



Annalisa Grimaldi

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Biography

December 1993: BSC in Biology

January 1994-May 1995: Laboratory of Zoology, University of Milano, Italy (Chief Prof. Giulio Lanzavecchia)

June 1996-June 1997: Laboratory of Biology of Invertebrates, University of Insubria, Varese, Italy (Chief Prof. Magda de Equileor)

June 1997-June 1998: Laboratory of Muscle research and development, Randall Institute MRC and King's College, London, GB (Chief Dr. Simon Hughes)

November 1997-November 2000: PhD in Developmental Biology

January 2001: Assistant Professor

Qualifications and awards

Assistant Professor

Research interests

1. Helical muscle structure and development The aim of this research is to investigate the organization, growth mechanism and differentiation of helical fibers, a peculiar type of striated muscle. Biochemical, structural and ultrastructural studies are performed to analyze circomyarian fibers (Annelida) and pseudocircomyarian fibers (Cephalopoda). The transcription factors involved in differentiation (MRFs expression and localization) and the regulation of muscle development by the morphogen Hedgehog are considered.

2. Angiogenesis in Hirudinea A variety of stimuli including surgical wounds, grafts and the administration of modulators of neovascularization (activators of vascular cell growth) can induce a prompt biological response in the leech *Hirudo medicinalis*, leading to the formation of an extensive blood vessel network. An increasing body of evidence indicates the involvement of botryoidal tissue cells (a peculiar tissue of Arhyncobdellids) in neo vessel formation. Leech angiogenic process shares a surprising degree of similarity with neovascularization in vertebrates, both at the cellular and at the biochemical levels: in fact, it involves similar growth factors/growth factor receptors (in particular we have characterized the existence of a VEGF-VEGF receptor system), and relies on analogous cell-cell and

cell-matrix interactions.

3. Host-parasite interactions Biodiversity can be a source of new natural products for the control of economically important pest insects. Parasitoid insects evolved an astonishing number of adaptations to develop inside their hosts. The employment of molecules made by these insects as biological control agents could be an interesting alternative to the use of chemical insecticides. The model species chosen for this research is *Toxoneuron nigriceps*, an endophagous parasitoid of the tobacco budworm, *Heliothis virescens*. *T. nigriceps* injects in its host, together with the egg, a venom and a polydnavirus (CnPDV); this leads to a remarkable alteration of the immune response and of the neuroendocrine system of the host. Thus, the study of the molecular and physiological mechanisms of the host-parasitoid interaction represents an interesting opportunity to identify new genes and molecules with insecticide activity and with a high level of selectivity, reducing the risks to non-target organisms.

Teaching experience and appointments

Course: Life Science 2 for Biology of Health
Course: Laboratory of Histological Techniques for Biology of Health
Practicals: Zoology of invertebrates and vertebrates
Master; AQUALAB Training Course in Fish Welfare

Representative publications

Tettamanti G., Grimaldi A., Congiu T., Perletti G., Raspanti M., Valvassori R., de Eguileor M., 2005. Collagen reorganization in leech wound healing. *Biology of the Cell*, 97: 557-568 (Abstract)

Ferrarese R., Brivio M., Congiu T., Falabella P., Grimaldi A., Mastore M., Perletti G., Pennacchio F., Sciacca L., Tettamanti G., Valvassori R., de Eguileor M., 2005. Early suppression of immune response in *Heliothis virescens* larvae by the endophagous parasitoid *Toxoneuron nigriceps*. *Invertebrate Survival Journal*, 2: 60-68 (Free full text)

Grimaldi A., Tettamanti G., Martin B.L., Gaffield W., Pownall M.E. and Hughes S.M., 2004. Hedgehog regulation of superficial slow muscles fibres in *Xenopus* and the evolution of tetrapod trunk myogenesis. *Development*, 131: 3249-3262 (Abstract)

Tettamanti G., Grimaldi A., Rinaldi L., Arnaboldi F., Congiu T., Valvassori R. and de Eguileor M., 2004. The multifunctional role of fibroblasts during wound healing in *Hirudo medicinalis* (Annelida, Hirudinea). *Biology of the Cell*, 96: 443-455 (Abstract)

Grimaldi A., Tettamanti G., Rinaldi L., Valvassori R. and de Eguileor M., 2004. Role of cathepsin B in leech wound healing. *Invertebrate Survival Journal* 1:36-48 <http://www.isj.unimo.it/articoli/ISJ002.pdf> (Free full text)

de Eguileor M., Tettamanti G., Grimaldi A., Perletti G., Congiu T., Rinaldi L. and Valvassori R., 2004. *Hirudo medicinalis*: avascular tissue for clear-cut angiogenesis studies? *Current Pharmaceutical Design*, 10:1979-1988 (Abstract)

Tettamanti G., Grimaldi A., Ferrarese R., Rinaldi L., Bortolotto A., Di Guardo G. and de Eguileor M., 2004. A comparative study of *sporta perimedullaris muscolosa* in the reniculus of six species of cetaceans.

The Italian Journal of Zoology, 71: 115-121 (Errata 71: 271-273)

Perletti G., Osti D., Marras E., Tettamanti G. and de Eguileor M., 2004. Generation of VSV-G pseudotyped lentiviral particles in 293T cells. *Journal of Cellular and Molecular Medicine*, 8: 142-143 (Free full text)

Grimaldi A., Tettamanti G., Brivio M. F., Valvassori R. and de Eguileor M., 2004. Differentiation of slow and fast fibers in tentacles of *Sepia officinalis* (Mollusca). *Development Growth & Differentiation*, 46: 181-193 (Abstract)

Grimaldi A., Tettamanti G., Rinaldi L., Brivio M. F., Castellani D. and de Eguileor M., 2004. Muscle differentiation in tentacle of *Sepia officinalis* (Mollusca) is regulated by muscle regulatory factors (MRFs) related proteins. *AL Development Growth & Differentiation*, 46: 83-96 (Abstract)

Tettamanti G., Grimaldi A., Valvassori R., Rinaldi L. and de Eguileor M., 2003. Vascular Endothelial Growth Factor is involved in neoangiogenesis in *Hirudo medicinalis* (Annelida, Hirudinea). *Cytokine*, 22: 168-179 (Abstract)

Tettamanti G., Grimaldi A., Ferrarese R., Palazzi M., Perletti G., Valvassori R., Cooper E.L., Lanzavecchia G. and de Eguileor M., 2003. Leech responses to tissue transplantation. *Tissue & Cell*, 35: 199-212 (Abstract)

Perletti G., Marras E., Dondi D., Grimaldi A., Tettamanti G., Valvassori R. and de Eguileor M., 2003. Assessment of the biological activity of an improved naked-DNA vector for angiogenesis gene therapy on a non-mammalian model. *International Journal of Molecular Medicine*, 11: 691-696 (Abstract)

de Eguileor M., Tettamanti G., Grimaldi A., Congiu T., Ferrarese R., Perletti G., Valvassori R., Cooper E.L. and Lanzavecchia G., 2003. Leeches: immune response, angiogenesis and biomedical applications. *Current Pharmaceutical Design*, 9: 133-147 (Abstract)

Giordana B., Milani A., Grimaldi A., Farneti R., Casartelli M., Ambrosecchio M.R., Digilio M.C., Leonardi M.G., de Eguileor M., Pennacchio F., 2003. Absorption of sugars and amino acids by the epidermis of *Aphidius ervi* larvae. *Journal of Insect Physiology*, 49: 1115-1124 (Abstract)

de Eguileor M., Grimaldi A., Tettamanti G., Ferrarese R., Congiu T., Protasoni M., Perletti G., Valvassori R. and Lanzavecchia G., 2001. *Hirudo medicinalis*: a new model system for testing activators and inhibitors of angiogenesis. *Angiogenesis*, 4: 299-312 (Abstract)

de Eguileor M., Grimaldi A., Tettamanti G., Valvassori R., Leonardi M.G., Giordana B., Tremblay E., Digilio M.C. and Pennacchio F., 2001. Larval anatomy and structure of absorbing epithelia in the aphid parasitoid *Aphidius ervi* Haliday (Hymenoptera, Braconidae). *Arthropod Structure & Development*, 30: 27-37

de Eguileor M., Grimaldi A., Tettamanti G., Congiu T., Protasoni M., Reguzzoni M., Valvassori R. and Lanzavecchia G., 2001. Ultrastructure and functional versatility of hyrudinean botryoidal tissue. *Tissue & Cell*, 33: 332-341 (Abstract)

de Eguileor M., Grimaldi A., Tettamanti G., Boselli A., Valvassori R., Cooper E.L. and Lanzavecchia G., 2000. Lipopolysaccharide-dependent induction of leech leukocytes that cross-react with vertebrate cellular differentiation markers. *Tissue & Cell*, 32: 437-445 (Abstract)

de Eguileor M., Giordana B., Leonardi M. G., Grimaldi A., Tettamanti G., Fiandra L., Valvassori R. and Lanzavecchia G., 2000. Integumental amino acid uptake in a carnivorous predator mollusc (*Sepia officinalis*, Cephalopoda). *Tissue & Cell*, 32: 389-399 (Abstract)

de Eguileor M., Grimaldi A., Tettamanti G., Valvassori R., Cooper E.L. and Lanzavecchia G., 2000. Different types of response against foreign antigens by leech leukocytes. *Tissue & Cell*, 32: 40-48 (Abstract)

de Eguileor M., Tettamanti G., Grimaldi A., Boselli A., Scari G., Valvassori R., Cooper E.L. and Lanzavecchia G., 1999. Histopathological changes after induced injury in leeches. *Journal of Invertebrate Pathology*, 74: 14-28 (Abstract)

de Eguileor M., Grimaldi A., Boselli A., Tettamanti G., Lurati S., Valvassori R. and Lanzavecchia G., 1999. Possible roles of extracellular matrix and cytoskeleton in leech body wall muscle. *Journal of Microscopy*, 196: 6-18 (Abstract)

de Eguileor M., Grimaldi A., Lanzavecchia G., Tettamanti G. and Valvassori R., 1998. Dimensional and numerical growth of helical fibers in leeches: an unusual pattern. *The Journal of Experimental Zoology*, 281:171-187