European Atherosclerosis Journal
www.eathj.org

EAJ 2026;1:15-19
https://doi.org/10.56095/eaj.v5i1.135

The XI Spring Meeting of Young Researchers of the Italian Society of Diabetology (SID), the Italian Society of Geriatrics and Gerontology, the Italian Society of Arterial Hypertension (SIIA), the Italian Society of Internal Medicine (SIMI), the Italian Society of Cardiovascular Prevention (SIPREC) and the Italian Society for the Study of Atherosclerosis (SISA)

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CONFERENCE REPORT

Received 29 April 2026; accepted 30 April 2026

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The XI Spring Meeting of Young Researchers, jointly promoted by the Italian Society of Diabetology (SID), the Italian Society of Geriatrics and Gerontology (SIGG), the Italian Society of Arterial Hypertension (SIIA), the Italian Society of Internal Medicine (SIMI), the Italian Society of Cardiovascular Prevention (SIPREC), and the Italian Society for the Study of Atherosclerosis (SISA), was held in Rimini from April 19 to 21, 2026. Entitled *"Spring of Minds: from genetics to AI"*, this edition brought together young investigators from different scientific backgrounds to discuss how technological innovation, molecular medicine, artificial intelligence (AI), and a deeper understanding of biological complexity are reshaping research and clinical practice in the cardiometabolic field.

Consistent with the spirit of the Spring Meeting, the Congress was conceived as a meeting organized by young researchers for young researchers, providing a dynamic forum for scientific exchange, networking, and interdisciplinary discussion. The scientific programme included five thematic sessions and a dedicated workshop on AI in cardiometabolic medicine, covering a broad spectrum of topics ranging from digital technologies and wearable devices to precision medicine, organ protection, cardiovascular prevention, cardio-oncology, aging, frailty, and communication in the era of AI. The Meeting also offered young participants the opportunity to present their work through oral communications and poster sessions, fostering active discussion around emerging data and future research directions. In the following report, we summarize the main themes addressed during the scientific sessions and highlight the key messages emerging from the lectures and workshop activities. More than 120 young researchers actively participated in the oral and poster sessions, presenting their latest findings and engaging in multidisciplinary exchange. In the following report, we outline the core themes explored in the Meeting's lecture program.

The Meeting opened with a session entitled "*Technology and medicine: challenges and opportunities*", which addressed the increasingly central role of intelligent technologies and digital tools in the management of cardiometabolic diseases. The session framed technology not as a replacement for clinical reasoning, but as an opportunity to improve monitoring, decision-making, and personalization of care when critically integrated into clinical pathways.

Sara Coluzzi discussed the evolving role of diabetes technologies and AI in the management of type 1 diabetes, highlighting how technological innovation is progressively reducing the cognitive burden associated with daily glycaemic management. Particular emphasis was placed on continuous glucose monitoring (CGM), which has transformed glucose assessment from isolated measurements into a dynamic and integrated evaluation of glycaemic control, introducing metrics such as Time in Range (TIR) alongside HbA1c [1]. The presentation also focused on the increasing integration between CGM systems, smart insulin pens, and automated insulin delivery (AID) systems. Smart pens were described as improving treatment adherence and enabling more precise insulin titration through dose tracking and bolus calculation support. Advanced hybrid closed-loop systems were presented as the current standard of care in type 1 diabetes, allowing automated modulation of insulin delivery while still requiring meal announcement and carbohydrate estimation [2]. Finally, emerging perspectives toward fully closed-loop and bi-hormonal systems were discussed. AI-based carbohydrate counting, computer vision tools, and dual-hormone systems integrating insulin with glucagon or pramlintide were presented as promising strategies to further reduce patient workload, improve glycaemic stability, and move closer to physiological glucose regulation. Overall, the presentation emphasized that AI should not replace clinical judgement but rather enhance personalized diabetes care through greater automation and decision support.

Alessandro Croce then focused on the evolving role of wearable and cuffless technologies in blood pressure monitoring. Blood pressure assessment has progressively moved beyond traditional office-based measurements toward out-of-office strategies, reflecting the growing awareness that isolated clinical readings may not fully capture the complexity of blood pressure behaviour in daily life. Current ESH and ESC guidelines [3, 4] recommend that the diagnosis of hypertension should rely on repeated office blood pressure measurements, combined with out-of-office approaches such as home blood pressure monitoring and 24-hour ambulatory blood pressure monitoring, using validated upper-arm cuff devices. Ambulatory monitoring allows the evaluation of circadian blood pressure variability, whereas home monitoring improves reliability through repeated measurements over several days. This transition has significantly increased the quantity and quality of data available for clinical decision-making. In this context, cuffless and wearable devices represent a further step toward more frequent, unobtrusive, and potentially continuous blood pressure monitoring. Their limited interference with daily activities may improve long-term tracking, patient adherence, and the personalization of cardiovascular risk assessment. However, Croce also emphasized that the increasing amount of available data does not automatically translate into better clinical information. More frequent and less controlled measurements may introduce variability, reduce data quality, and raise new challenges regarding validation, interpretation, and integration into clinical decision-making. Overall, wearable technologies appear promising, but their clinical implementation requires careful evaluation to ensure that greater data availability is accompanied by adequate accuracy and reliability.

The following session, "*New therapeutic paradigms for organ protection and cardiovascular risk reduction*", explored how recent pharmacological innovations are reshaping the management of cardiometabolic diseases. The session highlighted a major conceptual shift: therapeutic success is no longer defined only by the control of individual risk factors, such as glucose or lipid levels, but also by the ability to reduce residual risk and protect target organs.

Martina Chiriacò presented new horizons in the pharmacotherapy of diabetes and obesity, emphasizing the shift from glucose-centric treatment toward integrated management of metabolic and cardio-renal disease.

A key question was why further enhance glucagon-like peptide-1 (GLP-1) receptor agonism. The addition of glucose-dependent insulinotropic polypeptide (GIP) agonism was described as exerting direct effects on adipose tissue. GIP signalling, acting on endothelial and immune cells within white adipose tissue, may enhance insulin sensitivity and increase lipid storage capacity, thereby limiting ectopic fat deposition [5]. In parallel, glucagon receptor co-agonism, beyond promoting weight loss, appears to exert hepatotropic effects, including reductions in hepatic steatosis and fibrosis, independently of GLP-1 pathways [6]. Amylin analogues, particularly long-acting compounds such as cagrilintide, were discussed as targeting central appetite regulation, with potential effects on caloric intake and eating behaviour [7]. These concepts converge in triple agonists (GLP-1/GIP/glucagon) such as retatrutide, where combined modulation of energy intake and expenditure may help sustain weight loss [8]. Overall, the presentation highlighted a shift toward integrated multi-target pharmacology, consistent with emerging trends in cardiometabolic research.

Andrea Baragetti focused on the persistent cardiovascular risk

that remains despite current evidence-based therapies [9]. A major theme is the rapid expansion of lipid-lowering biotechnology. Examples include oral Proprotein Convertase Subtilisin/Kexin type 9 (PCSK9) inhibitors, obicetrapib targeting cholesteryl ester transfer protein (CETP), muvalaplin for Lp(a), inclisiran, lerodalcibep as a PCSK9-targeting adnectin suitable for monthly self-administration, and VERVE-102, designed to achieve durable *PCSK9* gene inactivation. The presentation also discusses small-interfering RNA (siRNA) applications beyond cholesterol, including zilebesiran for resistant hypertension. Baragetti highlighted that the therapeutic landscape is moving toward a more integrated approach, in which different biological pathways are targeted through increasingly specific pharmacological and biotechnological strategies [10-12]. However, their clinical positioning will depend on trial evidence, appropriate biomarkers, guideline integration, patient accessibility, and healthcare-system affordability. Overall, the presentation argued that the growing burden of residual cardiovascular risk justifies the continued development of advanced pharmacological and biotechnological tools. The key challenge will be translating these innovations into practical, equitable, and sustainable care for patients at high cardiovascular risk.

The second day of the Meeting commenced with a session, entitled "*Genetics and epigenetics in metabolic diseases: from biological mechanisms to precision medicine*". This session provided a mechanistic and translational perspective on how genetic, epigenetic, and metabolic information may contribute to personalized risk stratification and treatment. **Luca Tagliafico** provided an overview of the relationship between metabolism, epigenetics, and biological aging, highlighting the translational relevance of aging biomarkers in clinical practice. Since Comprehensive Geriatric Assessment cannot reach a widespread application in routine practice, biomarkers may represent valuable complementary tools with predictive and prognostic purposes. Among these, epigenetic biomarkers and epigenetic clocks showed promising performances in estimating biological age and monitoring the effects of therapeutic interventions [13]. Nonetheless, they do not fully encompass all dimensions of aging. Also, as for their relevance throughout the cardiometabolic field, epigenetic age acceleration has been associated with obesity and worse cardiovascular outcomes, including heart failure [14]. Preliminary evidence further suggests that GLP-1 receptor agonists may contribute to reducing epigenetic age. The abovementioned epigenetic clocks still require further validation before routine clinical implementation. Currently, although they are not implemented in clinical care, they may provide a significant contribution to research, particularly in risk stratification and personalized care.

Alessia Di Costanzo discussed the role of genetics in lipid metabolism as a tool to predict the long-term effects of lipid targets and to support therapeutic development. She highlighted that plasma lipid levels are strongly influenced by genetic determinants and that Mendelian lipid disorders represent valuable in vivo models to clarify causal relationships between lipid traits and cardiovascular disease. A paradigmatic example is *PCSK9*: loss-of-function variants have been associated with lower LDL-C levels and reduced coronary heart disease risk, demonstrating how human genetics can identify causal pathways and druggable targets [15]. Di Costanzo then illustrated how Mendelian randomization can validate causal genotype–phenotype associations and prioritize therapeutic targets, as shown by *NPC1L1* variants, which predicted the clinical benefit of ezetimibe [16]. Importantly, lifelong genetically mediated LDL-C reduction appears to confer greater coronary protection than pharmacological LDL-C lowering initiated later in life, supporting the concept that "lower is better, earlier is better" [16]. The lecture also addressed the post-genomic view of lipid disorders, using severe hypertriglyceridaemia and data from the Italian LIPIGEN cohort were presented as examples of how genetic burden may influence triglyceride levels, pancreatitis risk, and treatment response [17]. Finally, rare loss-of-function variants in *APOB* and *ANGPTL3* were presented as tools to predict long-term safety issues of emerging lipid-lowering drugs, balancing cardiovascular benefit and potential hepatic adverse effects [18, 19]. Overall, lipid genetics emerged as a tool to guide target discovery, risk stratification, treatment personalization, and safety assessment.

The fourth session, "*Internistic complications in patients with cancer*", addressed cardio-oncology and geriatric oncology as a paradigmatic field in which translational research, clinical complexity, and multidisciplinary decision-making closely intersect.

The first lecture, delivered by **Mario Stabile**, focused on the mismatch between preclinical and clinical research in cardio-oncology. The speaker reviewed the mechanisms underlying cancer therapy-related cardiovascular toxicity, including targeted therapy-induced cardiac dysfunction and the central role of oxidative stress, as well as anthracycline cardiotoxicity, moving from classical paradigms to emerging mechanisms such as cellular senescence and genetic susceptibility [20, 21]. Particular attention was also devoted to immune checkpoint inhibitors (ICIs), whose cardiovascular toxicity extends beyond myocarditis to include arrhythmias, vasculopathy, heart failure, and accelerated atherosclerosis [22, 23]. A major limitation highlighted during the lecture was the difficulty of reproducing clinically relevant cardiotoxicity in validated preclinical models. This issue contributes to a significant translational gap: while preclinical cardio-oncology research remains disproportionately focused on anthracyclines, contemporary oncology trials increasingly involve tyrosine kinase inhibitors, alkylating agents, antimetabolites, and ICIs.

Fabrizio Vallelonga moved beyond this mismatch by presenting cardio-oncology as a rapidly expanding clinical discipline based on the integration of cardiovascular, oncological, and haematological expertise. Examples of cardiovascular risk stratification in patients receiving potentially cardiotoxic therapies were discussed, including blood pressure, blood pressure variability, pulse wave velocity, global longitudinal strain, and left atrial strain. These markers were presented as useful tools to identify high-risk patients and personalize surveillance, in line with contemporary guideline-based approaches [24]. The talk also emphasized that cardio-oncology practice often takes place in an area of uncertainty, where cardiovascular risk must be balanced against oncological benefit, prognosis, therapeutic alternatives, and patient preferences. Overall, the two lectures underscored cardio-oncology as both a translational research challenge and a patient-centred model of personalized care.

Closing the session, **Elena Page** shifted the focus from cardiovascular toxicity to the broader multidimensional assessment of older patients with cancer, highlighting how geriatric tools and predictive models may support safer and more personalized therapeutic decisions. She discussed predictive models of pharmacological toxicity in older patients with cancer, candidated for systemic therapy. The decision to initiate systemic treatment requires an assessment that goes beyond chronological age and considers the holistic complexity of the individual. Simple tools for clinical practice were illustrated to identify vulnerable older patients at increased risk of adverse events, deserving a comprehensive geriatric assessment. In particular, the G8 screening tool was described as an effective instrument for detecting vulnerability and performing multidisciplinary management [25]. Furthermore, predictive models of chemotherapy-related toxicity, including the CARG and CRASH scores, were also discussed as useful

tools for estimating the risk of severe adverse events and balancing the risks and benefits of treatment [26]. To sum up, the goal is to promote shared therapeutic decision-making based not only on tumor characteristics, but also on the patient's values and priorities. In this perspective, simultaneous care pathways may accompany active oncologic treatments to ensure symptom control, quality of life, and continuity of care.

The final day of the Meeting began with the session, entitled "*New and old challenges in cardiovascular prevention: between technological advancement and the rediscovery of biological complexity*". The session connected the technological focus of the Meeting with enduring clinical challenges in cardiovascular prevention, emphasizing that innovation must be interpreted within the broader complexity of patient biology and vulnerability.

Giulio Francesco Romiti discussed the role of AI in the diagnosis of cardiovascular diseases, focusing on its potential to support — rather than replace — clinical decision-making. He highlighted the rapidly increasing interest in AI in medicine and emphasized that AI-assisted diagnosis is among the applications closest to clinical implementation, provided that it addresses a clearly defined clinical problem. Romiti illustrated this concept through acute myocardial infarction diagnosis. Some patients without classical ST-elevation may still present a complete coronary occlusion, or occlusion myocardial infarction, and may experience delayed reperfusion and worse outcomes [27]. In this setting, AI-based electrocardiographic analysis may help identify patterns of coronary occlusion not captured by conventional ST-segment criteria. He presented evidence from convolutional neural networks trained on large ECG datasets with angiographic information, showing how AI may support the recognition of occlusive myocardial infarction and provide interpretable outputs [27]. The lecture then moved from opportunities to critical appraisal. Romiti stressed that AI is not a "perfect machine" and is not always justified when simpler prediction tools achieve comparable performance [28]. He also emphasized the importance of data quality, representative cohorts, and external validation, since many AI models in cardiovascular medicine still lack validation, making their performance uncertain [29].

Finally, he underlined that AI outputs should be interpreted like any other diagnostic test, within a Bayesian framework integrating pre-test probability, likelihood ratios, clinical context, and patient-specific factors [30]. The key message was that AI will not replace physicians but may become a collaborative tool to support better clinical decisions, provided that models are adequately validated and critically interpreted.

Pasquale Mone addressed the relationships between frailty and cardiometabolic diseases. Frailty was presented as a multidimensional geriatric syndrome characterized by reduced physiological reserve and increased vulnerability to stressors, leading to adverse outcomes such as disability, hospitalization, procedural complications, cognitive decline, and mortality [31]. In the context of population aging, frailty and cardiometabolic disorders frequently coexist and may amplify each other's negative effects, particularly in patients with multimorbidity [32, 33]. The presentation highlighted the importance of Comprehensive Geriatric Assessment in older adults with cardiometabolic diseases, while also discussing the Fried Frailty Phenotype, based on weight loss, exhaustion, weakness, slowness, and low physical activity, as a reference model for identifying physical frailty [31]. Mone also focused on cognitive frailty, defined by the coexistence of physical frailty and mild cognitive impairment, emphasizing the role of cognitive tests such as MMSE and MoCA in clinical evaluation. Finally, the lecture explored inflammation, oxidative stress, endothelial dysfunction, and sarcopenia as key mechanisms linking frailty and cardiometabolic disease, and discussed the potential role of preventive strategies during midlife in improving health trajectories in older age [34].

Within the Congress, a workshop entitled "*Understanding Artificial Intelligence in Cardiometabolic Medicine: Concepts, Practice, and Critical Evaluation*" was organized. The workshop offered participants both conceptual foundations and a practical framework for the critical appraisal of AI applications in medicine, with a specific focus on cardiometabolic research. The initial lecture by **Elena Olmastroni** and **Stefano Scotti** framed cardiovascular diseases as complex network disorders driven by the interaction of genetic, molecular, environmental, and behavioural factors, highlighting the limitations of traditional risk stratification based on a restricted set of clinical variables. In this context, omics sciences were presented as a key tool to improve the understanding of cardiovascular pathophysiology through the integration of multi-omics data, enabling the identification of molecular pathways, disease subtypes, and potential therapeutic targets within a network medicine approach. Building on this framework, AI and machine learning (ML) were introduced as enabling technologies for the analysis of high-dimensional biological data, supporting pattern recognition, risk stratification, and predictive modelling. The workshop then expanded on these concepts through a dedicated session conducted by **Monica Moroni** and **Marco Chierici** from Fondazione Bruno Kessler. They explored how AI works, with particular attention to its methodological and technical foundations and core analytical components. An introductory overview contextualised AI and ML within data-driven medicine, outlining key aspects related to model development, training, validation, and interpretation. This provided the basis for a gradual transition from theoretical principles to applied and critical perspectives. A substantial part of the workshop was dedicated to an interactive, practice-oriented component, in which participants analysed selected scientific articles to evaluate the clinical opportunities and limitations of AI in medicine. This activity promoted a structured and critical appraisal of real-world applications, with particular focus on ethical implications, methodological constraints, and implementation challenges. Within this session, the OMIGEN group was also presented as a young investigator initiative focused on the integration of omics and AI in cardiovascular research, with the aim of fostering interdisciplinary collaboration and methodological innovation in the field.

The Meeting concluded with an unconventional communication-focused lecture by Davide Gambardella, entitled "*You explained it very well. Too bad nobody understood you. Side effects of communication in the AI era*". The lecture offered a thought-provoking reflection on the challenges of scientific communication in an increasingly complex and technology-driven context, emphasizing that clarity, empathy, and the ability to adapt language to different audiences remain essential skills for researchers and clinicians.

Overall, the XI Spring Meeting offered an updated and multidisciplinary view of cardiometabolic research, highlighting how genetics, epigenetics, omics, artificial intelligence, digital tools, and clinical complexity are converging toward a more precise and integrated model of prevention and care.

References

[1] Battelino T, et al. Clinical Targets for Continuous Glucose Monitoring Data Interpretation: Recommendations From the International Consensus on Time in Range. Diabetes Care. 2019; 42(8):1593-1603.

[2] Di Molfetta S, et al. Efficacy and Safety of Different Hybrid Closed Loop Systems for Automated Insulin Delivery in People With Type 1 Diabetes: A Systematic Review and Network Meta-Analysis. Diabetes Metab Res Rev. 2024; 40(6):e3842.
[3] Mancia G, et al. 2023 ESH Guidelines for the management of arterial hypertension The Task Force for the management of arterial hypertension of the European Society of Hypertension: Endorsed by the International Society of Hypertension (ISH) and the European Renal Association (ERA). J Hypertens. 2023, 41(12):1874-2071.
[4] McEvoy JW, et al. 2024 ESC Guidelines for the management of elevated blood pressure and hypertension. Eur Heart J. 2024; 45(38):3912-4018.
[5] Hammoud R, Drucker DJ. Beyond the pancreas: contrasting cardiometabolic actions of GIP and GLP1. Nat Rev Endocrinol. 2023; 19(4):201-216.
[6] Sanyal AJ, et al. A Phase 2 Randomized Trial of Survodutide in MASH and Fibrosis. N Engl J Med. 2024; 391(4):311-319.
[7] Garvey WT, et al. Coadministered Cagrilintide and Semaglutide in Adults with Overweight or Obesity. N Engl J Med. 2025; 393(7):635-647.
[8] Jastreboff AM, et al. Triple-Hormone-Receptor Agonist Retatrutide for Obesity - A Phase 2 Trial. N Engl J Med. 2023; 389(6):514-526.
[9] Lawler PR, et al. Real-world risk of cardiovascular outcomes associated with hypertriglyceridaemia among individuals with atherosclerotic cardiovascular disease and potential eligibility for emerging therapies. Eur Heart J. 2020; 41(1):86-94.
[10] Seidah NG, et al. Novel strategies to target proprotein convertase subtilisin kexin 9: beyond monoclonal antibodies. Cardiovasc Res. 2019; 115(3):510-518.
[11] Group HTRC, et al. Long-term safety and efficacy of anacetrapib in patients with atherosclerotic vascular disease. Eur Heart J. 2022; 43(14):1416-1424.
[12] Nicholls SJ, et al. Muvalaplin, an Oral Small Molecule Inhibitor of Lipoprotein(a) Formation: A Randomized Clinical Trial. JAMA. 2023; 330(11):1042-1053.
[13] Duan R, et al. Epigenetic clock: A promising biomarker and practical tool in aging. Ageing Res Rev. 2022; 81:101743.
[14] Zhang F, et al. Causality between heart failure and epigenetic age: a bidirectional Mendelian randomization study. ESC Heart Fail. 2023; 10(5):2903-2913.
[15] Cohen JC, et al. Sequence variations in PCSK9, low LDL, and protection against coronary heart disease. N Engl J Med. 2006; 354(12):1264-1272.
[16] Ference BA, et al. Effect of naturally random allocation to lower low-density lipoprotein cholesterol on the risk of coronary heart disease mediated by polymorphisms in NPC1L1, HMGCR, or both: a 2 x 2 factorial Mendelian randomization study. J Am Coll Cardiol. 2015; 65(15):1552-p1561.
[17] D'Erasmo L, et al. Contemporary Management of Familial and Multifactorial Chylomicronemia Syndromes in Italy: Insights From the National LIPIGEN Registry. Arterioscler Thromb Vasc Biol. 2025; 45(12):2264-2276.
[18] Di Costanzo A, et al. Low Cholesterol due to APOB Variants: Exploring the Balance Between Liver and Cardiovascular Risk. Liver Int. 2026; 46(2):e70515.
[19] Di Costanzo A, et al. Effect of Cholesterol-Lowering Variants in ANGPTL3 and APOB Genes on Liver Disease. J Am Coll Cardiol. 2024; 84(18):1767-1770.
[20] Jirkovsky E, et al. Clinically Translatable Prevention of Anthracycline Cardiotoxicity by Dexrazoxane Is Mediated by Topoisomerase II Beta and Not Metal Chelation. Circ Heart Fail. 2021; 14(11):e008209.
[21] Zhang S, et al. Identification of the molecular basis of doxorubicin-induced cardiotoxicity. Nat Med. 2012; 18(11):1639-1642.
[22] Mahmood SS, et al. Myocarditis in Patients Treated With Immune Checkpoint Inhibitors. J Am Coll Cardiol. 2018; 71(16):1755-1764.
[23] Herrmann J. Vascular toxic effects of cancer therapies. Nat Rev Cardiol. 2020; 17(8):503-522.
[24] Lyon AR, et al. 2022 ESC Guidelines on cardio-oncology developed in collaboration with the European Hematology Association (EHA), the European Society for Therapeutic Radiology and Oncology (ESTRO) and the International Cardio-Oncology Society (IC-OS). Eur Heart J. 2022; 43(41):4229-4361.
[25] Bellera CA, et al. Screening older cancer patients: first evaluation of the G-8 geriatric screening tool. Ann Oncol. 2012; 23(8):2166-2172.
[26] Mohile SG, et al. Practical Assessment and Management of Vulnerabilities in Older Patients Receiving Chemotherapy: ASCO Guideline for Geriatric Oncology. J Clin Oncol. 2018; 36(22):2326-2347.
[27] Herman R, et al. International evaluation of an artificial intelligence-powered electrocardiogram model detecting acute coronary occlusion myocardial infarction. Eur Heart J Digit Health. 2024; 5(2):123-133.
[28] Christodoulou E, et al. A systematic review shows no performance benefit of machine learning over logistic regression for clinical prediction models. J Clin Epidemiol. 2019; 110:12-22.
[29] Cai Y, et al. Artificial intelligence in the risk prediction models of cardiovascular disease and development of an independent validation screening tool: a systematic review. BMC Med. 2024; 22(1):56.
[30] Gill CJ, Sabin L, Schmid CH. Why clinicians are natural bayesians. BMJ. 2005; 330(7499):1080-1083.
[31] Fried LP, et al. Frailty in older adults: evidence for a phenotype. J Gerontol A Biol Sci Med Sci. 2001; 56(3):M146-M156.
[32] Santulli G, et al. Interplay between frailty and cardiometabolic disorders: from pathophysiology to clinical implications. Cardiovasc Diabetol. 2025; 25(1):1.
[33] Jankauskas SS, et al. Cardiovascular-kidney-metabolic syndrome: a comprehensive review of pathophysiology, epidemiology, diagnosis, and management. Cardiovasc Diabetol. 2026.
[34] Mone P, et al. Cognitive dysfunction correlates with physical impairment in frail patients with acute myocardial infarction. Aging Clin Exp Res. 2022; 34(1):49-53.