases: from metabolic syndrome to tissue regeneration. Chiarugi P, Fiaschi T. *Expert Opin Ther Targets*. 2010 Feb;14(2):193-206.

27. Redox-based escape mechanism from death: the cancer lesson. Pani G, Giannoni E, Galeotti T, Chiarugi P. *Antioxid Redox Signal*. 2009 Nov;11(11):2791-806.
28. Sphingosine 1-phosphate increases glucose uptake through trans-activation of insulin receptor. Rapizzi E, Taddei ML, Fiaschi T, Donati C, Bruni P, Chiarugi P. *Cell Mol Life Sci*. 2009 Oct;66(19):3207-18.
29. Survival or death: the redox paradox. Chiarugi P. *Antioxid Redox Signal*. 2009 Nov;11(11):2651-4.
30. Redox regulation of anoikis resistance of metastatic prostate cancer cells: key role for Src and EGFR-mediated pro-survival signals. Giannoni E, Fiaschi T, Ramponi G, Chiarugi P. *Oncogene*. 2009 May 21;28(20):2074-86.
31. Globular adiponectin induces differentiation and fusion of skeletal muscle cells. Fiaschi T, Cirelli D, Comito G, Gelmini S, Ramponi G, Serio M, Chiarugi P. *Cell Res*. 2009 May;19(5):584-97.
32. Kinase-dependent and -independent roles of EphA2 in the regulation of prostate cancer invasion and metastasis. Taddei ML, Parri M, Angelucci A, Onnis B, Bianchini F, Giannoni E, Raugei G, Calorini L, Rucci N, Teti A, Bologna M, Chiarugi P. *Am J Pathol*. 2009 Apr;174(4):1492-503.
33. EphA2 reexpression prompts invasion of melanoma cells shifting from mesenchymal to amoeboid-like motility style. Parri M, Taddei ML, Bianchini F, Calorini L, Chiarugi P. *Cancer Res*. 2009 Mar 1;69(5):2072-81.
34. Transferrin-receptor-mediated iron accumulation controls proliferation and glutamate release in glioma cells. Chirasani SR, Markovic DS, Synowitz M, Eichler SA, Wisniewski P, Kaminska B, Otto A, Wanker E, Schäfer M, Chiarugi P, Meier JC, Kettenmann H, Glass R. *J Mol Med*. 2009 Feb;87(2):153-67.
35. Src redox regulation: there is more than meets the eye. Chiarugi P. *Mol Cells*. 2008 Oct 31;26(4):329-37.
36. Anoikis: a necessary death program for anchorage-dependent cells. Chiarugi P, Giannoni E. *Biochem Pharmacol*. 2008 Dec 1;76(11):1352-64.
37. From anchorage dependent proliferation to survival: lessons from redox signalling. Chiarugi P. *IUBMB Life*. 2008 May;60(5):301-7.
38. Redox regulation of anoikis: reactive oxygen species as essential mediators of cell survival. Giannoni E, Buricchi F, Grimaldi G, Parri M, Cialdai F, Taddei ML, Raugei G, Ramponi G, Chiarugi P. *Cell Death Differ*. 2008 May;15(5):867-78.
39. Dual role of mitochondrial reactive oxygen species in hypoxia signaling: activation of nuclear factor-kB via c-SRC and oxidant-dependent cell death. Lluís JM, Buricchi F, Chiarugi P, Morales A, Fernandez-Checa JC. *Cancer Res*. 2007 Aug 1;67(15):7368-77.
40. Redox-dependent and ligand-independent trans-activation of insulin receptor by globular adiponectin. Fiaschi T, Buricchi F, Cozzi G, Matthias S, Parri M, Raugei G, Ramponi G, Chiarugi P. *Hepatology*. 2007 Jul;46(1):130-9.
41. EphrinA1 activates a Src/focal adhesion kinase-mediated motility response leading to rho-dependent actino/myosin contractility. Parri M, Buricchi F, Giannoni E, Grimaldi G, Mello T, Raugei G, Ramponi G, Chiarugi P. *J Biol Chem*. 2007 Jul 6;282(27):19619-28. Epub 2007 Apr 22.
42. Integrin-mediated cell adhesion and spreading engage different sources of reactive oxygen species. Taddei ML, Parri M, Mello T, Catalano A, Levine AD, Raugei G, Ramponi G, Chiarugi P. *Antioxid Redox Signal*. 2007 Apr;9(4):469-81.
43. Redox signalling in anchorage-dependent cell growth. Chiarugi P, Fiaschi T. *Cell Signal*. 2007 Apr;19(4):672-82.
44. Redox regulation of ephrin/integrin cross-talk. Buricchi F, Giannoni E, Grimaldi G, Parri M, Raugei G, Ramponi G, Chiarugi P. *Cell Adh Migr*. 2007 Jan-Mar;1(1):33-42.

45. Protein tyrosine phosphorylation and reversible oxidation: two cross-talking posttranslation modifications. Chiarugi P, Buricchi F. *Antioxid Redox Signal*. 2007 Jan;9(1):1-24.
46. A novel redox-based switch: LMW-PTP oxidation enhances Grb2 binding and leads to ERK activation. Giannoni E, Raugei G, Chiarugi P, Ramponi G. *Biochem Biophys Res Commun*. 2007 Sep 22;348(2):367-73.
47. Redox regulation of beta-actin during integrin-mediated cell adhesion. Fiaschi T, Cozzi G, Raugei G, Formigli L, Ramponi G, Chiarugi P. *J Biol Chem*. 2007 Aug 11;281(32):22983-91.
48. Oxidation and inactivation of low molecular weight protein tyrosine phosphatase by the anticancer drug Aplidin. Taddei ML, Chiarugi P, Cuevas C, Ramponi G, Raugei G. *Int J Cancer*. 2006 Apr 15;118(8):2082-8.
49. EphrinA1 repulsive response is regulated by an EphA2 tyrosine phosphatase. Parri M, Buricchi F, Taddei ML, Giannoni E, Raugei G, Ramponi G, Chiarugi P. *J Biol Chem*. 2007 Oct 7;280(40):34008-18.
50. PTPs versus PTKs: the redox side of the coin. Chiarugi P. *Free Radic Res*. 2007 Apr;39(4):353-64.
51. Intracellular reactive oxygen species activate Src tyrosine kinase during cell adhesion and anchorage-dependent cell growth. Giannoni E, Buricchi F, Raugei G, Ramponi G, Chiarugi P. *Mol Cell Biol*. 2007 Aug;25(15):6391-403.