

# Roberto Chignola

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## Personal informations

Birthdate: March 27th, 1966  
Birthplace: Verona, Italy

## Present position

Associate Professor (as of Dec. 28, 2018)  
Area: 09 – Industrial and Information Engineering  
Sector: 09/G2 – Bioengineering  
Sub-sector: ING-IND/34 – Industrial Bioengineering  
Department of Biotechnology, University of Verona

## Education

- 1984: High school diploma
- 1989: Degree (Laurea) In Biology, University of Padova. Thesis title: *Application of flow cytometry to study the endocytosis of proteinaceous toxin vectors: correlation between endocytosis and cytotoxicity* (thesis advisor Prof. Cesare Montecucco)
- 1991: National qualification as professional biologist

## Teaching qualification

- 2017: Habilitation in Applied Physics
- 2017: Habilitation in Bioengineering

## Research interests

- Experimental and theoretical oncology
- Experimental and theoretical immunology
- Toxicity analysis of food components and of drugs
- Applied statistics
- Modeling of biological systems

## Short description

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I started my scientific career at the Immunology Institute of the University of Verona where I prepared my thesis work (that I discussed at the University of Padova). I worked in the field of ligand/toxin conjugates as experimental anti-tumor therapeutics and I was asked to study their intracellular trafficking and their cytotoxic effects on tumor cells grown in three-dimensional cell culture systems (tumor spheroids). At that time I could learn the basics of biochemical, molecular biology and cell culture techniques, and I became skilled in the cytotoxicity testing of drugs and in the production of monoclonal antibodies.

Stimulated by continuous discussions with colleagues, however, I started studying the immunopathology of tumors and of autoimmune diseases. I then used my acquired skills on the cytotoxicity testing of drugs and my knowledge of immunology to cooperate with food scientists in topics such as the toxicity of food components on the immune system at the gastro-intestinal interface.

Since the very beginning of my research activity, I thought that a quantitative approach could have helped us improving our knowledge of complex diseases such as cancer. I therefore attended biophysical courses and I started to work with experts from different disciplines such as Physics, Mathematics, Engineering. I succeeded in modeling the intracellular trafficking of toxins (first half of the '90s). Then I focused my research on the mathematical modeling of tumor growth, keeping in mind that the mathematical/physical modeling of biological processes must always proceed in parallel with experimentation. This approach has permeated all my research activity, up to recent times where my research is mainly devoted to the bottom-up numerical modeling of solid cancers.

Thus, during the course of my studies I have acquired new skills. I can now translate model equations into laboratory experiments and vice versa, and use basic and advanced statistical methods to analyse data and grasp biological information.

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## Post-lauream training courses

- 1989: International course on *Molecular mechanisms of intracellular targeting and sorting*, University of Trieste and University of Udine in collaboration with the Biophysics and Molecular Biology Society
- 1990: First national course on *Tumor immunology*, University of Verona
- 1997: International course on *Chaos and noise in biology and medicine*, Italian Institute of Philosophy Studies and International School of Biophysics, Ischia (Napoli)
- 1997: National course on *Complex systems in biology*, School of Pure and Applied Biophysics, Venezia
- 2008: National course on *From genes to models and return*, PhD School in Molecular and Biological Sciences, University of Milano

## Profession

- 1990 – 1992: Three-years fellowship from the Italian Association for Cancer Research (AIRC). Project title: *Production of chimeric toxins with improved trans-membrane translocation properties for the synthesis of anti-tumor ligand/antibody toxin conjugates*
- 1993: International Cancer Technology Transfer grant from the National Cancer Institute (NCI, USA) and the Union Internationale Contre le Cancer (UICC, Switzerland).

Project title: *Immunotoxins in cancer treatment: improvement of pharmacologic potential*. Supervisor: Dr. Richard J. Youle. Place: National Institutes of Health (Bethesda, USA)

- 1993 – 1994: Fellowship from the Italian Ministry of Health. Project title: *Production of a chimeric gp41/Ricin A chain toxin*
- 1994 – 1996: Fellowship from the local health units ULSS25 followed by a contract with the University of Verona. Project title: *Study on the chemico-physical and biological properties of cytotoxic molecules for the production of novel anti-tumor molecules*
- 1996 – 2002: Permanent position as Laboratory Technician, Immunology Institute, University of Verona
- 2000 and 2001: Visiting fellow at the Instituto Gulbenkian de Ciência, Lisboa, Portugal
- 2000 – 2001: Research contract with the National Research Council. Project title: *Organized fluctuations in complex biological systems*. Place: Institute of Electronic Circuits, Genova
- 2002 – 2014: Associate fellow at the National Institute for Nuclear Physics
- 2002 – 2018: (Dec. 30, 2002 – Dec. 28, 2018) Assistant Professor, Area 06/A2 – General and Clinical Pathology, Sector MED/04 – General Pathology, Department of Biotechnology, University of Verona

## Responsibilities

- 2002 – now: I lead the Experimental and Theoretical Immunology and Oncology Lab (launched in 2002 with grants from Fondazione Cariverona) at the Department of Biotechnology
- 2002 – 2012: I am the co-investigator of several initiatives in the field of biophysics of cancer (Virtus, VBL, VBL-Rad and now eBON, with grants from the Commission V, INFN)
- 2002 – 2004: Research unit leader, project *Physiopathological aspects of the interactions between cereal-based foodstuffs and the immune system*, granted by the Fondazione Cariverona
- 2002 – 2005: Research unit leader, project title *Food quality and health*, FISR, sponsored by four Governmental Ministries
- 2005: Member of the scientific committee, National Meeting *BIOSYS 2005*, National Association for Automation
- 2005 – 2015: Member of the teaching/tutoring staff, PhD in Applied Biotechnology, PhD School in Sciences, Engineering and Medicine
- 2006 – 2009: I actively participated in the project *Scientific Degrees* (Lauree Scientifiche) sponsored by the Ministry of Instruction, University and Research. I organized lessons and practical short courses of applied mathematics for high-school students
- 2007 – 2010: Research unit leader, project *Development of models to assess the risks*

*deriving from the addition of enzymes to cereal flours on human health*, granted by the Fondazione Cariverona

- 2010: Co-investigator of an HPC (High Performance Computing) project related to VBL/eBON at CINECA (C type grant)
- 2010: Co-investigator of an HPC project related to VBL at CASPUR (standard HPC grant)
- 2010: Co-investigator, project title *New technologies for the “made in Italy”*, Ministry of Economic Development (36 months)
- 2011: Co-investigator of an HPC project related to eBON at CASPUR (standard HPC grant)
- 2011: Local coordinator of the two years PRIN (Projects of Relevant National Interest) project *Numerical simulation of tumor spheroids*
- 2011: Co-investigator of a two years Joint Project (University/Industry). Project title *Strategies for the development of new vaccines for wheat allergy*
- 2014: Local coordinator, project title *MERIDIAN* (Measuring the Effects of Radiation on Immunity and Differentiation), Commission V, INFN
- 2017: Principal investigator, project title *Slowing down the aggressiveness of solid tumors*, Basic Research Program, University of Verona

## Teaching

- 1991 – 1995: General Immunology and Immunohematology (first and second year courses, respectively), Regional High School for Professional Nurses
- 1995 – 1996: Immunohematology, University Diploma in Nursing Sciences, Faculty of Medicine, University of Verona
- 2002 – 2010: Immunology, Biotechnology Degree Course, Faculty of Sciences, University of Verona
- 2003 – 2010: Techniques of Animal Cell Cultures, Biotechnology Degree Course, Faculty of Sciences, University of Verona
- 2008 – 2010: Introduction to Pathology and Oncology, Master Degree in Molecular and Industrial Biotechnology, University of Verona
- 2012 – 2013: Introduction to Pathology and Immunology, Biotechnology Degree Course, University of Verona
- 2005 – 2015: advanced courses in Experimental and Theoretical Oncology, Applied Statistics, PhD Program in Applied Biotechnology, PhD School in Sciences, Engineering and Medicine, University of Verona
- 2015 – now: Statistics, Biotechnology Degree Course, University of Verona
- 2017 – now: Mathematical models in biology, Applied Mathematics Degree Course, University of Verona
- 2019 – now: Quantitative methods for Biotechnology, Master Degree in Biotechnology

for bioresources and sustainable development, University of Verona

- 2002 – now: Advisor (with full responsibility) of 30 thesis works, Degree Courses in Biotechnology

## Invited talks at National and International Meetings

- 1990: *DNA analysis by flow cytometry*, National meeting on Actualities on Colon-Rectum Carcinoma, University of Pisa, Pisa (Italy)
- 1998: *Mathematical approaches to complex systems*, National meeting of the Italian Neuroimmunology Association, Chieti (Italy)
- 2001: *Order and disorder in natural systems*, National meeting on Mathematics and Neurosciences (Neuromat-II), Pavia (Italy)
- 2002: *Mathematical modeling of multicellular tumor spheroid growth: implications for the growth of solid tumors*, International meeting on Advances in the use of multicellular spheroids in cancer biology and therapy, ISS, Rome (Italy)
- 2002: *Toxicological aspects and problems of foodstuffs from genetically modified organisms*, National meeting on Foodstuffs and GMO, Verona (Italy)
- 2006: *Metabolism and cell population dynamics*, Gordon Research Conference on Metabolism and Ecology, Bates College, Portland, Maine (USA)
- 2006: *Virtual Biophysics Lab*, National meeting on Applications of physics to biology and medicine, INFN and University of Trieste, Trieste (Italy)
- 2008: *Ab initio computational modeling of tumor spheroids*, 1st Transatlantic Workshop on multilevel cancer modeling, Bruxelles (Belgium)
- 2013: *From tumor microenvironment dynamics to scaling-laws in oncology*, XCIX National meeting of the Italian Physics Society, Trieste (Italy)

## Public conferences

- 2009: *On the origins of tumors: when a cell loses control*, High School E. Medi, Villafranca (Verona, Italy)
- 2010: *The immune system: how we defend ourselves against the attack of evolving pathogens*, High School E. Medi, Villafranca (Verona, Italy)
- 2011: *On the origin of tumors: the basis for a personalized therapy*, civic center, San Pietro di Lavagno (Verona, Italy)

## Scientific societies

- 1997-2001: Member of the Society for Mathematical Biology
- since 2015: Member of the Italian Society of Cancerology and of the European Association for Cancer Research
- since 2019: National Bioengineering Group

## Awards

- 2006: Award from the National Association for Automation

## Patents

- Highly efficient method used for the screening of bioactive molecules. R. Chignola, C. Dalla Pellegrina, C. Tomelleri. University of Verona, Patent number: IT1380835-B (Sep. 13, 2010)
- Multi-layered particles. F. Zanoni, G. Zoccatelli, M. Vakarelova, R. Chignola. US Provisional Patent Application 62/769,642; Patent 067641-P0001A RDG (2018)

## Publications

(most recent items come first)

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### Refereed papers in scientific journals

1. S. Patmanidis, R. Chignola, A. C. Charalampidis, G. P. Papavassilopoulos. A comparison between nonlinear least squares and maximum likelihood estimation for the prediction of tumor growth on experimental data of human and rat origin. *Biomedical Signal Processing and Control* (2019), 54: 101639
2. T. Fredrich, H. Rieger, R. Chignola, E. Milotti. Fine-grained simulations of the microenvironment of vascularized tumours. *Scientific Reports* (2019), 9: 11698
3. L. Andolfi, S.L.M. Greco, D. Tierno, R. Chignola, M. Martinelli, E. Giolo, S. Luppi, I. Delfino, M. Zanetti, A. Battistella, G. Baldini, G. Ricci, M. Lazzarino. Planar AFM macro-probes to study the biomechanical properties of large cells and 3D spheroids. *Acta Biomaterialia* (2019), 94: 505-513
4. G. Badino, R. Chignola. Fluctuations of atmospheric pressure and the sound of underground karst systems: the Antro del Corchia case (Apuane Alps, Italy). *Frontiers in Earth Science* (2019), 7: 147
5. R. Chignola, M. Sega, B. Molesini, A. Baruzzi, S. Stella, E. Milotti. Collective radioresistance of T47D breast carcinoma cells is mediated by a Syncytin-1 homologous protein. *PLoS ONE* (2019), 14: e0206713
6. S. Stella, R. Chignola, E. Milotti. Dynamical detection of boundaries and cavities in biophysical cell-based simulations of growing tumour tissues. *IEEE/ACM Transactions on Computational Biology and Bioinformatics* (2019), 16: 1901-1911
7. C. Cavallini, R. Chignola, I. Dando, O. Perbellini, E. Mimiola, O. Lovato, C. Laudanna, G. Pizzolo, M. Donadelli, M.T. Scupoli. Low catalase expression confers redox hypersensitivity and identifies an indolent clinical behavior in CLL. *Blood* (2018), 131: 1942-1954
8. A. Menin, F. Zanoni, M. Vakarelova, R. Chignola, G. Donà, C. Rizzi, F. Mainente, G. Zoccatelli. Effects of microencapsulation by ionic gelation on the oxidative stability of flaxseed oil. *Food Chemistry* (2018), 269: 293-299
9. B. Molesini, G.L. Rotino, V. Dusi, R. Chignola, T. Sala, G. Mennella, G. Francese, T. Pandolfini. Two metalloproteinase inhibitors are implicated in tomato fruit development and regulated by the Inner No Outer transcription factor. *Plant Science* (2018), 266: 19-26
10. E. Milotti, V. Vyshemirsky, S. Stella, F. Dogo, R. Chignola. Analysis of the fluctuations of the tumor/host interface. *Physica A* (2017), 486: 587-594
11. G. Gonzato, G. Rossi, R. Chignola. Basalt intrusions in palaeokarst caves in the central Lessini Mountains (Venetian Prealps, Italy). *Acta Carsologica* (2017), 46: 33-45
12. E. Milotti, S. Stella, R. Chignola. Pulsation-limited oxygen diffusion in the tumour microenvironment. *Scientific Reports* (2017), 7: 39762
13. D. Treggiari, G. Zoccatelli, R. Chignola, B. Molesini, P. Minuz, T. Pandolfini. Tomato cystine-knot miniproteins possessing anti-angiogenic activity exhibit in vitro gastrointestinal stability, intestinal absorption and resistance to food industrial processing. *Food Chemistry* (2017), 221: 1346-1353
14. M. Vakarelova, F. Zanoni, P. Lardo, G. Rossin, F. Mainente, R. Chignola, A. Menin, C. Rizzi, G. Zoccatelli. Production of stable food-grade microencapsulated astaxanthin by vibrating nozzle technology. *Food Chemistry* (2017), 221: 289-295
15. S. P. Santero, F. Favretto, S. Zanzoni, R. Chignola, M. Assfalg, M. P. D'Onofrio. Effects of macromolecular crowding on a small lipid binding protein probed at the single-aminoacid level. *Archives of Biochemistry and Biophysics* (2016), 606: 99-110

16. F. Mainente, C. Rizzi, G. Zoccatelli, R. Chignola, B. Simonato, G. Pasini. Setup of a procedure for cider proteins recovery and quantification. *European Food Research and Technology* (2016), 242: 1803-1811
17. V. Guglielmi, G. Vattei, R. Chignola, A. Chiarini, M. Marini, I. Dal Pra, M. Di Chio, C. Chiamulera, U. Armato, G. Tomelleri. Evidence for caspase-dependent programmed cell death along with repair processes in affected skeletal muscle in patients with mitochondrial disorders. *Clinical Science* (2016), 130: 167-181
18. A. Baruzzi, S. Remelli, E. Lorenzetto, M. Sega, R. Chignola, G. Berton. Sos1 regulates macrophage podosome assembly and macrophage invasive capacity. *The Journal of Immunology* (2015), 195: 4900-4912
19. C. Lombardo, M. Bolla, R. Chignola, G. Senna, G. Rossin, B. Caruso, C. Tomelleri, D. Cecconi, A. Brandolini, G. Zoccatelli. A study of the immunoreactivity of *T. monococcum* (Einkorn) wheat in patients with wheat-dependent exercise-induced anaphylaxis for the production of hypoallergenic foods. *Journal of Agricultural and Food Chemistry* (2015), 63: 8299-8306
20. R. Chignola, M. Sega, S. Stella, V. Vyshemirsky, E. Milotti. From single-cell dynamics to scaling laws in oncology. *Biophysical Reviews and Letters* (2014), 9: 273-284
21. M. Sega, R. Chignola. Population ecology of heterotypic tumour cell cultures. *Cell Proliferation* (2014), 47: 476-483
22. G. Gonzato, A. Castellarin, R. Chignola, F. Gamberini, P. Lazzeri, Unione Speleologica Veronese. New dating of paleokarst features at Torricelle hills (Verona, Italy). *Italian Journal of Geosciences* (2014), 133: 427-438
23. S. Stella, R. Chignola, E. Milotti. Efficient and extendible class scheme for the combined reaction-diffusion of multiple molecular species. *Computer Physics Communications* (2014), 185: 826-835
24. E. Milotti, V. Vyshemirsky, M. Sega, S. Stella, R. Chignola. Metabolic scaling in solid tumours. *Scientific Reports* (2013), 3: 1938
25. E. Milotti, V. Vyshemirsky, M. Sega, S. Stella, F. Dogo, R. Chignola. Computer-aided biophysical modeling: a quantitative approach to complex biological systems. *IEEE/ACM Transactions on Computational Biology and Bioinformatics* (2013), 10: 805-810
26. A. Cesano, O. Perbellini, E. Evensen, C.C. Chu, F. Cioffi, J. Ptacek, R.N. Damle, R. Chignola, J. Cordeiro, X. Yan, R.E. Hawtin, I. Nichele, J.R. Ware, C. Cavallini, O. Lovato, R. Zanotti, K.R. Rai, N. Chiorazzi, G. Pizzolo, M.T. Scupoli. Association between B-cell receptor responsiveness and disease progression in B-cell chronic lymphocytic leukemia: results from single cell network profiling studies. *Haematologica* (2013), 98: 626-634
27. E. Milotti, V. Vyshemirsky, M. Sega, R. Chignola. Interplay between distribution of live cells and growth dynamics of solid tumours. *Scientific Reports* (2012), 2: 990
28. G. Zoccatelli, M. Sega, M. Bolla, D. Cecconi, P. Vaccino, C. Rizzi, R. Chignola, A. Brandolini. Expression of  $\alpha$ -amylase inhibitors in diploid *Triticum* species. *Food Chemistry* (2012), 135: 2643-2649
29. M. Sega, C. Zanetti, C. Rizzi, M. Olivieri, R. Chignola, G. Zoccatelli. Production and characterization of monoclonal antibodies for the quantification of potentially allergenic xylanases from *Aspergillus niger*. *Food Additives and Contaminants. Part A. Chemistry, Analysis, Control, Exposure & Risk Assessment* (2012), 29: 1356-1363
30. R. Chignola. La distribuzione di Poisson nel laboratorio biomedico. *MatematicaMente* (2012), 168
31. R. Chignola, E. Milotti. Bridging the gap between the micro- and the macro-world of tumors. *AIP Advances* (2012), 2: 011204
32. M. Consolini, M. Sega, C. Zanetti, M. Fusi, R. Chignola, M. De Carli, C. Rizzi, G. Zoccatelli. Emulsification of simulated gastric fluids protects wheat alpha-amylase inhibitor 0.19 epitopes from digestion. *Food Analytical Methods* (2012), 5: 234-243



33. R. Chignola, M. Farina, A. Del Fabbro, E. Milotti. Modular model of TNF $\alpha$  cytotoxicity. *Bioinformatics* (2011), 27: 1754-1757
34. R. Chignola, A. Del Fabbro, M. Farina, E. Milotti. Computational challenges of tumor spheroid modeling. *Journal of Bioinformatics and Computational Biology* (2011), 9: 559-577
35. R. Chignola, E. Milotti. Batteri, virus, mutazioni e statistica: l'esperimento di Luria e Delbrück. *MatematicaMente* (2011), 157
36. E. Milotti, R. Chignola. Emergent properties of tumor microenvironment in a real-life model of multi-cell tumor spheroids. *PLoS ONE* (2010), 5: e13942
37. R. Chignola, A. Del Fabbro, E. Milotti. Dynamics of intracellular Ca<sup>2+</sup> oscillations in the presence of multisite Ca<sup>2+</sup>-binding proteins. *Physica A - Statistical Mechanics and its Applications* (2010), 389: 3172-3178
38. A. Gliozzi, C. Guiot, R. Chignola, P. Delsanto. Oscillations in growth of multicellular tumor spheroids: a revisited quantitative analysis. *Cell Proliferation* (2010), 43: 344-353
39. C. Tomelleri, C. Dalla Pellegrina, R. Chignola. Microplate spectrophotometry for the high-throughput screening of cytotoxic molecules. *Cell Proliferation* (2010), 43: 130-138
40. E. Milotti, A. Del Fabbro, R. Chignola. Numerical integration methods for large-scale biophysical simulations. *Computer Physics Communications* (2009), 180: 2166-2174
41. C. Dalla Pellegrina, O. Perbellini, M. T. Scupoli, C. Tomelleri, C. Zanetti, G. Zoccatelli, M. Fusi, A. Peruffo, C. Rizzi, R. Chignola. Effects of wheat germ agglutinin on human gastrointestinal epithelium: insights from an experimental model of immune/epithelial cells interaction. *Toxicology and Applied Pharmacology* (2009), 237: 146-153
42. E. Milotti, R. Chignola, C. Dalla Pellegrina, A. Del Fabbro, M. Farina, D. Liberati. VBL: Virtual Biophysics Lab. *Il Nuovo Cimento* (2008) 31C: 109-118
43. E. Milotti, A. Del Fabbro, C. Dalla Pellegrina, R. Chignola. Statistical approach to the analysis of cell desynchronization data. *Physica A - Statistical Mechanics and its Applications* (2008) 387: 4204-4214
44. C. Tomelleri, E. Milotti, C. Dalla Pellegrina, O. Perbellini, A. Del Fabbro, M. T. Scupoli, R. Chignola. A quantitative study on the growth variability of tumour cell clones in vitro. *Cell Proliferation* (2008) 41: 177-191
45. G. Zoccatelli, C. Dalla Pellegrina, M. Consolini, M. Fusi, S. Sforza, G. Aquino, A. Dossena, R. Chignola, A. Peruffo, M. Olivieri, C. Rizzi. Isolation and identification of two lipid transfer proteins in pomegranate (*Punica granatum*). *Journal of Agricultural and Food Chemistry* (2007) 55: 11057-11962
46. R. Chignola, A. Del Fabbro, C. Dalla Pellegrina, E. Milotti. Ab initio phenomenological simulation of the growth of large tumor cell population. *Physical Biology* (2007) 4: 114-133
47. E. Milotti, A. Del Fabbro, C. Dalla Pellegrina, R. Chignola. Dynamics of allosteric action in multisite protein modification. *Physica A - Statistical Mechanics and its Applications* (2007), 379: 133-150
48. G. Zoccatelli, C. Dalla Pellegrina, S. Mosconi, M. Consolini, G. Veneri, R. Chignola, A. Peruffo, C. Rizzi. Full-fledged proteomic analysis of bioactive wheat amylase inhibitors by a three-dimensional analytical technique: Identification of new heterodimeric aggregation states. *Electrophoresis* (2007), 28: 460-466
49. R. Chignola, C. Dalla Pellegrina, A. Del Fabbro, E. Milotti. Thresholds, long delays and stability from generalized allosteric effect in protein networks. *Physica A - Statistical Mechanics and its Applications* (2006), 371: 463-472
50. R. Chignola, P. Dai Pra, L. M. Morato, P. Siri. Proliferation and death in a binary environment: a stochastic model of cellular ecosystems. *Bulletin of Mathematical Biology* (2006), 68: 1661-1680

51. G. Veneri, G. Zoccatelli, S. Mosconi, C. Dalla Pellegrina, R. Chignola, C. Rizzi. A rapid method for the recovery, quantification and electrophoretic analysis of proteins from beer. *Journal of the Institute of Brewing* (2006), 112: 26-27
52. R. Chignola, A. Del Fabbro, R. Foroni, E. Milotti. Modellizzazione biofisica per la crescita dei tumori solidi. *Automazione e Strumentazione* (2005) 10: 87-93
53. C. Dalla Pellegrina, C. Rizzi, S. Mosconi, G. Zoccatelli, A. Peruffo, R. Chignola. Plant lectins as carriers for oral drugs: is wheat germ agglutinin a suitable candidate? *Toxicology and Applied Pharmacology* (2005), 207: 170-178
54. C. Dalla Pellegrina, G. Padovani, F. Mainente, G. Zoccatelli, G. Bissoli, S. Mosconi, G. Veneri, A. Peruffo, G. Andrighetto, C. Rizzi, R. Chignola. Anti-tumour potential of a gallic acid-containing phenolic fraction from *Oenothera biennis*. *Cancer Letters* (2005), 226: 17-25
55. R. Chignola, E. Milotti. A phenomenological approach to the simulation of metabolism and proliferation dynamics of large tumor cell populations. *Physical Biology* (2005), 2: 8-22
56. S. Vincenzi, S. Mosconi, G. Zoccatelli, C. Dalla Pellegrina, G. Veneri, R. Chignola, A. Peruffo, A. Curioni, C. Rizzi. Protein recovery from wine and their quantification: development of a new procedure. *American Journal of Enology and Viticulture* (2005), 56: 182-187
57. R. Chignola, R. Foroni. Estimating the growth kinetics of experimental tumours from as few as two determinations of tumour size: implications for clinical oncology. *IEEE Transactions on Biomedical Engineering* (2005), 52: 808-815
58. R. Chignola, E. Milotti. Numerical simulation of tumor spheroid dynamics. *Physica A - Statistical Mechanics and its Applications* (2004), 338: 261-266
59. C. Dalla Pellegrina, A. Matucci, G. Zoccatelli, C. Rizzi, S. Vincenzi, G. Veneri, G. Andrighetto, A. Peruffo, R. Chignola. Studies on the joint cytotoxicity of wheat germ agglutinin and monensin. *Toxicology in Vitro* (2004), 18: 821-827
60. A. Matucci, G. Veneri, C. Dalla Pellegrina, G. Zoccatelli, S. Vincenzi, R. Chignola, A. Peruffo, C. Rizzi. Temperature-dependent decay of Wheat Germ Agglutinin activity and its implications for food processing and analysis. *Food Control* (2004), 15: 391-395
61. S. Sartoris, M. G. Testi, E. Stefani, R. Chignola, C. Guerriero, A. Matucci, T. Cestari, A. Scarpa, A. P. Riviera, G. Zanoni, G. Tridente, G. Andrighetto. The induction of an anti-tumor adaptive immune response elicited by tumor cells expressing de novo B7-1 mainly depends on the anatomic site of their delivery. The dose applied regulates the expansion of the response. *Immunology* (2003), 11: 474-481
62. C. Rizzi, L. Galeoto, G. Zoccatelli, S. Vincenzi, R. Chignola, A. Peruffo. Active soybean lectin in foods: quantitative determination by ELISA using immobilised asialofetuin. *Food Research International* (2003), 36: 815-821
63. C. Guerriero, G. Zoccatelli, E. Stefani, S. Sartoris, T. Cestari, A. P. Riviera, G. Tridente, G. Andrighetto, R. Chignola. Myelin basic protein epitopes secreted by human T cells encounter natural autoantibodies in the serum. *Journal of Neuroimmunology* (2003), 141: 83-89
64. C. Rizzi, R. Chignola, G. Zoccatelli, M. Donà, A. Peruffo, U. Carraro, K. Rossini. Effects of a Wheat Germ-enriched diet on skeletal muscle regeneration in Whistar rats *Italian Journal of Food Science* (2003), 15: 417-425
65. G. Zoccatelli, C. Dalla Pellegrina, S. Vincenzi, C. Rizzi, R. Chignola, A. Peruffo. Egg-matrix for large-scale single-step affinity purification of plant lectins with different carbohydrate specificities. *Protein Expression and Purification* (2003), 27: 182-185
66. S. Vincenzi, G. Zoccatelli, F. Perbellini, C. Rizzi, R. Chignola, A. Curioni, A. Peruffo. Quantitative determination of dietary lectin activities by enzyme-linked immunosorbent assay using specific glycoproteins immobilized on microtiter plates. *Journal of Agricultural and Food Chemistry* (2002), 50: 6266-6270

67. R. Chignola, C. Rizzi, S. Vincenzi, T. Cestari, N. Brutti, A. P. Riviera, S. Sartoris, A. Peruffo, G. Andrighetto. Effects of dietary wheat germ deprivation on the immune system in whistar rats: a pilot study. *International Immunopharmacology* (2002), 2:1495-1501
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*Abstracts and talks: International Meetings*

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3. D. Treggiari, G. Zoccatelli, R. Chignola, B. Molesini, P. Minuz, T. Pandolfini. *Bioavailability of tomato cysteine-knot miniproteins with anti-angiogenic properties*, XIV FISV Congress, Roma (2016)
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6. R. Chignola, M. Segà, A. Baruzzi, S. Stella, E. Milotti. *Resistance of T47D human breast carcinoma cells to ionizing radiations*, 58th Annual Meeting of the Italian Cancer Society, Verona (2016)
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8. E. Milotti, S. Stella, R. Chignola. *Synthetic life in extreme conditions*, 5th Workshop of the Italian Astrobiology Society, Trieste (2015)
9. M. Segà, R. Chignola. *Radioresistance of breast cancer T47D cells grown as 3D cultures*, 27th Annual Conference of Italian Association of Cell Cultures (ONLUS-AICC), Verona (2014)
10. C. Giulia, M. Segà, A. Carcereri de Prati, E. Butturini, R. Chignola, S. Mariotto. *Chemosensitization of breast cancer cells to chemotherapy through HIF-1alpha inhibition in hypoxic environment: preliminary studies*, 27th Annual Conference of Italian Association of Cell Cultures (ONLUS-AICC), Verona (2014)
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13. R. Chignola. *Problemi di scala e scambio di informazioni*, Oncogenesi: tra scienza e clinica medica, Frascati, Roma (2010)
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