Eur J Transl Myol 34 (2) 12490, 2024 doi: 10.4081/ejtm.2024.12490

Report and Abstracts of the 20th Meeting of IIM, the Interuniversity Institute of Myology: Assisi, October 12-15, 2023

Francesca Riuzzi,[1] Emanuele Mocciaro[2]

[1]*Section of Anatomy, Department of Medicine and Surgery, University of Perugia, Perugia, Italy;* [2]*Gene Expression and Regulation Unit, San Raffaele Scientific Institute, DIBIT2, Milano, Italy.*

The authors contributed equally to the article.

Abstract

The 2023 represented a milestone for the Interuniversity Institute of Myology (IIM) since it marked twenty years of IIM activity joined with the 20th annual meeting organized by the association. The 20th IIM meeting took place in the fascinating town of Assisi, in the heart of central Italy, from 12 to 15 October. The commemorative 20th edition of the meeting represented a success in terms of participation and contributions as it brought together 160 myologists, clinicians, pharmaceutical companies, and patient organization representatives from Italy, several European countries (especially France), the United Kingdom, Brazil, and the USA. Four main scientific sessions hosted 36 oral communications and 54 always-on-display posters reporting original and unpublished results. Four main lectures from internationally renowned invited speakers and talks from delegates of the Societé Française de Myologie gave particular interest and emphasis to the scientific discussion. In line with the traditional policy of the IIM to encourage the participation of young researchers, about 50% of the attendees were under 35 years old. Moreover, the 20th IIM meeting was part of the high-training course in "Advanced Myology Update 2023", reserved to young trainees and managed by the University of Perugia (Italy) in collaboration with the IIM. In addition to the meeting scientific sessions, the 29 attendees to the course had a dedicated round table and dedicated lessons with the IIM invited speakers as teachers. Awards for the best talk, best poster blitz, and best poster have been conferred to young attendees, who became part of the IIM Young Committee, involved in the scientific organization of the IIM meetings. To celebrate the 20th IIM anniversary, a special free-access educational convention on "Causes and mechanisms of muscle atrophy. From terrestrial disuse to Space flights" has been organized, in which IIM experts in the field have illustrated the current knowledge about the muscle atrophy process in several atrophying conditions, and the former Italian astronaut, Paolo Nespoli shared his incredible experience in Space fascinating the large audience attending both in presence and online live stream. The meeting was characterized by a vibrant, friendly, and inclusive atmosphere, and stimulated discussion on emerging areas of muscle research, fostering international collaborations, and confirming the IIM meeting as an ideal venue to discuss around muscle development, function, and diseases pointing to the development of efficacious therapeutic strategies. Here, the abstracts of the meeting illustrate the most recent results on basic, translational, and clinical research in the myology field. Some abstracts are missing as per authors' decision due to the patentability of the results.

Key Words: muscle; genetics, epigenetics, development and regeneration; wasting; neuromuscular diseases; clinical trials.

Eur J Transl Myol 34 (2) 12490, 2024 doi: 10.4081/ejtm.2024.12490

Eur J Transl Myol 34 (2) 12490, 2024 doi: 10.4081/ejtm.2024.12490

The Interuniversity Institute of Myology (IIM; https://iim-myology.it) was founded in 2004 starting from the idea of Giorgio Fanò-Illic (University of Chieti-Pescara, Italy, at that moment) to bring together scientists of Italian universities involved in the myology field and with the main scope to organize an annual meeting on muscle research. Over time, the IIM has become an increasingly international reality, and now it is a scientific association open to scientists from all over the world belonging to universities or research centers involved in the study of the mechanisms at the basis of muscle physiology and diseases, ranging from myogenesis to muscle regeneration, muscle function, muscle atrophy, and muscular dystrophy. Aims of the IIM are to promote the study of biological, physiological and pathological aspects of muscles; to foster collaboration between myologists from different centers and countries; to stimulate the mobility of students, researchers and teachers; and, to promote knowledge on muscle biology through seminars, conventions, meetings, and high-training courses. The activity of the IIM culminates in the organization of an annual international meeting, which has reached the twentieth edition this year. The 20th IIM meeting was held in Assisi from October 12 to 15, 2023, and brought together 160 researchers, clinicians, pharmaceutical companies, and patient organization representatives from Italy, Europe (with a consistent French delegation), the United Kingdom, Brazil, and USA, leading to a fruitful discussion on the main areas of muscle research. The following four sessions were structured: i) muscle function, muscle stem cells and regenerative medicine; ii) muscle plasticity, aging and exercise; iii) muscle wasting and cachexia; and, iv) modeling and treating muscle diseases. Attendees had the opportunity to show their most recent and unpublished results through 36 oral communications selected by the IIM scientific committee, and 54 posters which were always on display during the meeting and were object of discussion in two planned poster sessions. Four keynote lectures were given by Philippos Mourikis (Paris Est University, Paris, France) about the self-made quiescent niche of muscle stem cells (MuSCs);[1,2] Dada Pisconti (College Arts and Sciences, Stony Brook, USA) about the unifying mechanism regulating muscle stem cell quiescence entry, maintenance and exit;[3,4] Shahragim Tajbakhsh (Institut Pasteur, Paris, France) about the skeletal muscle stem and niche cell dynamics in developmental and regenerative myogenesis;[5,6] and, Saverio Tedesco (University College of London, UK) about engineering human skeletal muscle for advanced tissue, disease, and therapy modeling.[7,8]

Thanks to a collaboration with the Societé Française de Myologie (SFM), the IIM invited three SFM representatives, Bruno Allard, Vincent Gache, and Capucine Trollet to take talks in the meeting.

The IIM puts strong effort in maintaining the meeting registration fees as lower as possible for young trainees to encourage their participation; actually, about 50% of attendees were under-35-year people. Many young researchers chose to attend the university high-training course in Advanced Myology Update, which represents a very peculiar formula in the scenario of the university education. Indeed, the course is managed by the University of Perugia in collaboration with the IIM and included the entire IIM meeting, a dedicated round table on career in science, and dedicated lessons given by the invited speakers of the meeting. Philippos Mourikis discussed about new single-cell transcriptomics technologies and their relevance to muscle research; Saverio Tedesco illustrated the development of new *in vitro* models of muscle tissue; Shahragim Tajbakhsh gave an interactive lesson about the temporal evaluation of myogenic cell states; and, Dada Pisconti explained how to design a translationally meaningful pre-clinical trial for muscle disorders. The overall scientific program of the course, together with the residential formula of this latter giving the possibility to share opinions and perspectives with leading international myologists, resulted in a very valuable experience for both young and senior scientists, and it has been particularly appreciated by early post-docs and Ph.D. students, which contributed enthusiastically to the discussions.

During the meeting, two technical talks were provided by Bio-Techne (Milan, Italy) about spatial biology, single cell characterization and omics, and Bi/ond (Delft, The Netherlands) about dynamic in vitro muscle models. A slot was dedicated to Parent Project association (https://parentproject.it) whose representative, Ilaria Zito illustrated the aim and scope of this association made of parents of patients suffering from Duchenne or Becker muscular dystrophy, the effort of the association in sustaining the patients' families and the research, and the projects intended to make this complex pathology easily understandable.

To celebrate the 20th anniversary, the 2023 IIM meeting hosted the convention "Causes and mechanisms of muscle atrophy. From terrestrial disuse to Space flights" (13th October) in the auditorium of the Department of Medicine and Surgery of the University of Perugia. The convention was focused on muscle atrophy, a biological process associated with a multitude of conditions including disuse, denervation, malnutrition, aging (sarcopenia), prolonged use of steroid anti-inflammatory drugs, chronic inflammatory pathologies, the presence of certain cancer types (cachexia), and the absence of gravity as experienced during long-lasting space flights. Experts in the field such as Marco Sandri (University of Padua, Italy),[9] Paola Costelli Sandri (University of Turin, Italy),[10] Sestina Falcone (Sorbonne University Center of Research in Myology, Paris, France)[11] and Stefania Fulle (University G. d'Annunzio Chieti-Pescara, Italy)[12] discussed with a lay language about several conditions of muscle atrophy in the light of the latest knowledge in this topic. The presence of the former Italian astronaut, Paolo Nespoli as a special guest represented a great element of attraction; he fascinated the large audience with stories about his experiences in various missions in Space. More than 500 people attended the convention in presence and an additional 300 people attended via the dedicated live

streaming connection. At the end of the conference, the participants in the meeting had a guided tour at the "Casa del Cioccolato Perugina", with a visit to the factory where the well-known chocolate is produced.
On Saturday, 14th October, there was a commemorative session during which Giorgio Fanò-Illic, the first IIM director, told in a funny way the new affiliated researchers about the origins of the IIM and its evolution in a scientific association in 2019, the directors the IIM has had over time (2004-2007, Giorgio Fanò-Illic, University G. d'Annunzio Chieti-Pescara, Italy; 2007-2010, Roberto Bottinelli, University of Pavia, Italy; 2010-2016, Antonio Musarò, University Sapienza Rome, Italy; 2016-2022, Davide Gabellini, San Raffaele Institute, Milan, Italy; 2022-present, Guglielmo Sorci, University of Perugia, Italy), and the future perspectives of the association. During the same session, the new logo and the new web site (https://iim-myology.it) of the IIM were presented as well as the new X (Twitter's rebranded identity) (https://twitter.com/IIM_myology) and Instagram (https://www.instagram.com/iim_myology/) pages that, together with the existing LinkedIn page, completed the new social media panel of IIM.
At the end of the meeting, under a convivial and commemorative environment, special awards were assigned based on the evaluation by international panels composed by IIM members. In particular, prizes were assigned for the best oral communications (Andrea Bracaglia, Rome, Italy; Eloisa Turco, Padua, Italy; Noora Pöllänen, Helsinki, Finland), the best posters (Silvia Codenotti, Brescia, Italy; Gaia Laurenzi, Rome, Italy; Giorgia Piccoli, Padua, Italy), and the best poster blitzes (Giacomo Rubini, Turin, Italy; Martina Paiella, Novara, Italy; Caterina Boccia, Rome, Italy). This latter prize has been decided by the engagement of the audience with a live vote through a QR Code provided at the end of the blitzes presentation. A highly participated dance party concluded the meeting, in accordance with the important role of physical exercise in maintaining health and skeletal muscle performance during adulthood.
The 20th IIM meeting resulted successful in bringing full-time together so many myologists in a friendly and vibrant atmosphere, favoring discussion on the main areas of muscle research, providing protected dissemination of the most recent results, and fostering collaboration among researchers. The attached abstracts of the 20th IIM meeting reveal the relevant contribution of this scientific community to the myology field. The next IIM meeting is scheduled for September 4-7, 2024, to be held in Assisi, Italy again.

List of abbreviations

IIM, Interuniversity Institute of Myology
SFM, Societé Française de Myologie

Conflict of interest

The authors declare no potential conflict of interest, and all authors confirm accuracy.

Ethics approval and informed consent

Not applicable.

Patient consent for publication

Not applicable.

Corrisponding Author

Francesca Riuzzi, Section of Anatomy, Department of Medicine and Surgery, University of Perugia, 06132 Perugia, Italy.
ORCID ID: https://orcid.org/0000-0001-7908-3379
E-mail: francesca.riuzzi@unipg.it

Emanuele Mocciaro
ORCID ID: https://orcid.org/0000-0002-4287-8933
E-mail: mocciaro.emanuele@hsr.it

References

1. Zaidan L, Geara P, Borok MJ, et al. Unfractionated bulk culture of mouse skeletal muscle to recapitulate niche and stem cell quiescence. J Vis Exp 2023;196:65433.
2. Machado L, Geara P, Camps J, et al. Tissue damage induces a conserved stress response that initiates quiescent muscle stem cell activation. Cell Stem Cell 2021;28:1125-35.e7.
3. Flamini V, Ghadiali RS, Antczak P, et al. The satellite cell niche regulates the balance between myoblast differentiation and self-renewal via p53. Stem Cell Reports 2018;10:970-83.
4. Pisconti A, Banks GB, Babaeijandaghi F, et al. Loss of niche-satellite cell interactions in syndecan-3 null mice alters muscle progenitor cell homeostasis improving muscle regeneration. Skelet Muscle 2016;6:34.
5. Evano B, Sarde L, Tajbakhsh S. Temporal static and dynamic imaging of skeletal muscle in vivo. Exp Cell Res 2023;424:113484.
6. Grimaldi A, Comai G, Mella S, Tajbakhsh S. Identification of bipotent progenitors that give rise to myogenic and connective tissues in mouse. Elife 2022;11:e70235.
7. Choi S, Ferrari G, Moyle LA, et al. Assessing and enhancing migration of human myogenic progenitors using directed iPS cell differentiation and advanced tissue modelling. EMBO Mol Med 2022;14:e14526.
8. Pinton L, Khedr M, Lionello VM, et al. 3D human induced pluripotent stem cell-derived bioengineered skeletal muscles for tissue, disease and therapy modeling. Nat Protoc 2023;18:1337-76.
9. Romanello V, Sandri M. The connection between the dynamic remodeling of the mitochondrial network and the regulation of muscle mass. Cell Mol Life Sci 2021;78:1305-28.
10. Garcia-Castillo L, Rubini G, Costelli P. Pharmacotherapeutic options for cancer cachexia: emerging drugs and recent approvals. Expert Opin Pharmacother 2023;24:1053-65.
11. Traoré M, Gentil C, Benedetto C, et al. An embryonic

Eur J Transl Myol 34 (2) 12490, 2024 doi: 10.4081/ejtm.2024.12490

CaVβ1 isoform promotes muscle mass maintenance via GDF5 signaling in adult mouse. Sci Transl Med 2019;11:eaaw1131.
12. Di Filippo ES, Chiappalupi S, Balsamo M, et al. Preparation of human muscle precursor cells for the MyoGravity project's study of cell cultures in experiment units for space flight purposes. Appl Sci 2022; 12:7013.

Disclaimer

Submission: 21 March 2024.
Accepted for publication: 27 March 2024.
Eealry access: 22 April 2024.