

human sciences according to gender indicators;

- promote actions in support of biomedical, pharmacological and psychosocial research based on gender differences;
- promote studies to investigate the regulatory and pharmacological aspects of gender medicine;
- promote the prevention of risks to health and safety at work through their evaluation and management from a gender perspective;
- encourage the creation of collaborative networks at local, national and international level between entities interested in gender medicine;
- promote actions to prevent and combat gender-based violence (women, children, the elderly, vulnerable people, migrants);
- promote the development and dissemination of SAGER (Sex and Gender Equity in Research) editorial guidelines for authors and publishers for the adoption of a gender approach in publications in the biomedical area (ISS);
- promote the inclusion in their projects and activities of the thematic area 'gender medicine' among scientific societies through the programming of training and research activities;
- promote and implement interventions for the ongoing training of doctors and healthcare professionals useful to favour the sharing of the latest scientific findings, the appropriate prescription of drugs and the correct approach to a patient according to gender indicators (master's degree, distance learning, workshops, etc.).

A problem of great interest, which the Puglia Region (OER-Puglia and GISeG) is following with particular attention, is the collection and correct use of health data according to gender indicators: currently informa-

tion in this area is insufficient. In order to have correct data, it is necessary to collect information through computerised systems including specific indicators for gender differences. OER-Puglia and GISeG have proposed to other Regions to share common protocols aimed at collecting homogeneous data.

Therefore, GISeG has carried out many activities to date, but the hope is that they will be increasingly numerous and interesting and will contribute to improving knowledge on gender issues.

### **Position Paper** **Italian Society of Endocrinology and gender medicine**

**Andrea Lenzi<sup>1</sup>, Silvia Migliaccio<sup>2</sup>, Paolo Vitti<sup>3</sup>**

1. Full Professor of Endocrinology; President Italian Committee of Biosafety, Biotechnology and Life Sciences; President of the National Committee of Guarantors for Research; President of the Research Foundation of the Italian Society of Endocrinology, Experimental Medicine Department; Chairman of the Medical Pathophysiology, Food Science and Endocrinology Section, Sapienza University of Rome

2. Associate Professor of Applied Medical Technical Sciences; Member of the "Gender dysphoria and disorders of gonadal and genital development" Working Group of the Italian Society of Endocrinology, Department of Movement, Human and Health Sciences, Foro Italico University of Rome

3. Full Professor of Endocrinology; President of the Italian Society of Endocrinology, Head of the Section of Endocrinology, Department of Clinical and Experimental Medicine, University of Pisa; Head of the Clinical Center of Endocrinology and Endocrine Surgery, Azienda Ospedaliero-Universitaria Pisana

The Italian Society of Endocrinology (SIE) is a society in which many topics and research interests (clinical, basic and translational) related to hormones, metabolism, environmental contaminants, wellness and exercise converge. It is well known since the birth of medical science, and more rigorously since the 1970s, that medicine is not a neutral science, but a science greatly influenced by gender. Among the many medical disciplines, endocrinology is likely to be the most appropriate in the classification of specialized branches with a high peculiarity for gender medicine and therefore for a different evaluation, diagnosis and therapy between the male and female genders, which present different hormonal milieus which, as known, determine marked phenotypic differences that go well beyond chromosome sexual

determination. Therefore, the epidemiology of diseases, clinical manifestations, the natural history of disease and even the response to therapy differ greatly between the male and female genders and certainly hormones, together with social, economic, cultural and other biological factors, contribute to determining the significant differences in health in the two genders. However, while it is well known that hormones determine differences typical of sex, whether male or female, their role in the body's homeostasis or in the development of multiple pathologies is far more complex and not yet fully clarified and characterized.

Interestingly, the history of endocrinology helps us to understand the original role of endocrinology in gender medicine since a short *History of Endocrinology* recently published recalls that as early as the beginning of 19<sup>th</sup> century "W. Cooke described the case of a girl in whom a pararenal tumor was accompanied by a modification of the whole body that made her look like a male" and later in 1852 "Chowne observed at the Charing Cross Hospital a young 20-year-old pregnant woman, characterized by a hirsutism and a masculine appearance so strong that it generated doubts about her sex." It is therefore clear that endocrinologists have always understood the fundamental role of epigenetics and hormonal regulation in the determinism of specific phenotypic characteristics as well as of the differentiated therapeutic approach in gender pathologies.

The Italian Society of Endocrinology (SIE) has always been deeply committed to spreading and enhancing the knowledge and expertise of its members on gender medicine through an educational and research activity involving all the members of the Society, by establishing clubs and study groups that deal specifically with various issues, including specific attention to the gender implications of the various diseases. The recent creation of a study group on "Gender dysphoria and disorders of gonadal

and genital development" makes it even better to understand the sensitivity and deep commitment of the SIE in its approach to the multiple facets of gender issues that are extended with related issues to gender dysphoria.

### Conclusions

One of the future objectives of the SIE will therefore be to continue the broader dissemination of a specific endocrinological culture through the promotion of gender education, ensuring adequate levels of training through the preparation of articles, organization of refresher courses held in the classroom and via distance learning, but also by promoting further clinical and basic research activities focused on the understanding and characterization of specific molecular, cellular and biological mechanisms on the basis of which the peculiar differences of gender are founded.

### References

- Cataldi M, Muscogiuri G, Savastano S, Barrea L, Guida B, Tagliatela M, et al. Gender-related issues in the pharmacology of new anti-obesity drugs. *Obes Rev*. 2018 Dec 27. <https://doi.org/10.1111/obr.12805>.
- Cavagnini F. Storia della SIE. Atti XXXVIII Congresso Nazionale SIE Taormina, 2015.
- Emerenziani GP, Ferrari D, Vaccaro MG, Gallotta MC, Migliaccio S, Lenzi A, et al. Prediction equation to estimate heart rate at individual ventilatory threshold in female and male obese adults. *PLoS ONE* 2018;13(5):e0197255.
- Emerenziani GP, Izzo G, Vaccaro MG, Quattrone A, Lenzi A, Aversa A. Gender difference and correlation between sexuality, thyroid hormones, cognitive, and physical functions in elderly fit. *J Endocrinol Invest*. 2018 Nov 7. doi: 10.1007/s40618-018-0974-1. [Epub ahead of print]
- Fisher AD, Ristori J, Bandini E, Giordano S, Mosconi M, Jannini EA, et al. Medical treatment in gender dysphoric adolescents endorsed by SIAMS-SIE-SIEDP-ONIG. *J Endocrinol Invest*. 2014;37:675-87.
- Fittipaldi S, Bimonte VM, Soricelli A, Aversa A, Lenzi A, Greco EA, et al. Cadmium exposure alters steroid receptors and proinflammatory cytokine levels in endothelial cells in vitro: a potential mechanism of endocrine disruptor atherogenic effect. *J Endocrinol Invest*. 2018 Nov 26. doi: 10.1007/s40618-018-0982-1. [Epub ahead of print]
- Keuper M, Berti L, Raedle B, Sachs S, Böhm A, Fritsche L, et al. Preadipocytes of obese humans display gender-specific bioenergetic responses to glucose and insulin. *Mol Metab*. 2019; 20: 28-37.
- Lombardo F, Toselli L, Grasseti D, Paoli D, Masciandaro P, Valentini F, et al. Hormone and genetic study in male to female transsexual patients. *J Endocrinol Invest*. 2013;36:550-7.
- Marinò M, Latrofa F, Menconi F, Chiovato L, Vitti P. Role of genetic and non-genetic factors in the etiology of Graves' disease. *J Endocrinol Invest*. 2015;38:283-94.
- Raparelli V, Morano S, Franconi F, Lenzi A, Basili S. Sex Differences in type-2 diabetes: implications for cardiovascular risk management. *Curr Pharm Des*. 2017;23: 1471-6.
- Vignozzi L, Malavolta N, Villa P, Mangili G, Migliaccio S, Lello S. Consensus statement on the use of HRT in postmenopausal women in the management of osteoporosis by SIE, SIOMMMS and SIGO. *J Endocrinol Invest*. 2018 Nov 19. doi: 10.1007/s40618-018-0978-x. [Epub ahead of print]