




The European Society of Cardiology Working Group on Coronary Pathophysiology and Microcirculation

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Since its establishment in 2004, the European Society of Cardiology (ESC) Working Group on Coronary Pathophysiology and Microcirculation (WG-CPM) has been committed to advancing research and education on coronary pathophysiology, ranging from large epicardial arteries to smaller resistance and exchange vessels, enhancing prevention, diagnosis, and treatment of coronary perfusion and ischaemic heart disease. To achieve these objectives, and fostering ongoing interactions, the 'Nucleus' -governing body of WG-CPM, is carefully balanced between basic scientist and clinical and interventional cardiologists, all with strong translational focus. The group's multidisciplinary approach combines the knowledge of experts in coronary pathophysiology, promoting translational and personalized medicine strategies. The current WG-CPM Nucleus consists of 10 voting members, including the chairperson, chairperson-elect, immediate past-chairperson, treasurer, secretary, and communications coordinator. Additionally, there are five non-voting members selected from other scientific bodies due to their leadership skills and expertise in areas of mutual research and educational interest with the WG-CPM. With over 400 members from different countries worldwide, we are a growing community, especially among young scientists and clinicians under the age of 40 (who comprise 26% of the WG members). The WG-CPM is an important platform to facilitate increased focus and knowledge on aspects of coronary (patho)physiology through structured education and faculty development.

To fulfil its mission, WG-CPM centres its roadmap on several important pillars including research and education, dissemination, advocacy, membership, and the promotion of young and talented members (Figure 1). In recent years, we have started joint activities with other ESC constituent bodies, including associations, WGs, and councils with common scientific and educational interests. Our WG-CPM actively promotes the latest advancements in cardiovascular disease by publishing scientific documents and hosting WG Talks on topics ranging from cardiovascular pharmacology to interventional cardiology. As the field of coronary (patho)physiology evolves, we address emerging challenges and opportunities to provide students, trainees, and established scientist and practitioners with the latest advancements and stimulate discussion as well as to provide educational

programmes and training opportunities. Key areas we have covered include the following:

- (1) Young community: the WG-CPM is dedicated to enriching the community by supporting young researchers and clinicians through Mobility Travel Grants. These grants help recipients build international relationships and foster new collaborations with experts from various research institutions across Europe and ESC-associated countries. Beginning in 2024, the WG-CPM will also take an active role in a new ESC initiative, awarding the best two abstracts in the areas of coronary pathophysiology and microcirculation presented at the ESC Congress in London. This effort not only recognizes outstanding scholarly work but also encourages ongoing contributions to our field.
- (2) Publications: six publications to fill current knowledge gaps and deal with major unmet needs have featured in the past 4 years: (i) the bidirectional link between depression and CHD within the intersecting fields of neuroscience, cardiovascular physiology, and behavioural medicine¹; (ii) the pathophysiology of microvascular dysfunction in association with ischaemic heart disease²; (iii) the molecular mechanisms involved in the functional and structural adaptations of the coronary macrovasculature and microvasculature to regular aerobic exercise³; (iv) the mechanisms, therapeutic implications, and methodological challenges of gut microbiota and cardiovascular diseases⁴; (v) the perivascular adipose tissue as a source of novel therapeutic targets and clinical biomarkers in cardiovascular medicine⁵; and (vi) in collaboration with other ESC scientific bodies including the WG on Thrombosis, the Association for Acute CardioVascular Care, and the European Heart Rhythm Association, we have published a consensus document coordinated by our WG on the cardiovascular injury and post-acute sequelae of COVID-19.⁶
- (3) Working Group Talks: exploring non-statin LDL-lowering therapies,⁷ emphasized their roles, beyond LDL-C reductions. The speaker and discussants focused on key aspects such as vascular

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ESC – Working Group on CORONARY PATHOPHYSIOLOGY & MICROCIRCULATION

WHO WE ARE:

Multidisciplinary Working Group with shared scientific interests & complementary expertise on:

Clinical, translational and basic research

on coronary pathophysiology, from the large epicardial coronary arteries down to the resistance and exchange vessels.



Stimulate prevention, improve diagnosis and treatment of coronary artery and ischemic heart disease

WHAT WE DO:

Dissemination & Advocacy

- Increase disease awareness
- Promote interdisciplinary collaborative research networks

Research & Education

- Scientific & Consensus documents
- Joint symposia
- Online seminars

Promoting Talent

- Mobility Grants
- Abstract Awards

WHY YOU SHOULD JOIN US:

- ✓ To advance cardiovascular medicine is one of our main goals!
- ✓ Be part of a expanding community of microcirculatory experts.

Figure 1 Summary of the activities of the Working Group, describing WHO we are, WHAT to do, and WHY to join us.

inflammation, endothelial function, and thrombosis for atherosclerotic cardiovascular disease, investigating coronary physiology in chronic total occlusions (CTOs),⁸ and focused on the assessment complexities in non-CTO lesions and the impacts on the collateral circulation and CTO territories after interventions.

- (4) Meetings: the WG-CPM's collaborative initiatives include organizing joint symposia during annual meetings with other ESC WGs and Councils. These sessions provide a platform for discussions on recent advances in the field and offer valuable networking opportunities. Over the last 2 years, our contributions have included participation in the bi-annual Eurothrombosis & Eurovessels Congress (2022), the Frontiers in CardioVascular Biomedicine (FCVB) Congresses (2022 and 2024), and joint symposia at annual meetings of National Cardiac Societies in North Macedonia (2023) and Serbia (2021).
- (5) The WG-CPM actively engages in several key activities, including providing commentary on selected 'Papers of the Month' featured periodically on our webpage and submitting proposals for the scientific programmes of both the ESC and FCVB Congresses.

Despite past successes and collaborations with various ESC bodies, the WG-CPM recognizes the significant challenges in both applied and experimental coronary pathophysiology. Looking ahead, the WG-CPM is dedicated to addressing pivotal research and applied questions in coronary pathophysiology and microcirculation. Key areas for future educational activities that will benefit greatly from multidisciplinary translational collaborations include (i) the structural and functional aspects of coronary disorders, along with the implications of microvascular dysfunction in heart failure with preserved ejection fraction; (ii) the relevance of coronary physiology in conditions like acute coronary syndromes, the no-reflow phenomenon, and myocardial bridges; and (iii) the effects of cancer treatments and the implications of environmental pollution, as well as the

mechanisms linking them to atherosclerosis and coronary vascular dysfunction. These are critical areas that require comprehensive collaboration. Furthermore, the WG-CPM emphasizes the importance of involving patients and the public in research and education to increase awareness and align effectively with patient needs.

We are committed to advancing educational and research initiatives and invite trainees and global colleagues with an interest in coronary circulation to join our mission and foster new collaborations by becoming a member of the WG-CPM community embarking on an exciting journey forward. Membership is free, and applications can be submitted via a dedicated link on our webpage, which also provides information on more services and activities.

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Conflict of interest: T.P. declares to be a co-founder of the Spin-off Ivastatin Therapeutics S (unrelated to this work). E.C., D.T., and M.Z. have nothing to disclose.

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Authors



Biography: Dr Edina Cenko, MD, PhD, is a clinical researcher based at the University of Bologna, Italy, where she also earned her MD and PhD. Her research primarily explores sex and gender differences in ischaemic heart disease, including risk stratification, non-obstructive coronary artery disease, and coronary microcirculation. Dr Cenko has been a significant contributor to numerous clinical research projects and registries focused on the epidemiology, evaluation, therapy, quality of care, and outcomes of acute coronary syndromes. Her work has been published in highly qualified international journals, including *JAMA Internal Medicine*, the *Journal of the American College of Cardiology*, and *The Lancet Regional Health—Europe*. Her work underscores her commitment to advancing cardiovascular medicine, particularly through studies on sex and gender differences in ischaemic heart disease outcomes. She is the chairperson elect of the ESC Working Group on Coronary Pathophysiology and Microcirculation.



Biography: Marija Zdravkovic, MD, PhD, FESC, is a cardiologist and a clinical researcher at the University of Belgrade, Serbia, where she also completed her MD and PhD. With post-PhD studies completed at the University of Zurich, Switzerland, her research focuses on cardiomagnetic resonance in ischaemic heart disease and heart failure, imaging in risk stratification and coronary microcirculation. Dr Zdravkovic has participated as an investigator in numerous clinical research projects and registries, examining the diagnostic and modern therapy of acute coronary syndromes and heart failure, with numerous publications in prestigious international journals, including *JAMA Internal Medicine*, the *Journal of the American College of Cardiology*, and *The Lancet Regional Health—Europe*.



Biography: Professor Dimitris Tousoulis, MD, PhD, is a clinical and basic researcher at the University of Athens, Greece. He completed his PhD at Imperial College, London, and another at Athens University. He is a Professor of Cardiology, Director of the 1st Cardiology Unit, and Vice Rector at the National and Kapodistrian University of Athens. He has served on the Editorial Boards of journals like the *European Heart Journal* and *Cardiovascular Research*. His research focuses on endothelial function, inflammation, thrombosis, risk factor stratification, epidemiology, non-obstructive coronary artery disease, and coronary microcirculation. He is a leading investigator in numerous clinical research projects and registries. He was country lead investigator in several international studies. His work, published in prestigious journals like *New England Journal of Medicine* and *The Lancet*, includes almost 1440 papers in PubMed with an H-index of 110 and over 50 000 citations. He is the past chairperson of the ESC Working Group on Coronary Pathophysiology and Microcirculation.



Biography: Dr Teresa Padro, PhD, heads the 'Biomarkers for Cardiovascular Disease Status' Research Group at the Research Institute of Hospital Santa Creu i Sant Pau in Barcelona, Spain. She has held research positions at several European Research institutions, including Gaubius Institute TNO (Leiden, the Netherlands), the University of Münster (Germany), and ICCG in Barcelona. With 190 articles listed in PubMed, her research focuses on novel biomarkers and molecular targets for vascular and myocardial remodelling, atherosclerosis, and ischaemic heart disease. Dr Padro serves as principal investigator and co-investigator on national and European research projects, generates intellectual property, and holds four patents. She co-founded three spin-offs. Dr Padro is the current chairperson of the ESC Working Group on Coronary Pathophysiology and Microcirculation (2022–24) and General Secretary of the European and Mediterranean League against Thrombotic Diseases (EMLTD).