ESHG

VIEWPOINT

The Young Geneticists Network and the ESHG-Young committee, a forward-looking international community

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Human Genetics is a rapidly expanding field at the intersection of science and medicine, which aims to understand the mechanisms involved in the functioning of the human body.

The search for the molecular basis of human health and the study of traits transmitted from parents to children gave rise to the field of Medical Genetics less than half a century ago [1]. This relatively young discipline is of great importance for diagnosing and understanding human diseases, predicting a possible risk of recurrence, and developing therapeutic strategies. Human Genetics comprises a scientific field with fundamental or translational research units and a medical field including Clinical Genetics and diagnostic laboratories (cytogenetics, biochemical and molecular genetics) [2].

Young geneticists (YG) face difficulties in accessing training and may feel professionally isolated due to the small number of peers at a local level. Although the use of the internet has greatly improved the cross-border dissemination of knowledge and data, human and technical resources vary considerably around the world leading to inequalities in training and practice. In addition, rapidly changing technologies have led to a widening generational gap between young and senior professionals [3]. YG strongly felt the need for an online community that could: promote human genetics to young people, connect isolated professionals, encourage ambitious collaborations, reduce inequalities and the generational gap.

THE YOUNG GENETICIST NETWORK (YGN)

This idea was born when a few enthusiastic YG, sharing the same needs and aspirations, met at conferences, courses, and internships abroad. The Facebook® group, created in February 2018, is open to all students and young professionals under 36 years of age (or in training) interested in Human Genetics [4]. The aim is to allow members to share information and ask questions related to Human Genetics (with respect to patient safety and ethics) in a friendly and supportive atmosphere, all within easy reach. Two non-for-profit structures played a key role in the development of the YGN: the European Reference Network for Intellectual disability, Telehealth, Autism, and Congenital Anomalies (ERN-ITHACA), a virtual network involving healthcare providers across Europe to improve the diagnosis and care of patients [5], and the European Society of Human Genetics (ESHG) [6]. Their support was essential to promote this group at European meetings (Fig. 1).

From the initial small group, the community has grown to a dynamic network of 1377 members from 101 different countries and 42% ($n = 583$) of them belong to 24 member states of the European Union in July 2021 (Fig. 2). Among YGN members there are geneticists with scientific and/or medical training, and genetic counselors.

THE ESHG-YOUNG COMMITTEE (ESHG-Y)

The ESHG-Y committee was launched with great enthusiasm at the ESHG 2019 conference in Gothenburg (Fig. 1) [7]. Its mission is to represent and support European YG by developing strategies and programs that aim at a better education. Currently, the focus is on four main objectives: organize scientific events, provide equal access to educational opportunities, create a professional network, and support YG to become leaders. In addition, the ESHG-Y committee is managing the YGN. The ESHG-Y is open to all YG who join the ESHG and apply for the trainee membership. It is financially and administratively dependent on the ESHG. The members of the ESHG-Y elect seven individuals among them who will oversee coordinating the activities of the committee on a voluntary basis for a period of 2 years. Every year, half of the previously elected members (three or four interchangeably) are renewed to ensure better continuity in the projects and smooth

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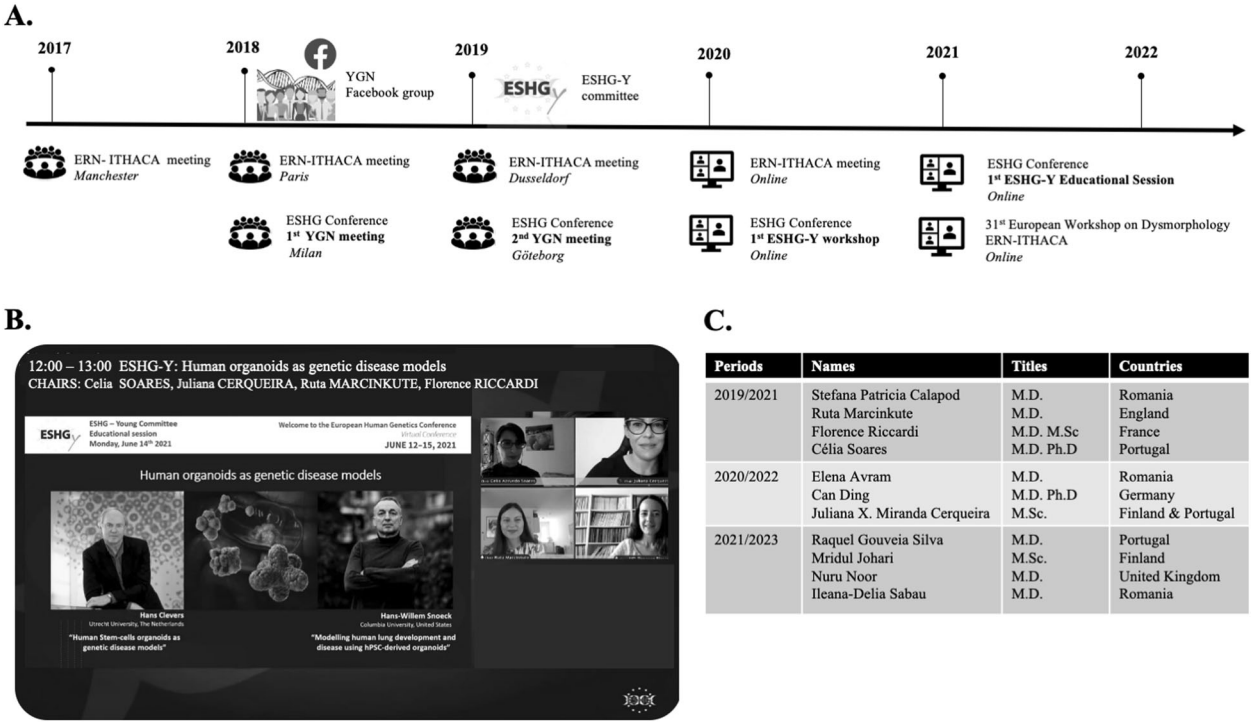


Periods	Names	Titles	Countries
2019/2021	Stefana Patricia Calapod Ruta Marcinkute Florence Riccardi Célia Soares	M.D. M.D. M.D. M.Sc M.D. Ph.D	Romania England France Portugal
2020/2022	Elena Avram Can Ding Juliana X. Miranda Cerqueira	M.D. M.D. Ph.D M.Sc.	Romania Germany Finland & Portugal
2021/2023	Raquel Gouveia Silva Mridul Johari Nuru Noor Ileana-Delia Sabau	M.D. M.Sc. M.D. M.D.	Portugal Finland United Kingdom Romania

Fig. 1 First steps and achievements of the YGN and ESHG-Young. A Timeline of the different steps that led to the creation of the YGN and ESHG-Young. As early as 2017, the project to develop an international community of young geneticists was presented at different ERN-ITHACA and ESHG meetings. Then, it became a Facebook® group in 2018 and an official committee within the ESHG in 2019. From 2020 onwards, ESHG-Y has been involved in managing sessions (workshop and educational sessions) at ESHG conferences. **B** Screenshot of the ESHG-Y educational session at the 2021 ESHG conference entitled "Human organoids as genetic disease models". **C** Elected members of ESHG-Y committee since 2019. Abbreviations: ERN-ITHACA European Reference Network for Intellectual disability, Telehealth, Autism and Congenital Anomalies; YGN Young Geneticists Network; ESHG European Society of Human Genetics; ESHG-Y European Society of Human Genetics-Young.

hand-over. The ESHG-Y is constantly looking for more volunteers to contribute to the effective development of the various projects.

COLLABORATIVE PROJECTS

The ESHG-Y committee, through the YGN, is a multilingual community with medical and scientific expertize. It has demonstrated its ability to participate in ambitious collaborative projects.

- Training opportunities for YG

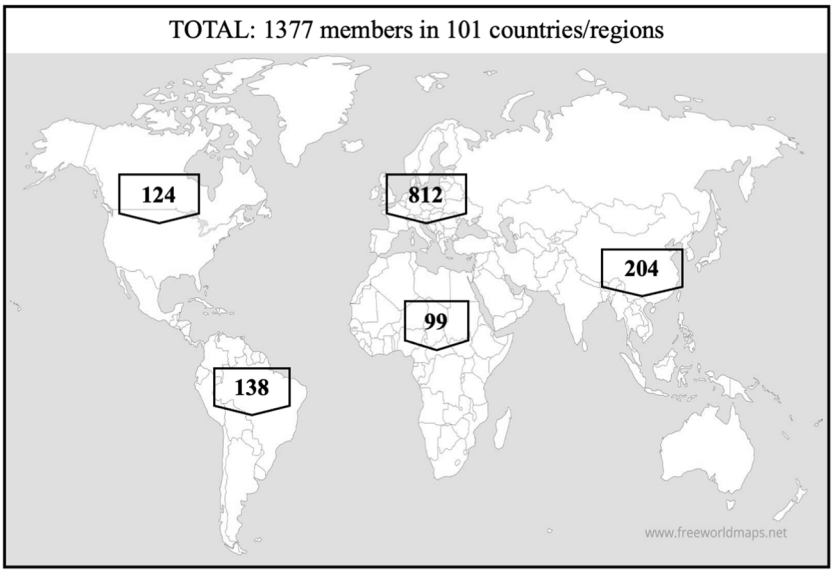
  The objective is to provide innovative ideas and support for the development of interesting and useful training opportunities keeping in mind the concrete needs and digital culture of the young generation. In association with the ESHG Education Committee [8], ESHG-Y assists the initiation of the Mentorship Program to support YG from less economically advantaged countries [9]. The ESHG-Y contributes to share, disseminate, and promote existing resources that may be difficult to access due to a lack of information or costs. This activity increased during the COVID-19 pandemic when a multitude of events of interest were accessible online.

  The ESHG-Y is involved in the development of innovative resources, recruiting volunteers for the implementation of two Massive Open Online Courses (MOOC). In addition, the ESHG-Y has been running its own session at the ESHG conference (Fig. 1). In 2020, it was a career development workshop and, in 2021, an educational session on human organoids. The ESHG-Y also participated in the scientific program of the 31st European workshop on Dysmorphology.
- Educational materials for patients and families

  The ESHG-Y assists the ERN-ITHACA in the translation of patient and family guides from Unique and Orphanet initiatives. The ESHG-Y offers a two-in-one solution, with native-speaking YG proofreading the automatically generated translations by artificial intelligence while consolidating their knowledge of the disease.

Over the past years, the European YG has built a network of mutual support and knowledge. The YGN provides easy access to quality resources from around the world to create a professional network that can last throughout a career, and the opportunity to build bridges between specialists who have a clinical and scientific background. The ESHG-Y allows YG to have their ideas and needs heard and understood as aspiring professionals. Together, they provided the missing building block for Human Genetics in Europe. There is every reason to believe that this community will bring about significant and lasting change with the support of existing societies. All generations can inspire each other and work together for a better future.

A.



B.

North America	
Country or region	Members (n)
USA	105
Canada	19

Central & South America	
Country or region	Members (n)
Brazil	50
Mexico	38
Argentina	15
Peru	11
Colombia	11
Chile	5
Ecuador	3
Barbados	1
Panama	1
Guyana	1
Honduras	1
Costa Rica	1

Europe & Middle East	
Country or region	Members (n)
France	*139*
Italy	*80*
UK	62
Germany	*53*
Russia	52
Romania	*47*
Portugal	*43*
Netherlands	*32*
Spain	*24*
Poland	*24*
Czech Republic	*21*
Belgium	*21*
Lithuania	*19*
Turkey	19
Jordan	18
Georgia	14
Sweden	*12*
Austria	*10*
Greece	*9*
Denmark	*9*
Israel	8
Hungary	*8*
Slovenia	*7*
Switzerland	7
Latvia	7
Palestine	6
Northern Macedonia	6
Serbia	5
Bulgaria	*5*
Lebanon	5
Cyprus	*5*
Ukraine	5
Finland	*4*
Syria	3
Armenia	3
Malta	*3*
Slovakia	*3*
Norway	3
Estonia	*3*
Azerbaijan	2
Kosovo	2
Ireland	*2*
Albania	2

Africa	
Country or region	Members (n)
Egypt	31
Tunisia	13
Nigeria	12
South Africa	11
Algeria	6
Libya	6
Sudan	6
Morocco	3
Zambia	1
Madagascar	1
Mauritius	1
Burkina Faso	1
Cameroon	1
Sierra Leone	1
Ethiopia	1
Panama	1
Guyana	1
Uganda	1
Ghana	1

Asia & Oceania	
Country or region	Members (n)
India	70
Pakistan	23
Australia	12
Iran	12
Bangladesh	10
Saudi Arabia	9
Thailand	9
Vietnam	7
Iraq	7
Philippines	6
China	5
Malaysia	5
Indonesia	4
United Arab Emirates	3
Japan	3
South Korea	3
Hong Kong	3
Singapore	2
Myanmar	2
Taiwan	2
Kazakhistan	2
Qatar	2
Cambodia	1
Mongolia	1
Sri Lanka	1

Fig. 2 Worldwide distribution of YGN members. A World map of the YGN members. The network gathers 1377 members from 101 countries or regions in July 2021. **B** Number of YGN members by country or region. Note that 42% ($n = 583$) of the YGN members belong to 24 member states of the European Union, marked in italic, and shaded in light gray.

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THE ESHG-YOUNG COMMITTEE

Juliana Miranda Cerqueira[7,8], Elena Avram[9] and Can Ding[10]

AUTHOR CONTRIBUTIONS

FR was responsible for designing and writing the article. She updated reference lists, created figures, and submitted the manuscript. RM contributed to writing and reviewing the report. CAS contributed to data extraction, writing, creating figures, and reviewing the article. PSC contributed to data extraction and provided feedback on the report. JMC contributed to figure creation and reviewed the report. EA and CD contributed to writing, providing references and feedback on the article. Without the existence of the ESHG-Young Committee, it would not have been possible to carry out this work.

COMPETING INTERESTS

The authors declare no competing interests.

ADDITIONAL INFORMATION

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