icpm11 & iWPCT10

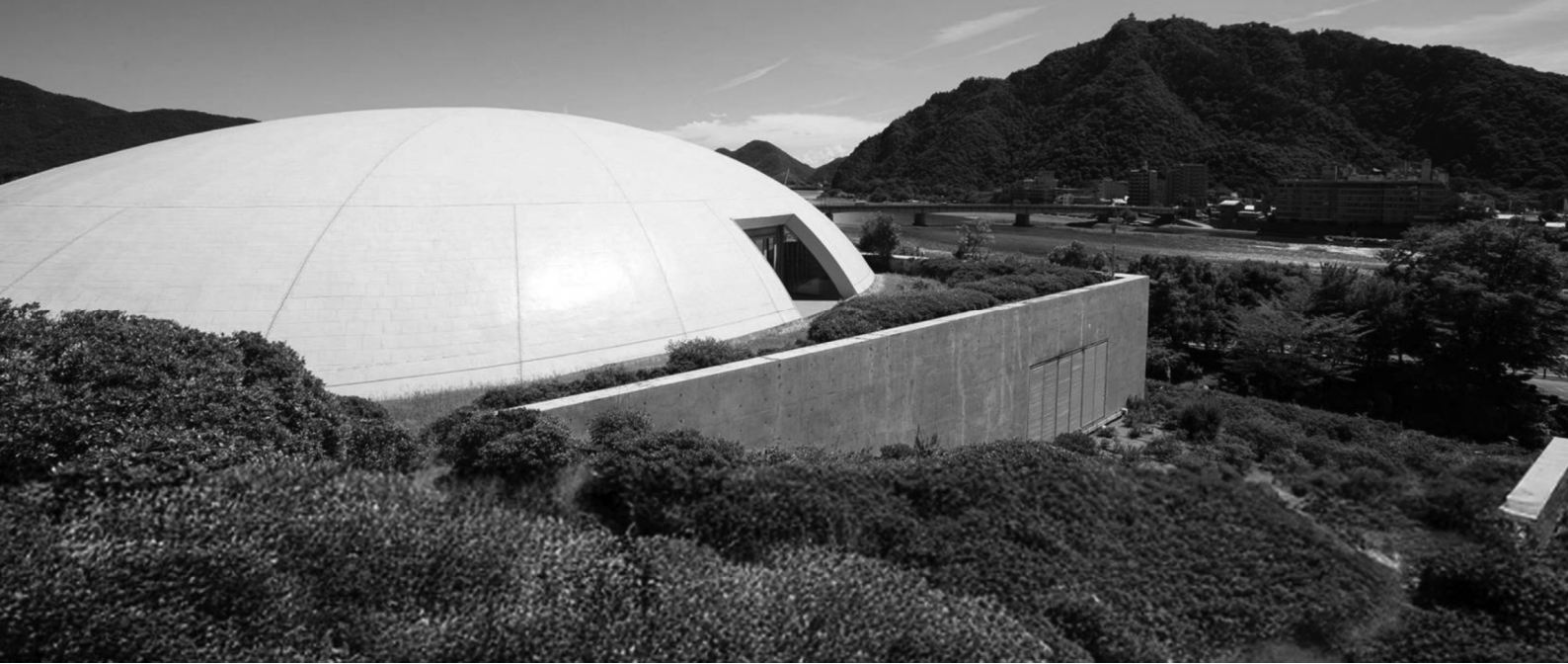
PROGRAM BOOK

11th INTERNATIONAL CONFERENCE
ON PLASMA MEDICINE &
10th INTERNATIONAL WORKSHOP
ON PLASMA FOR CANCER TREATMENT

May 31- June 5, 2026

Nagaragawa Convention Center,
Gifu, Japan

Organized by
Center for Low-temperature Plasma Sciences
Nagoya University



cLPS

Center for Low-temperature Plasma Sciences

Goals of Low-temperature Plasma Sciences

Realization of a sustainable global environment

Drastic solutions to energy, poverty, food, environmental, health, and transportation problems

Creation of new industries for energy, communications, transportation, clothing, food, shelter, medicine, and nursing care

Collaboration and fusion of social system innovations

- Creation of state-of-the-art devices
- Establishment of innovative environmental improvement technologies
- Challenges to the global food crisis
- Establishment of next-generation medical technologies

Creating system innovation in each field

Creation of next-generation plasma nanoprocesses	Creation of next-generation environmental plasma technologies	Promotion revolutionary plasma for agricultural and fishery technologies	Creation of plasma medical science
Plasma and Nanotechnology	Plasma and Environmental Control	Plasma and Agriculture, Fisheries	Plasma and Medicine

Integrating with other fields to create a new values

Engineering and Science / Social and Human Environment / Bioagricultural Sciences / Medical Science (Medical care)

Sciences for non-equilibrium reaction fields and excited substance chemistry

Low-temperature plasma sciences

Core region

Center for Low-temperature Plasma Sciences

The Center for Low-temperature Plasma Sciences, with its Plasma Science Platform, will contribute to the realization of a sustainable Earth by expanding the Center's capabilities for joint research and development.

Philosophy & Mission

■Basic philosophy

The Center will construct a collaborative system with other institutions based on the Plasma Science Platform, work to deepen knowledge of low-temperature plasma sciences, create game-changing innovations, and conduct research to translate the results into social innovation. In addition, we will conduct world-class environmental and energy science research, including biosystem science, materials science, and other new fields.

■Four missions

- Creation of innovation
- Enhancement of global collaboration
- Creation of new scientific fields and Conducting multidisciplinary researches
- Human resource development

NAGOYA UNIVERSITY

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Venue:
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cLPS 低温プラズマ科学研究センター Center for Low-temperature Plasma Sciences, Nagoya University

プラズマバイオエンジニアリング研究センター

c-ARP Center for Applied Research of Plasma

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Organized by
Center for Low-temperature Plasma Sciences
Nagoya University

Welcome Note

Dear Participants,

On behalf of the Local Organizing Committee, it is my great pleasure to welcome you to the 11th International Conference on Plasma Medicine (ICPM11), held in conjunction with the traditional Summer School and the 10th International Workshop on Plasma for Cancer Treatment (IWPCT10).

ICPM11 and IWPCT10 continue a longstanding tradition of providing a vital platform for the exchange of knowledge and ideas in the multidisciplinary field of plasma biomedicine. As we gather in this beautiful setting, we aim to foster collaboration among experts from diverse disciplines, including plasma physics, medicine, biology, biochemistry, pharmacy, agriculture, and food science. Together, we will explore the latest developments and technological challenges in plasma medicine, a rapidly advancing field with tremendous potential for transformative therapeutic breakthroughs.

This conference offers a unique opportunity for researchers, clinicians, and professionals to engage in meaningful discussions, share insights, and establish international collaborations that will help shape the future of plasma technology in medicine and beyond. We are confident that the knowledge and experiences shared throughout this event will contribute significantly to the advancement of our field and inspire innovative solutions to the complex challenges we face.

We hope that you will find this conference both inspiring and rewarding.

Sincerely,

Prof. Dr. Hiromasa Tanaka
Chair of the Local Organizing Committee

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Masaaki Mizuno, Nagoya University Hospital
Masafumi Ito, Meijo University
Mounir Laroussi, Old Dominion University

Poster | Poster

Tue. Jun 2, 2026 2:00 PM - 4:45 PM JST | Tue. Jun 2, 2026 5:00 AM - 7:45 AM UTC | Lobby Area, 4F / Large Conference Room C, 4F

Poster Session 1

2:00 PM - 4:45 PM JST | 5:00 AM - 7:45 AM UTC

[32013] Dual Role of Plasma-Activated Water in Hydroponic Lettuce: Nitrogen Supplementation and Growth Enhancement via ROS Signaling

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Dual Role of Plasma-Activated Water in Hydroponic Lettuce: Nitrogen Supplementation and Growth Enhancement via ROS Signaling

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Cold plasma generates reactive oxygen and nitrogen species (RONS) that dissolve in water, forming plasma-activated water (PAW) and inducing complex chemical changes. Reactive oxygen species (ROS) can function as stress-related signaling molecules, while reactive nitrogen species (RNS) contribute to the nitrogen availability for plants. Due to the prolonged bioavailability of RONS, PAW has gained attention as a sustainable agricultural approach with the potential to modulate plant metabolism and enhance nutrient uptake. This is particularly relevant in nitrogen-deficient soils, where limited nitrogen availability represents a major constraint on plant development.

This study investigates the effects of plasma-activated water (PAW) generated by a multi-transient spark (TS) discharge system on the growth and physiological responses of hydroponically cultivated lettuce (*Lactuca sativa* L.), with a particular focus on evaluating PAW as a sustainable source of nitrogen for plant nutrition. It follows our previous study on the PAW-enhanced lettuce germination and growth in soil [1].

Two parallel hydroponic cultivation systems were established to differentiate between the biostimulatory effects of PAW under nutrient-sufficient conditions and its potential role as an alternative nitrogen source. The first cultivation was conducted using a half-strength complete Hoagland nutrient solution and focused on assessing whether PAW can trigger positive growth and stress-related responses via low-level oxidative signaling. The second cultivation employed a half-strength nitrogen-deficient Hoagland solution to evaluate whether PAW can compensate for nitrogen deficiency and function as a sole nitrogen source.

In both cultivation systems, four treatments were applied: (1) a control group grown in the respective Hoagland nutrient solution (ctrl+/ctrl-); (2) plants grown from seeds primed in PAW for 1.5 h and subsequently cultivated in the respective Hoagland solution (prim); (3) plants cultivated exclusively in PAW enriched with the respective Hoagland nutrients (PAW); and (4) plants grown from PAW-primed seeds and cultivated in PAW supplemented with the respective Hoagland solution (prim PAW). After ten weeks of cultivation, key morphological and physiological parameters of the lettuce plants were assessed, including chlorophyll content and the concentration of selected secondary metabolites, such as phenolic compounds and flavonoids.

Our findings indicate that plasma-activated water (PAW) can function as a sustainable nitrogen source under nitrogen-deficient conditions, as PAW-treated plants achieved chlorophyll content and secondary metabolite levels comparable to those of fully fertilized controls. Under nutrient-sufficient conditions, PAW further enhanced the plant performance and metabolic activity, highlighting its dual role as both a nitrogen supplement and a plant growth–stimulating agent.

This work was funded by the EU NextGenerationEU through the Recovery and Resilience Plan for Slovakia under the project 09I03-03-V03-00033 EnvAdwice and Slovak Research and Development Agency APVV-22-0247.

References

[1] R. Mehrabifard, A. Mišúthová, Z. Machala, Plasma Processes and Polymers, 22, 12 (2025).