

The First Insubria Autumn School on Neuroimmunopharmacology: Challenging Paradigms Beyond Boundaries

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Abstract This issue of the Journal of Neuroimmune Pharmacology is dedicated, in part, to the proceedings of the First Insubria Autumn School on Neuroimmunopharmacology, organized by Marco Cosentino, Georges J.M. Maestroni, Franca Marino (University of Insubria, Varese, Italy), Manfred Schedlowsky (University of Duisburg-Essen, Germany) and Rainer H. Straub (University of Regensburg, Germany), which took place in November 2011 in Varese, Italy. The School was attended by 50 graduate students and postdoctoral fellows in medical and biological disciplines from 16 European universities and 25 faculties/departments.

Keywords Neuroimmune pharmacology · Teaching · Insubria autumn school

The field of neuroimmune pharmacology encompasses interdisciplinary research in pharmacology, immunology and neuroscience, providing original therapeutic approaches to investigations of the neuroimmune network. The overarching goal of the discipline is to identify novel pharmacological targets or to exploit more established medicines for unique indications. The foundation for the field is developed in a companion series of articles on microglia-neuronal networks led by Professor Carol Colton from Duke University USA.

Neuroimmune pharmacology is a young but a growth-oriented research discipline. In 1993, 2006 and 2008 the Society on NeuroImmune Pharmacology, the Journal of Neuroimmune Pharmacology and the textbook of Neuroimmune Pharmacology were founded, respectively. The field was defined by the efforts of each of the three elements. The journal in recent years developed the interplay between the three disciplines as part of special issues highlighting diagnostics and therapeutics of inflammatory, infectious and degenerative disorders of the nervous system (e.g. Hein and O'Bannion 2012; Roy 2011; Soldan and Jacobson 2010). Remarkably, a recent issue was dedicated to education for the discipline (Chang and Cabral 2011) emphasizing the importance of a close cooperation amongst the fields defining neuroimmune pharmacology. What was clear from these papers is that neuroimmune pharmacology is not limited to studies of autoimmune diseases of the nervous system (e.g. multiple sclerosis and peripheral neuropathies, the classical field of interest for conventional neuroimmunology) but encompasses neurodegenerative processes such as Parkinson's and Alzheimer's disease, stress-related disorders, and cardiovascular disease, in which both central and peripheral inflammatory processes are front and center as topics of interest for the journal. Such a broad coverage of disciplines has been increasingly addressed as critical to disease development as well as to treatment responses.

The program of the Insubria Autumn School included several modules dedicated to autoimmune disease, neurodegenerative disease, cancer, neuropsychopharmacology and cardiovascular disease. The module dedicated to autoimmune disease focused on multiple sclerosis as a model disease, discussing conventional current and future pharmacotherapeutic targets (Mauro Zaffaroni, Center for the Study of Multiple Sclerosis, Hospital S. Antonio Abate, Gallarate, VA, Italy), and perspectives

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for mesenchymal stem cell therapy (Antonio Uccelli, University of Genoa, Genoa, Italy) as well as non-conventional use of drugs acting on dopaminergic and adrenergic pathways (Cosentino and Marino 2012). A lecture was also dedicated to experimental autoimmune encephalomyelitis (Giatti et al. 2012). Among neurodegenerative diseases, Parkinson's disease was discussed with regard to its immune and neural pathogenesis (Blandini 2013); and the neuroimmune cytokine network in neuropathic pain was presented as a therapeutic target (Sacerdote et al. 2012). Dopaminergic and adrenergic pathways also were in the spotlight in the module dedicated to cancer, where their role as regulators of tumor angiogenesis and immunity was presented (Sarkar et al. 2012). In this context, novel issues in tumor vaccination and immunotherapy were also considered (Accolla and Tosi 2012). Behavioral conditioning of the immune response was the exciting topic of the module dedicated to neuropsychopharmacology, which extensively dealt with learned immunosuppression (Hadamitzky et al. 2012) and central nervous system processing of immune signals (Prager et al. 2012). The neuroimmune correlates of stress and obesity (Ippoliti et al. 2012) and emerging evidence regarding the neuroimmune network in the pathogenesis of the atherosclerotic plaque (Businaro 2012) characterized the module dedicated to cardiovascular disease. The School thus provided participants with cutting-edge insights in both established fields for neuroimmunology as well as in novel areas of research where recent clues point to a relevant role for the neuroimmune network. All topics were presented with specific attention to the respective pharmacological and therapeutic implications.

Although the term “psychoneuroimmunology” dates back to the early 1970s (Ader and Cohen 1975), the oldest papers indexed in PubMed under the terms “psychoneuroimmunology” or “neuroimmunology” were published in 1983 and 1981, respectively. At present, about 2800 papers were retrieved in PubMed using “neuroimmunology” as key word, and nearly half using “psychoneuroimmunology”. Using the term “neuroimmune pharmacology”, ~ 500 papers can be retrieved, the oldest ones dating back to 1988. Nonetheless, over the last decade there has been a sharp increase in both “neuroimmunology” and “neuroimmune pharmacology” papers, the latter steadily grew from ~10% of “neuroimmunology” published reports in 2001–2002 to about 28% (Fig. 1). During the last five years (2008–2012), the break down of original contributions for “neuroimmune pharmacology” according to the affiliation of the first author (PubMed AD field) originated from the United States of America (43%). European Union however ranked #2 (24%)

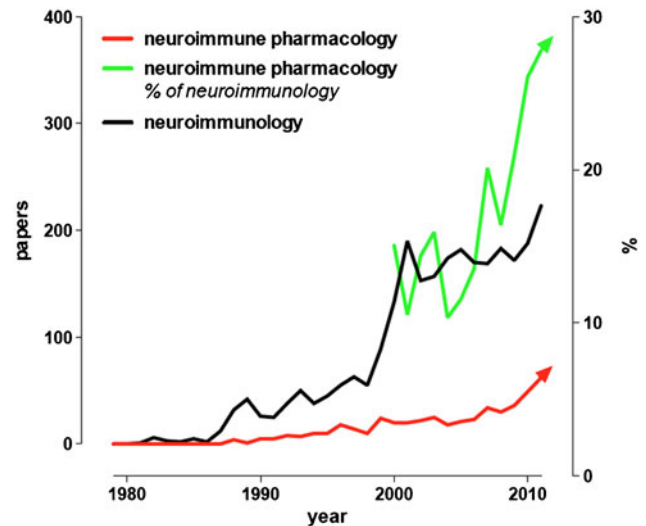


Fig. 1 Temporal trends of papers indexed in PubMed (Alexandru Dan Corlan. Medline trend: automated yearly statistics of PubMed results for any query, 2004. Web resource at URL: <http://dan.corlan.net/medline-trend.html>. Accessed: 2013-01-16. Archived by WebCite at <http://www.webcitation.org/65RkD48SV>)

with nine member states out of 27 (Belgium, France, Germany, Ireland, Italy, Poland, Spain, Sweden, United Kingdom). Italy in turn ranked #3 among EU states (after UK and Germany). The Insubria Autumn School of Neuroimmunopharmacology is the first initiative in EU aimed at providing PhD students and post-doc researchers in biology and medicine the opportunity to learn and integrate the various aspects of pharmacology, immunology, and neurosciences in a clinical and pharmacotherapeutic perspective. There is indeed a strong need for novel approaches to provide fresh insights into the increasing amount of biological and medical knowledge, overcoming the boundaries of established disciplines and academic departments. Neuroimmune pharmacology provides a huge substantive contribution in this regard for science, fostering interdisciplinary dissemination and exchange of knowledge. Developing educational formats is a critical step towards the acknowledgment of neuroimmune pharmacology as a course in biological, pre-medical, and medical schools.

This first edition of the Insubria Autumn School on Neuroimmunopharmacology benefited from the contribution of lecturers from both USA and EU, therefore representing among others a valuable opportunity to set an effective platform for the future development of a shared and fruitful teaching and learning format between the most active countries in the field. As an additional outcome, we expect that this collaborative

effort will also foster the establishment of continuous and durable scientific collaborations and exchanges, ultimately

leading to the consolidation of neuroimmune pharmacology on both sides of the ocean.



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Conflict of interest The authors declare that they have no conflict of interest.

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