



News Article

The first Malta Brain Awareness Week: An Interview with the Coordinator of the Malta Neuroscience Network

Giuseppe Di Giovanni*¹

¹Coordinator of the Malta Neuroscience Network Program, University of Malta

Professor Di Giovanni, can you give us a brief overview of your career?

I am a neuroscientist. For more than 2 decades, my research has focused on understanding the pathophysiology of central monoaminergic systems in different neuropsychiatric disorders such as depression, schizophrenia, drug abuse, Parkinson's disease and epilepsy. My research group uses a combination of *in vivo* and *in vitro* electrophysiological techniques and behavior tests in rodents. My work has attracted funding from international bodies and national Maltese bodies such as the MCST.

My principal scientific achievements have firstly been in revealing the role of serotonin in the modulation of central dopaminergic function (see recent review by De Deurwaerdere & Di Giovanni, 2016) and more recently, the pivotal involvement of 5-HT_{2C} receptors in absence epilepsy and temporal lobe epilepsy (see recent review by Di Giovanni & De Deurwaerdere, 2016) with important insights for the pathogenesis and therapy of both depression and epilepsy. Moreover, in collaboration with Prof. Crunelli I showed that the aberrant GABA_A tonic inhibition is one of the pathological mechanisms of absence epilepsy (Cope et al., 2009).

I love what I do and I consider myself very lucky to be doing it. Obviously, I had to work very hard to arrive at this point. I decided to become a neuroscientist when I was 15 after reading "La macchina per pensare" by Piero Angela (Angela, 1983), the first and still the best Italian science communicator. His book changed my life. As a child, I fell in love with brain science and, after the Liceo Scientifico, I took a degree in Biology and another in Natural Science at the University of Palermo, Sicily. After this, I received my Ph.D. in Neuroscience from the University of Chieti working at the Consorzio Mario Negri Sud in Santa Maria Imbaro, Italy, in the

laboratory of Neurophysiology led by Dr Ennio Esposito (who died suddenly of a heart attack, on October 23, 2011). Subsequently, I completed my post-doc at the Department of Pharmacology at Yale University, USA, one of the most prestigious universities in the world, under the supervision of Prof. Benjamin Bunney and Wei Xing Shi, pioneers in the study of the dopaminergic systems in normal and pathological conditions.

Successively, I was appointed Lecturer and then promoted to Senior Lecturer of Human Physiology at the Faculty of Medicine and Surgery, University of Palermo. In 2007 I went to Cardiff Wales, UK, on sabbatical and then I moved to Malta where I was appointed as Associate Professor at the University of Malta. Since 2013, I have been a Professor of Human Physiology at the University of Malta.

I have published more than 110 peer-reviewed papers, edited 7 books and 6 special issues of various journals. As researchers, our work is continuously evaluated by our peers, both for publishing and receiving external funding. To evaluate the impact of a researcher's work, two bibliometric (or better "scientometric") indexes are commonly used, the H-index score and the total number of times the scientific publications have been cited by other researchers.

My H-index score is 32 and my number of citations is more than 3370 (as of May 2016, source: <http://scholar.google.com/citations?user=pJFQfAkAAAAJ>), positioning me among the most cited researchers in Malta in all disciplines (https://scholar.google.com/citations?hl=en&view_op=search_authors&mauthors=um.edu.mt). I hope to be able to contribute further to scientific development of Malta.

Apart from my intense research activities, I am actively involved in editorial work. I am the Editor-in-

*Correspondence to: Giuseppe Di Giovanni (giuseppe.digiovanni@um.edu.mt)

Chief of the prestigious book series “The Receptors” by Springer, USA (<http://www.springer.com/series/7668>) and serve as associate editor in neuroanatomy and neurochemistry for the Journal of Neuroscience Methods by Elsevier, Amsterdam, Netherlands and CNS Neuroscience and Therapeutics by Wiley, London. Locally, I am the Editor-in-Chief of Xjenza Online, the journal of the Malta Chamber of Scientists (<http://www.mcs.org.mt/index.php/xjenza>).

When was the Malta Neuroscience Network founded?

I remember very well the first moment that I thought about it! It was a hot afternoon in September 2014, I was at the University as usual until late and I was thinking about a documentary I had been involved in: *Jien Min Jien* (<https://www.youtube.com/watch?v=ofpyAuy-aLo>), produced by Studio7 for RIDT and Science in the City. This documentary was about research at the University of Malta for which I organized the part on neuroscience research and how this has grown in the last 10 years also in terms of articles published in peer-reviewed journals. I realized then that there were many people interested in neuroscience, but not enough coordination and collaboration among them. Malta is a small country, therefore collaboration among scientists is of pivotal importance for the scientific development of the nation, the university and the education of our students. I went to Richard Muscat’s office and I said to him “Richard, what if we form a virtual neuroscience institute to bring together all of the neuroscience researchers in Malta?” I could see the enthusiasm on his face “Yes”, he said, “but do not call it Institute, the structure is too heavy, call it something like a group.” “What about a network?” I said. “Perfect,” replied Richard. So, I started contacting everyone working on neuroscience, either directly or by email, and everybody was enthusiastic about this proposal to create a network of people, all with different neuroscience specialisms. An important person who gave me support and input in the creation of the MNN was Wilfred Kenely, the CEO of RIDT. In reality, we started even earlier than this, during a fundraising event to support my research on depression and epilepsy. We had started working together on an exciting project; to have Carmine Lauri play a concert for Brain Research on Easter Sunday which proved to be a great success (<https://researchtrustmalta.wordpress.com/tag/carmine-lauri/>). This was successively included in the activities of MNN and the first Malta Brain Awareness Week (BAW) and I have decided to direct this funding to the entire research community (soon there will be calls for grant applications in which, obviously, I will also participate). Following the peer

review process, we will have the first 2 projects funded by MNN/RIDT. On Monday 20th April 2015, I was received by the Rector Prof. Juanito Camilleri with other members-to-be of the MNN: Prof. Richard Muscat, Dr Norbert Vella, Prof. Kenneth Camilleri, Prof. Alex Felice and Wilfred Kenely. The Rector followed my presentation on the creation of the network and on the existing similar networks around the world that promote research and training in the rapidly growing field of Neuroscience with great interest. Prof. Camilleri, firstly congratulated me and the other colleagues and then he suggested creating a new Programme that presents a light governance structure. In a few minutes we agreed that I would present the description of the new Neuroscience Programme proposal in time for the Senate meeting on the 7th of May 2015.

I did not waste time, and on the 21st of April we officially presented the new Malta Neuroscience Network. For this occasion, Prof. John Stein from Oxford University gave a talk to the general public at St James Cavalier in Valletta. Prof. Stein talked about modern techniques that help us understand the brain, the brain’s plasticity and the genetics that affect day to day activities. Prof. Stein also talked about deep brain stimulation to identify tremors, dyskinesias (involuntary movements) and pain, as well as discussing how the cerebellum controls our motor functions (<https://www.facebook.com/events/413741275467272/>).

On the 8th of May 2015 the Senate appointed me as Coordinator of the Board of the MNN, up to 31 December 2016.

The next MNN event was on 15th May, when Dr Owen Falzon gave a Caffe Scientifique talk on Brain Linked Machine.

On the 29th of July 2015, the MNN presented a DUAL SEMINAR at the South Auditorium, Mater Dei Hospital, Msida. The two invited speakers were well-known international scholars.

Prof. Vincenzo Crunelli, from Cardiff University, UK, talked about “Thalamocortical rhythms in wake, sleep and epilepsy” and Prof. Robert Fern, from Plymouth University, UK, focused his talk on “Glia, white matter and disease”. After the dual seminar, we had the first Malta Neuroscience Board Meeting in the Board Room, Medical School, MDH. From this moment we started working on the different activities of the MNN.

Thanks to Mr Malcolm Bonello of the Faculty of Media & Knowledge Sciences, who designed the logo of MNN (Fig. 1).

What is its function?

From the MNN statute...

“The Malta Neuroscience Network is under the aegis of our Faculty of Medicine and Surgery, joined with



Figure 1: Logo of Malta Neuroscience Network (MNN) designed by Mr Malcolm Bonello of the Faculty of Media & Knowledge Sciences.

the Faculties of Engineering, Health Sciences, Information & Communication Technology, Media & Knowledge Sciences, Science, Social Wellbeing and the Centres for Biomedical Cybernetics and for Molecular Medicine and Biobanking.

The aims of the Network are:

- (a) To encourage and facilitate interdisciplinary research that brings together academic members from all the Faculties of the University of Malta with an interest in in the rapidly growing field of Neuroscience.
- (b) To promote interdisciplinary dialogue among all the disciplines involved with Neuroscience.
- (c) To foster research and training in neuroscience at the University of Malta.
- (d) To hold regular meetings, seminars and conferences (MNN Conferences) in which to present research ideas, discuss work in progress and generally promote the sharing and dissemination of knowledge.
- (e) To sponsor and coordinate seminars by leading neuroscientists from home and abroad.
- (f) To create and maintain an electronic portal for the publication, discussion and dissemination of research.
- (g) To offer study-units in Neuroscience that may be included in both undergraduate and postgraduate programmes.
- (h) To collaborate with local and overseas centres/Universities, programmes and individuals with similar purpose and scope.
- (i) To raise public awareness in Neuroscience, brain disorders and mental health and other related areas through public talks, evening courses, Annual Brain Awareness Week, Brain Research fundraising in conjunction with RIDT and different NGOs and scientific associations.”

Apart from local neuroscientists, we have in our net-

work Prof. Giacomo Rizzolatti (Fig. 2), who discovered mirror neurons and Prof. Vincenzo Crunelli from Cardiff University, a world renowned neuroscientist specializing in epilepsy. This thanks to our Rector Juanito Camilleri who put forward my request, supported by Prof Christian Scerri and Prof Richard Muscat, to make Prof. Rizzolatti and Prof. Crunelli Affiliate Professors at the Department of Physiology and Biochemistry.



Figure 2: Professor Giacomo Rizzolatti (left) and Professor Giuseppe Di Giovanni (right) in the laboratory of Cognitive Neuroscience, University of Malta (March 2016).

If you helped found the MNN, could you tell us what the inspiration behind it was?

The human brain is the most complex organ in the known universe. This complexity makes it the last and hardest frontier in medical research. Unravelling the brain’s secrets could change the lives of millions of people of all ages, suffering from neurological and psychological conditions, lesions and addictions. Brain diseases can affect anyone. One in three Maltese people and about 1 billion people worldwide suffer from some form of condition or disease at some point in their lives. For example autism, multiple sclerosis, depression, and dementia are brain disorders that represent the most important challenges to public health in the 21st century. We need to develop new ways to cure these conditions rather than simply treat them. Discovering the reasons behind brain disorders necessitates the collaboration of many different scientific disciplines and clinicians. We now have a much deeper understanding of the brain’s complexity that has greatly improved human health. We have also increased our understanding regarding the genetic basis of diseases like autism, schizophrenia, Parkinson’s and Alzheimer’s disease. These advances are promising but further steps are needed to allow researchers to translate these findings into treatments. Basic researchers need to work with clinicians to ensure that these new discoveries within the lab end up at the bed-

side. This is the only approach that will allow us to understand the brain and subsequently protect brain health and benefit patients, their families, and health workers. This is the aim of Malta Neuroscience Network. This collaboration is precisely what is needed right now.

Is it linked to any foreign Networks? If so, which and how?

One of our first accomplished achievements for the MNN was to be accepted as the 43rd member organization among the other European Neuroscience societies by FENS in January 2016 (<http://www.fens.org/News-Activities/News/20161/01/Malta-Neuroscience-Network-as-new-member/>).

Our affiliation to FENS will be pivotal in the development of Neuroscience in Malta.

Another important collaboration is with the Mediterranean Neuroscience Society, made slightly easier by the fact that I am the treasurer of this Society (www.mnsociety.net/). The Mediterranean Neuroscience Society was created to support and help strengthen all initiatives that bring together Mediterranean neuroscientists. This has been achieved through schools and biannual meetings that have proved to be highly beneficial, not only for the scientific exchanges, but also in terms of training opportunities for students and young researchers. I am very happy that, after a successful 2015 meeting in Cagliari (Sardinia, Italy), the next meeting will take place in Malta in 2017 and MNN will be involved in its organization.

This year, you are also running a Brain Awareness Campaign. Why is that?

Brain Awareness Week (BAW) is the global campaign to increase public awareness of the progress and benefits of brain research. The global celebration, launched by The Dana Alliance for Brain Initiatives (<http://www.dana.org/About/DABI/>), presents an opportunity to bring attention to advances in brain science and advocate for science funding. Brain Awareness Week serves as a launching point for year-round Brain Awareness activities. Every March, BAW unites the efforts of partner organizations worldwide in a celebration of the brain for people of all ages. Activities are limited only by the organizers' imagination and include open days at neuroscience labs; exhibitions about the brain; lectures on brain-related topics; social media campaigns; displays at libraries and community centres; classroom workshops; and more.

The Malta Neuroscience Network launched the first Brain Awareness Week (March 14–18, 2016) in Malta (Fig. 3) and joined the global campaign with prominent neuroscientist Prof. Giacomo Rizzolatti, and Prof.

Vincenzo Crunelli from Cardiff University. Moreover, local neuroscientists, patients and NGOs have participated. The events have been organized in conjunction with RIDT, the University of Malta, Caritas Malta Epilepsy Association, the Istituto Italiano di Cultura and the Malta Chamber of Scientists. The following shows the events we have organized in more detail.



Figure 3: Official logo of the 1st Malta Brain Awareness Week designed by Mr Malcolm Bonello of the Faculty of Media & Knowledge Sciences.

Brain Awareness Week Program

Monday 14 March

CINEXJENZA & MNN

Film: The Diving Bell and the Butterfly

Speakers: Dr Owen Falzon and Dr Josanne Aquilina

Venue: ICT Auditorium, Faculty of ICT, University of Malta

Time: 18:30

Tuesday 15 March

Lab visits at University of Malta

Time: 10:00 – 13:00

Open Lecture: The Anatomy and Function of the Brain

Speaker: Dr Christian Zammit

Venue: Anatomy Lecture Room (ALR), Faculty of Medicine & Surgery, University of Malta

Time: 17:30

Wednesday 16 March

Café Scientifique & MNN

Discussion: Brain Oscillations in Epilepsy

Speaker: Prof. Vincenzo Crunelli

Personal experience by: Ms Trudy Kerr and Dr Anna Micallef

Venue: Italian Cultural Institute, Valletta

Time: 19:00

Thursday 17 March

Lab visits at University of Malta

Time: 10:00 – 13:00

Autism Round-table: Malta/Italy experience

Venue: At the Medical School Boardroom, Medical School, Mater Dei Hospital

Time: 15:30 (Fig. 4)

Open Lecture: From mirror neurons to a mirror brain

Speaker: Prof. Giacomo Rizzolatti

Venue: South Auditorium, Mater Dei Hospital

Time: 17:30

Friday 18 March

Video conference: Controversies in ADHD

Transmitting live from ACAMH UK

Venue: The Illustrations Unit, Mater Dei Hospital

Time: 10:00 – 17:00



Figure 4: Professor Rizzolatti and Professor Di Giovanni at the “1st Autism Round-table: Malta/Italy experience” at the MDH.

The BAW picked with a fund-raising concert on Easter Sunday, 27 March, at St Publius Church Floriana at 19:30 by the internationally acclaimed violinist, Carmine Lauri and a chamber ensemble under the direction of Michael Laus that performed Vivald’s Four Seasons. The concert was organized by the University of Malta’s Research, Innovation and Development Fund with all proceeds going towards brain research at the University of Malta.

Was the Brain Awareness a success? Why?

It was a great success! There was a very good response from the general public. Considering that this was the first national campaign I was very satisfied. People are very keen to learn more about the mysteries of

the brain. Moreover, 1 out of 4 families have a person with some brain disorders, so it is clearly not just an academic problem. Importantly, we also targeted the young generations and facilitated school visits to some laboratories at the University of Malta.

Department of Physiology and Biochemistry (Prof. Mario Valentino)

Introduction to the brain, understanding of normal brain function, videos and images of live brains (from mice), and effects of disease (Fig. 5).

Department of Communications Therapy (Prof. Helen Grech), Department of Cognitive Science (Prof. Ian Thornton & Prof. Noellie Brockdorff) (Fig. 6)

A brief introduction to cognitive science and experiments that are done to measure cognitive performance.

Department of Intelligent Computer Systems (Dr George Azzopardi)

Introduction to the visual system of the brain and how information about this can be used to build intelligent robots.

Department of Systems and Control Engineering & Center for Biomedical Cybernetics (Prof. Kenneth Camilleri, Dr Tracey Camilleri, Dr Owen Falzon)

An introduction to brain computer interface (BCI) systems, showcasing various EEG recording systems, videos of BCIs that have been implemented in our labs and performing an EEG recording of a volunteering student.

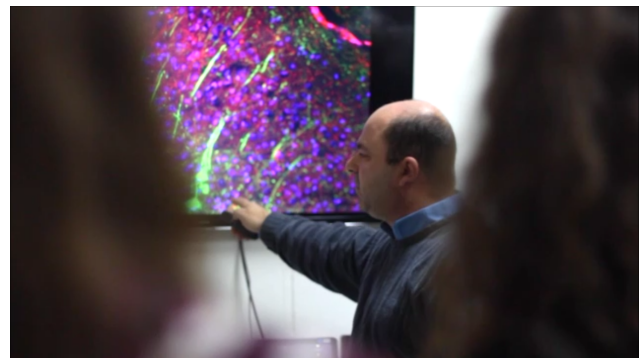


Figure 5: Prof. M. Valentino during a school visit to his laboratory at the University of Malta.

Why should people know more about the brain?

Brain illnesses are among the most important causes of death and disability worldwide. While 0.4 million people die from breast cancer every year, 1 million commit suicide. Add death due to drug abuse, Alzheimer’s,



Figure 6: Professor Ian Thornton during a school visit to his laboratory at the University of Malta.

Parkinson's and other neurodegenerative disorders, and the numbers skyrocket. Yet, despite the high numbers, social awareness of brain research is low. Mental illness is still perceived as an indulgence, a sign of weakness or punishment. For patients, it carries powerful negative attributes in all of their social relations. The situation must be improved. Neuroscientists need to work together with the media and educators to raise awareness among the general population and politicians. Mental illnesses are just as important as other physical illnesses, only much more complex, due to the limited understanding of our brain (<http://www.um.edu.mt/think/brain-awareness-research-and-facts/>).

All people who work in the field of research know that science is needed to generate new knowledge. Science and technology have undergone continuous development over the past 400 years. As a result, our society today is highly technical and specialized. However, there is a parallel public ignorance of scientific knowledge and everything that has to do with scientific culture, especially in brain research. Brain awareness should be elevated to the centre of the focus of our society and politicians, particularly since our health starts, and ends, with brain health.

What other projects are incorporated within this Network?

After concentrating on increasing brain awareness, we next want to focus on facilitating the collaboration among us and start multidisciplinary research projects. We will keep working with RIDT to increase brain awareness and the fundraising campaign. In terms of brain awareness, I have started a series of Feature Articles in THINK. In the next issue, I will talk about the use of marijuana in medical research and my research on this controversial drug (Di Giovanni, 2016a). This will be followed by other articles by other members of the MNN. I also published a divulgative article in the March 2016 issue of PINK magazine, regarding an on-

going research project in my laboratory entitled "the Paceville project", also known as "The Long-term Effects of Chronic Tobacco Use and Bingeing on Alcohol and Marijuana in Adolescence – a Gender Study". This project is the first to address the long-lasting and negative impacts of the abuse of these three substances together during the teenage years on mood, learning and memory in adults, with a focus on gender differences (Di Giovanni, 2016b). These articles were published in March in order to publicize the BWA and Carmine Lauri's concert.

Anything else you'd like to add?

We need to break research out of closed laboratories and truly collaborate. The future of brain health will expand exponentially when cognitive neuroscientists, medical doctors, molecular biologists, neuroengineers and other interdisciplinary team members come together to discover ways to promote brain performance in health, neurologic injury, psychiatric disturbance and brain disease. In Malta, we are behind the other European countries in this area. I know, it is hard to collaborate, to find the time to communicate science, to interact with colleagues and people, and to think about the community when you have your own personal problems, deadlines, lack of resources - both human and economical ones - but this is the only way to contribute to Malta's scientific development. I hope all my personal efforts and those of a few enlightened colleagues will not be wasted.

Collaboration is the fastest way to find real solutions that can change lives for all people – today.

For more information, join Malta Neuroscience on <https://www.um.edu.mt/research/notices/joinmaltaneurosciencenetwork> and follow <https://www.facebook.com/uom.neuroscinet/> on Facebook and @neuroscienceUoM on Twitter.

The above questions were asked to Professor Giuseppe Di Giovanni by Mr Iggy Fenech and an edited version of these is posted on RIDT blog.

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