GTH 2025 ARTE: The Art in Science – Curiosity and Creativity

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The 2025 Annual Congress of the Society of Thrombosis and Haemostasis Research (GTH) takes its inspiration from ARTE—Advances, Research, Technology, and Education in the field of thrombosis and hemostasis. The numerous scientific contributions of the congress highlight the most recent progresses in this field, and reveal the profound connection between the rigor of science and the beauty of human creativity. ARTE, the Italian word for "art," refers to the deep synergy existing between analytical precision and imaginative expression, which is vividly reflected in this year's contributions to our themed congress issue.

Like art, science is driven by curiosity, innovation, and the desire to shape new realities. The hemostatic system is a complex interplay of pathways interacting to maintain a perfect balance between procoagulant and anticoagulant molecules, proteins, and cell functions. Similarly, components of the dynamic, intricate, and sometimes whimsical sculptures of the Swiss artist Jean Tinguely, who inspired the Logo of the Congress 2025, connect to each other resulting in a perfect balanced and continuous motion. Both, the hemostatic system and artworks like Tinguely's sculptures invite us to contemplate the perfection and at the same time the fragility of the equilibrium in human health. Considering the science of thrombosis and hemostasis through the lens of ARTE, we would like to briefly highlight all masterpiece contributions of this congress in this issue and invite readers to contemplate the interplay of science and creativity.

Basic concept and indications of CAR T cells

The breakthrough of the chimeric antigen receptor (CAR) T-cell therapy has revolutionized cancer treatment. The work by **Van den Berg et al**[1] provides an overview of advances, fundamental concepts, clinical indications, and toxicity management in CAR T-cell therapy targeting specific tumor antigens. This work explores the cutting edge of cellular therapy and provides a reflection on the art and science behind their engineering.

Guidance-based appropriateness of hemostasis testing in the acute setting:

By considering how to improve the appropriateness of hemostatic testing in the emergency and intensive care units, **Mullier et al**[2] address a critical aspect of modern medicine: reducing redundancy while increasing the degree of information gained from a given test and consequently enhancing diagnostic yield.

Signal transduction and transformation by the platelet activation cascade: systems biology insights:

Platelet activation is a key event in hemostasis and thrombosis. The process characterizing platelet activation is very complex and difficult to investigate on the experimental basis alone. The work by **Panteleev and Sveshnikova**[3] illustrates how computation of biology systems can be used to understand every step of platelet signal transduction, much like an artist conceptualizing form and function on a canvas before bringing it to life.

Combining diagnostics and research in an academic laboratory:

The work by **Thiele et al**[4] gives an overview on differences between routine and research laboratories, describing challenges and opportunities of synergistic interdisciplinary laboratories in thrombosis and hemostasis. Academic laboratories serve as ateliers where innovation is sculpted through collaborative creativity, bridging experimental rigor with clinical needs and applications.

Women and hereditary bleeding disorders:

Addressing the distinctive characteristics of women and hereditary bleeding disorders, the work by **Bosch et al**[5] emphasizes the clinical challenges and hormonal management strategies for heavy menstrual bleeding, drawing

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attention to underrepresented the specific needs of different patient's categories in medicine.

Antithrombotic treatment for LVAD: one does not fit all:

The work by **Scala and Othenin-Girard**[6] on antithrombotic treatment for patients on left ventricular assist devices underscores the necessity of personalized therapy. This aligns with Tinguely's ethos of individuality within the mechanics, where no single solution can be sufficient and individual adjustments are key to functionality.

The use of DOACs in pediatrics: current therapeutic and prophylactic indications, cardiac indications, and real-world evidence—a review:

The work by **Bosch et al**[7] on DOACs in pediatric patients based on clinical trials and real-world data highlights the emerging evidence for anticoagulation therapies in younger populations. This work represents a form of creative problem-solving, tailoring treatments to the unique needs of children, much as artists adapt their visions to a specific medium. In the following, we would like to highlight other excellent contributions of our Congress that are already available online but will appear in a later issue of *Hämostaseologie – Progress in Hemostasis* in 2025.

Congenital fibrinogen deficiencies: not so rare:

The work by **Neerman-Arbez and Couzens** highlights recent advances in understanding the genetic causes of congenital fibrinogen deficiency and their variability. This is only possible by the growing use and availability of next-generation sequencing data, which have evolved through curiosity and innovative currents of thought.

Evidence in hemophilia assessment: the Hemophilia Joint Health Score:

The Hemophilia Joint Health Score provides an objective and systematic clinical evaluation of joint function and damage in patients with hemophilia. Contemplation of this work by **Graf** will provide insights into the past and future of clinical examination as opposed to technical examination tools.

Thromboprophylaxis in children: navigating uncharted waters:

This review by **van Ommen** is another work dedicated to the smallest and most delicate group of patients. It provides an overview of current knowledge on strategies to prevent venous thrombosis in children. Be transported and inspired by the murky waters of this work.

Accelerated fibrinolysis: a tendency to bleed?

Mehic et al provide an overview on bleeding disorders related to hereditary and acquired hyperfibrinolysis and discuss the potential role of hyperfibrinolysis in patients with mild to moderate bleeding disorders and bleeding disorders of unknown cause.

Fibrinogen replacement, a questionable dogma:

Korte and Duque discuss the use of supplementation of fibrinogen in specific bleeding situations. By questioning established norms, the authors embody the spirit of ARTE: using research and education to refine and challenge the status quo, much as an artist reinterprets tradition to create something new.

Pathophysiology and management of cerebral venous thrombosis:

Cerebral venous thrombosis presents unique diagnostic and therapeutic challenges. The work by **Aguiar de Sousa and Morais** delves into its still not fully known pathophysiology and management of cerebral venous thrombosis and highlights the need of more preclinical insights and the development of new therapeutic strategies besides anticoagulation. Combining advances in pathophysiological understanding with practical guidance, this work is an exercise in harmonizing the art and science of patient care.

Investigation of bleeding disorders: when and how should we test platelet functions?

Investigations of bleeding disorders highlight the precision needed in testing platelet functions. The work by **Gresele et al** gives an overview on clinical assessment, laboratory testing, and genetic analysis for the diagnosis of inherited platelet disorders. The combination of these diagnostic tools with emerging technologies like artificial intelligence may improve diagnostic workflows, expanding knowledge and leading to better personalized care. This mirrors the detailed craftsmanship of art, where timing, method, and context are crucial to revealing deeper truths.

Diagnostic utility of platelet morphology in inherited platelet disorders:

The work by **Zaninetti et al** takes us into the world of light and immunofluorescence microscopy showing the important role of platelet morphology in the diagnostic work-up of inherited platelet disorders. This is the artistic way of a scientist to visualize complex data and abstract concepts to facilitate understanding and communication.

Dear colleagues, let us celebrate this journey of discovery and creativity together, as we continue to push the boundaries of what is possible in thrombosis and hemostasis research.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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