

Antonios Gkantaras

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*Doctor of Medicine (MD), MSc Student in Precision Medicine,
Research Fellow in Pediatric Immunology and Rheumatology Referral Center, 1st Dept of Pediatrics,
Aristotle University of Thessaloniki, Thessaloniki, Greece*

Profile

Passionate Pediatric Resident with particular interest in Inborn Errors of Immunity/Primary Immunodeficiencies and the potential applications of Precision Medicine to improve diagnosis and therapeutic management in this heterogeneous group of immunological disorders. Besides Primary Immunodeficiencies, topics of scientific interest include: Autoimmunity, Hematologic Malignancies, Infections, and Teaching of Immunology. A promising young scientist, who expresses eagerness to engage in Basic and Clinical Research always with respect to his mentors, strongly believing that further research in the field of Primary Immunodeficiencies may shed light on functions and interactions of the various components of innate and adaptive immunity, contributing to a better understanding of the complexity of immune responses, even in immunocompetent subjects.

Education - Medical Training

Oct 2021 - Present	Joint MSc in Precision Medicine: Translational Research and Therapeutics, Department of Medicine and Pharmacy, Aristotle University of Thessaloniki, Thessaloniki, Greece.
Feb 2020 - Feb 2022	Residency: Pediatrics, General Hospital of Giannitsa, Pella, Greece.
Jun 2019 - Present	Fellowship: Pediatric Immunology and Rheumatology Referral Center, 1 st Dept of Pediatrics, Hippokration General Hospital, Aristotle University of Thessaloniki, Thessaloniki, Greece.
Sep 2016 - May 2019	Student Observership: Clinical Immunology Unit, 2 nd Department of Internal Medicine, Hippokration General Hospital, Aristotle University of Thessaloniki, Thessaloniki, Greece.
Oct 2013 - Jul 2019	Doctor of Medicine: Department of Medicine, Aristotle University of Thessaloniki, Thessaloniki, Greece. <i>Degree Grade: 9.45/10 (First-Class Honour)</i>

Courses - Certificates

Apr 2021 - Aug 2021	Data Analysis with R programming language (e-learning course), Aristotle University of Thessaloniki, Greece.
Nov 2020 - Mar 2021	Precision Medicine Using Computational Biomarkers (e-learning course), National and Kapodistrian University of Athens, Greece.
Oct 2020 - Dec 2020	HELP Course: Key human rights principles in Biomedicine (Tutored Online Course), Council of Europe (CoE).
Mar 2020 - Jun 2020	Scientific Writing in Health Sciences (e-learning course), National and Kapodistrian University of Athens, Greece.

Attended Workshops

- From high throughput sequencing to diagnosis in immune mediated disorders - ESID/ERN-RITA workshop (*Paris, France and Online, 30/05/2022-31/05/2022*)
 - Promoting immunizations in the anti-vaccine era (*in the context of the 12th International Forum for Medical Students and Junior Doctors, that took place as part of the 24th Scientific Congress of Hellenic Medical Students on April 26th, 2018 in Athens, Greece.*)
 - Autoantibody Detection Tests Related to Autoimmune Liver Diseases (*in the context of the 23rd Scientific Congress of Hellenic Medical Students & 11th International Forum for Medical Students and Junior Doctors, held in Faculty of Medicine, School of Health Sciences, University of Thessaly in Larissa, Greece, May 12 – 14, 2017.*)
 - Flow Cytometry and Diagnosis of Hematological Diseases (*in the context of the 23rd Scientific Congress of Hellenic Medical Students & 11th International Forum for Medical Students and Junior Doctors, held in Faculty of Medicine, School of Health Sciences, University of Thessaly in Larissa, Greece, May 12 – 14, 2017.*)
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Research & Medical Experience

From June 2022 to date (*in the context of postgraduate studies*):

Observer in **Genomics Research Unit, Institute of Applied Biosciences, Centre for Research and Technology Hellas (CERTH), Thessaloniki, Greece**, under the supervision of **Dr. Kostas Stamatoopoulos**, Director of the Institute of Applied Biosciences at CERTH and Visiting Professor at the Karolinska Institute, Stockholm, Sweden. Training area includes Next Generation Sequencing (NGS) studies: Whole-Exome Sequencing (WES) for clinical diagnostics, targeted NGS analysis for diagnosis and disease stratification, and high throughput immunogenetic analysis of adaptive immune receptors (Immunoglobulin Gene Repertoire Profiling).

From late 2021 to date (*in the context of postgraduate studies*):

Extern in **Laboratory of Biological Chemistry, Medical School, Aristotle University of Thessaloniki (AUTH), Greece**, under the supervision of **Dr. Andigoni Malousi**, Laboratory Educational Staff, School of Medicine, AUTH. Training and research area includes Bioinformatics analysis of Next Generation Sequencing (NGS) data (Variant calling, RNA-seq data analysis, Microarray data analysis, ChIP-seq data analysis, Functional genomics and epigenomics), and Machine Learning models for patients classification and biomarker discovery.

Assignments in the modules of my postgraduate course have explored research areas, covering the following topics:

- Current genomic and epigenomic landscape of Common Variable Immunodeficiency under the prism of NGS technologies (*comprehensive literature review*)
- Targeting IFN- γ in Primary Hemophagocytic Lymphohistiocytosis: A Translational Journey from Bench to Bedside (*short review regarding emapalumab*)
- Pharmacogenomics of anti-TNF Agents in Children with Inflammatory Bowel Disease (*comprehensive literature review*)
- A Novel 5-MicroRNA Signature for Diagnosis Prediction of Classical Hodgkin Lymphoma: A Support Vector Machine Learning Approach (*original research*)
- Systems Biology Approach for Studying the Pathogenesis of Immune Dysregulation in Patients with Common Variable Immunodeficiency: Bioinformatics Study and Machine Learning Analysis (*original research*)

- Diagnosis and Follow-up of Patients with Common Variable Immunodeficiency-like Disorders: Current Approaches and Future Perspectives through the Prism of Precision Medicine (*short literature review and perspective*)

From 2019 to date:

Research Fellow and Clinical Associate in **Pediatric Immunology and Rheumatology Referral Center, 1st Department of Pediatrics, Aristotle University of Thessaloniki**, Thessaloniki, Greece, under the supervision of **Prof. Dr. Evangelia Farmaki**, Professor of Pediatrics and Pediatric Immunology, Department of Medicine, AUTH. This academic medical center is the biggest referral center for patients with Inborn Errors of Immunity in Northern Greece, with over 30 years of experience and internationally acknowledged research activity.

During the aforementioned period, my fellowship training has incorporated diagnosis and clinical management of patients with a variety of Inborn Errors of Immunity (IEI), including but not limited to X-linked agammaglobulinemia (XLA), Common Variable Immunodeficiency (CVID), Artemis Deficiency and other types of Severe Combined Immunodeficiency (SCID), Autoimmune Lymphoproliferative Syndrome (ALPS), Mendelian Susceptibility to Mycobacterial Disease (MSMD), Familial Hemophagocytic Lymphohistiocytosis (fHLH), X-linked Lymphoproliferative disease (XLP), Wiskott-Aldrich syndrome (WAS), Chronic Granulomatous Disease (CGD), and Familial Mediterranean Fever (FMF), as well as patients with hypogammaglobulinemia after rituximab therapy. Under the guidance of my supervisor, I have attained sufficient clinical skills, along with both focused and comprehensive history-taking skills, to reach initial diagnosis in patients with suspected Primary Immunodeficiency.

Furthermore, under the guidance of my supervisor, I have been actively involved in teaching and clinical training of Greek and Erasmus medical students in the Medical School of Aristotle University of Thessaloniki, regarding the diagnostic approach to the patients with suspected Primary Immunodeficiency.

In addition, I have become acquainted with Immunology Laboratory and the associated applications of flow cytometry in the context of Primary Immunodeficiencies, including:

- Flowcytometric analysis of peripheral B cell subpopulations in suspected CVID or XLA,
- Flowcytometric quantification of $\alpha\beta^+CD4^+CD8^-$ (double-negative) T-cells in suspected ALPS,
- Flowcytometric evaluation of the functional integrity of IL-12/IFN- γ axis and the expression of the associated receptors (IL12R β 1, IFN γ R1) in suspected MSMD, and
- Flowcytometric assays for the screening and diagnosis of primary HLH.

During my fellowship, research has been focused on the following major axes:

- Inborn Errors of Immunity - Primary Immunodeficiencies Registry: Data collection, handling and management, laying emphasis on epidemiology, clinicolaboratory phenotypes, imaging findings, immunological features, and genetic background.
- Identification and characterization of distinct clinical phenotypes of Greek CVID patients: Correlation of the clinical phenotypes with lung HRCT findings and immunophenotypic profile of peripheral blood lymphocytes, investigation of biomarker candidates for screening, classification and follow-up of CVID patients. Part of the work contributed to the MSc thesis of Konstantina Charisi (2021) (Supervisor: Prof. Dr. Evangelia Farmaki), regarding features of early-onset CVID in a cohort of Greek patients.
- Clinical diagnosis, immunological and molecular investigation of ALPS: Genotype-phenotype correlation, study of inheritance patterns in pedigrees, identification of diagnostic biomarkers for the differential diagnosis between patients with autoimmune cytopenias/Evans syndrome (CVID, ALPS, Systematic Lupus Erythematosus, and overlap syndromes). Part of the work contributed to the MSc thesis of Sophia Raftopoulou (2019) (Supervisor: Prof. Dr. Matthaios

Speletas, Associate Professor of Immunology, Department of Immunology and Histocompatibility, School of Health Sciences, Faculty of Medicine, University of Thessaly, Larissa, Greece), regarding the comprehensive molecular investigation of FAS, FASL, CASP10 genes in Greek patients with ALPS-like phenotype.

- Immunological evaluation of the IL-12/IFN- γ axis in patients with high clinical suspicion of MSMD: Expression analysis of IFN- γ R1 and IL-12R β 1 receptors by flow cytometry, evaluation of the IL-12/IFN- γ axis functional integrity, correlation of clinical manifestations and immune findings with genetic background.
- Immunotypes of pediatric patients with acute SARS-CoV-2 infection and the associated Multisystem Inflammatory Syndrome (MIS-C): Immunophenotypic analysis of peripheral blood leukocyte populations in immunocompetent children and adolescents with acute COVID-19 and MIS-C, correlation of immunological findings with clinical features, and investigation of prognostic biomarkers related to disease severity. Long term follow-up of children who developed MIS-C. Study of the clinical course and immunological features of COVID-19 in children with Primary Immunodeficiency.

In addition, I participated as a member of the research team in the proposal of the project "Expanding the Genomic LAndscape of Inborn ERrors of Immunity: Novel genes and phenotypes unraveled by the power of Whole Exome Sequencing - Proposal Acronym: GLACIER-I", which was submitted to Hellenic Foundation for Research and Innovation (HFRI) for funding (Principal Investigator: Dr. Athina Ververi, PgCert(Genomics), MSc, PhD, MRCP(UK), CCT(UK) – Advisory Board: Prof. Dr. Evangelia Farmaki, Prof. Dr. Matthaios Speletas).

From 2016 to 2019 (*during undergraduate studies*):

Student Observership in **Clinical Immunology Unit, 2nd Department of Internal Medicine, Hippokration General Hospital, Aristotle University of Thessaloniki**, Thessaloniki, Greece, under the supervision of **Prof. Dr. Panagiota Boura**, Professor of Internal Medicine and Clinical Immunology, Department of Medicine, AUTH.

During the aforementioned period, my training incorporated diagnosis and clinical management of patients with Systemic Lupus Erythematosus (SLE) and Rheumatoid Arthritis, whereas my research focused on:

- Identification of sTREM-1 as a biomarker of disease activity in SLE patients.
- Study of the role of complement C4 in SLE patients: Identification of patients with suspected C4 deficiency, correlation of C4 levels with clinical and immunological features of SLE, and pathophysiological interpretations.

Mycophenolate Mofetil (MMF) in Lupus Nephritis: Retrospective study evaluating clinicolaboratory response in patients with lupus nephritis under MMF therapy, correlation with disease activity (SLEDAI-2K), disease biomarkers and lipidemic profile.

Other activities

From late 2020 to date:

Active member of the **European Journal of Immunology (EJI) Working Group of the young EFIS (yEFIS) Task Force**, under the auspices of the European Federation of Immunological Societies (EFIS). As a part of the EJI-Working Group of yEFIS, I contributed to the interview series "EJI across generations: yEFIS honours EJI's 50th Anniversary", which was published in EJI in September 2021 (<https://doi.org/10.1002/eji.202170095>), being responsible for the interview of Dr. Noella Lopes. In addition, I contributed to the interview series "2022 International Women's Day -

yEFIS highlights outstanding women vaccine researchers", which was published in EJI in March 2022 (<https://doi.org/10.1002/eji.202270045>).

From late 2018 to 2021:

Active member of the **Working Group of the Hellenic Society of Immunology (HSI)** to develop a common education and training framework for undergraduate Immunology courses in Greek Medical Schools, under the supervision of Dr. Alexandros Sarantopoulos. For this purpose, we highlighted the heterogeneity of the undergraduate immunology courses in the seven different Greek Medical Schools and we further explored the perspectives of Greek medical students regarding undergraduate Immunology education.

Honors – Awards

- **"Young Researcher" Award**, for the original study "A Novel 5-miRNA Signature for Diagnosis Prediction of Classical Hodgkin Lymphoma: A Supervised Machine Learning Approach", at the 51st Symposium of the Pediatric Society of Northern Greece, held in Thessaloniki, April 15-17, 2021.
- **Best Oral Presentation Award**, for the oral "Distinct patterns of immunological response in children with SARS-CoV-2 infection: An immunophenotypic analysis", at the 50th Symposium of the Pediatric Society of Northern Greece, held in Macedonia Palace Hotel, Thessaloniki, Greece, July 2-4, 2021.
- **Best Abstract Presentation**, for the study "Immunomodulatory effect of long chain polyunsaturated fatty acids (LCPUFA) in association with IL-10 -1082 A/G in children with food allergy" ([Taparkou A](#), Nedelkopoulou N, Raftopoulou S, Gkantaras A, Mavroudi A, Xinias I, Farmaki E), European Society for Clinical Cell Analysis (ESCCA) 2021 Virtual Conference, Online, April 22-24, 2021
- **Best Oral Presentation Award**, for the oral "Clinical Diagnosis, Molecular Testing and Confirmation of Autoimmune Lymphoproliferative Syndrome (ALPS)", at the 11th Panhellenic Congress of Immunology, held in Benaki Museum, Athens, Greece, December 5-7, 2019.
- **Award of Excellence**, Feb 2020 (*Awarded based on graduation degree during the academic year 2018-2019*).
- **Distinguished Scientific Poster Award**, for the poster "IgG Levels in Monthly Subcutaneous γ -Globulin Replacement Therapy in Patients with Common Variable Immunodeficiency", at the 10th Panhellenic Congress of Immunology, held in Grand Hotel Palace, Thessaloniki, Greece, December 8-10, 2016.

Publications

- Taparkou A., Gkantaras A., Farmaki E. Immune response data from children with COVID-19. 2021; *Haema* 12(Suppl 1): 210-216.
- Gkantaras A, Taparkou A, Papadimitriou E, Michailidou E, Tsiatsiou O, Milioudi M, et al. Immunophenotyping of peripheral leukocyte subsets in children with acute SARS-CoV-2 infection and multisystem inflammatory syndrome reveals distinct patterns of immunological response. *Eur J Immunol*. 2021;51(S1):362. (*published abstract*)
- Gkantaras A., Gkoukourelias I., Georgiadou A., Boura P. Soluble triggering receptor expressed on myelocytes-1 is strongly correlated with disease activity in systemic lupus erythematosus. *anosia* 2018; 14,3: 15-19.

- Sarantopoulos A., Farmaki E., Mytilinaiou M.G., Gkantaras A., Sarantopoulou K., Boura P., Tsirogianni A.. Impact of rituximab therapy on IgG4 levels in Rheumatoid Arthritis patients. *anosia* 2018; 14, 3: 32-33.
- Gkougkourelas I., Gkantaras A., Tselios K., Sarantopoulos A., Boura P. Soluble triggering receptor expressed on myelocytes as a biomarker in Lupus: Correlation with SLEDAI. *J Clin Cell Immunol* 2017, 8:6(Suppl). DOI: 10.4172/2155-9899-C1-042. (*published abstract*)
- Gkantaras A., Sarantopoulos A., Farmaki E., Boura P., Gkougkourelas I. IgG Levels In Monthly Subcutaneous γ -Globulin Replacement Therapy In Patients With Common Variable Immunodeficiency. *anosia* 2017; 13,1: 36-39.

Submitted – Under Review

- Karantaglis N*, Gkantaras A*, Iordanidou D, Volakli E, Karakeke E, Katsafiloudi M, Violaki M, Sdougka M. Evidence and rationale for vaccinating children and adolescents against SARS-CoV-2: a comprehensive narrative review.
Submitted to *Signa Vitae* Journal (Manuscript ID: SV2022040103) – Accepted; awaiting publication
(* *co-first authors*)
- Liampas A, Gkantaras A, Sapsanis C, Kolliopoulos G, Asimos K, Vantarakis A, Gkentzi D, Christaki E. The role of smoking in mortality of patients with COVID-19: A systematic review and meta-analysis.
Submitted to *Postgraduate Medical Journal (BMJ)* (Manuscript ID: pmj-2022-142021) – Under review

Presentations

- "A Novel 5-MicroRNA Signature for Diagnosis Prediction of Classical Hodgkin Lymphoma: A Support Vector Machine Learning Approach", 12th Scientific Conference of the School of Medicine in Aristotle University of Thessaloniki, Thessaloniki, Greece, March 9-12, 2022. (*oral*)
- "Immunophenotyping of peripheral leukocyte subsets in children with acute SARS-CoV-2 infection and Multisystem Inflammatory Syndrome reveals distinct patterns of immunological response", 6th European Congress of Immunology (ECI 2021), Online, 1-4 September 2021. (*poster*)
- "Distinct patterns of immunological response in children with SARS-CoV-2 infection: An immunophenotypic analysis" at the 50th Symposium of the Pediatric Society of Northern Greece, Thessaloniki, Greece, July 2-4, 2021. (*oral*)
- "Self-limited SARS-COV-2 infection in two adolescents with X-linked agammaglobulinemia", 39th Annual Meeting of the European Society of Paediatric Infectious Diseases (ESPID 2021), Online Virtual meeting, May 24-29, 2021. (*poster*)
- "Evaluation of the IL-12/IFN- γ axis in two patients with susceptibility to disseminated non-tuberculous mycobacterial infection and recurrent invasive non-typhoidal salmonellosis", 39th Annual Meeting of the European Society of Paediatric Infectious Diseases (ESPID 2021), Online Virtual meeting, May 24-29, 2021. (*poster*)
- "Primary Immunodeficiencies in Children: Think Zebra...", Online Meeting of the Immune Deficiency Patient Association of Greece "Galinos" in the context of the World Primary Immunodeficiency Week 2021 campaign, Online, April 25, 2021. (*oral - invited*)
- "Vaccine Development (Phases of Clinical Trials) and Future Perspectives of Vaccinology", 2nd Health Festival by HelMSIC, Online, December 4-6, 2020. (*oral - invited*)

- "Immunology in Greek Medical Schools: An HSI - HelMSIC Joint Action." 11th Panhellenic Congress of Immunology, Athens, Greece, December 5-7, 2019. (*oral - invited*)
 - "Toddler with recurrent salmonellosis - exploring the deficiency on the axis IL-12/IFN- γ ", 11th Panhellenic Congress of Immunology, Athens, Greece, December 5-7, 2019. (*oral*)
 - "Clinical Diagnosis, Molecular Testing and Confirmation of Autoimmune Lymphoproliferative Syndrome (ALPS)", 11th Panhellenic Congress of Immunology, Athens, Greece, December 5-7, 2019. (*oral*)
 - "Non-infectious Complications of Common Variable Immunodeficiency: A single centre experience", 11th Panhellenic Congress of Immunology, Athens, Greece, December 5-7, 2019. (*poster*)
 - "Inborn Errors of Immunity Registry: Updated data of 25-years experience of the Pediatric Immunology and Rheumatology Referral Center of Northern Greece", 11th Panhellenic Congress of Immunology, Athens, Greece, December 5-7, 2019. (*poster*)
 - "Soluble triggering receptor expressed on myelocytes-1 is strongly correlated with disease activity in systemic lupus erythematosus." European Congress of Immunology (ECI) 2018, Amsterdam, The Netherlands, September 2-5, 2018. (*poster*)
 - "Impact of rituximab therapy on IgG4 levels and B-cell phenotype in rheumatoid arthritis patients." European Congress of Immunology (ECI) 2018, Amsterdam, The Netherlands, September 2-5, 2018. (*poster*)
 - "Treating Lupus Nephritis with Mycophenolate Mofetil: Effects on Disease Biomarkers and Lipidemic Profile." 4th Panhellenic Conference on Continuing Education in Internal Medicine, Thessaloniki, Greece, February 21-25, 2018. (*oral*)
 - "Soluble triggering receptor expressed on myelocytes as a biomarker in Lupus. Correlation with SLEDAI." 2nd International Conference on Autoimmunity, Frankfurt, Germany, November 6-7, 2017. (*poster*)
 - "C4 Deficiency and anti-Ro/anti-DNA Autoimmunity in Systematic Lupus Erythematosus: Protective Phenotype of Primary Immunodeficiency?", 3rd Panhellenic Conference on Continuing Education in Internal Medicine, Thessaloniki, Greece, February 22-26, 2017. (*oral*)
 - "IgG Levels in Monthly Subcutaneous γ -Globulin Replacement Therapy in Patients with Common Variable Immunodeficiency", 10th Panhellenic Congress of Immunology, Thessaloniki, Greece, December 8-10, 2016. (*poster*)
 - "Complement Deficiency in Patients with Systematic Lupus Erythematosus", 10th Panhellenic Congress of Immunology, Thessaloniki, Greece, December 8-10, 2016. (*oral*)
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Memberships - Associations

- Pediatric Association of Northern Greece (*since April 2020*)
- European Society for Immunodeficiencies (ESID) (*since October 2020*)
- Young European Federation of Immunological Societies (yEFIS) (*since October 2020*)
- European Federation of Immunological Societies (EFIS) (*since 2020*)
- Hellenic Society of Immunology (HSI) (*since December 2019*)
- Thessaloniki Medical Association (*since July 2019*)
- Panhellenic Medical Association (*since July 2019*)
- MENSA Greece (*since 2011*)

Languages

- English (C2): Examination for the Certificate of Proficiency in English (ECPE) (University of Michigan) (29/11/2008)
- German (C1): Goethe-Zertifikat C1 (Goethe-Institut) (25/06/2016)
- Russian (B1): Certificate - Russian for Everyday Communication. Threshold level (B1) (Ministry of Education and Science of the Russian Federation) (19/06/2011)
- Greek (native language)

Skills

- European Computer Driving License (ECDL): Windows, MS Word, MS Excel, MS Power Point, MS Access, Internet Explorer & MS Outlook
- R (Programming Language)
- Statistical Data Analysis with MS Excel, IBM SPSS and Open Source Statistical Software (OSSS) platforms (SOFA, JASP, and Jamovi)
- Bioinformatics analysis with Galaxy platform
- Systematic Review Methodology: Filtering of search results with Rayyan
- Reference management with Mendeley Reference Manager and Zotero