

21st Annual International Gravitational Physiology Meeting

3 – 8 April, 2000
Nagoya International Center, Nagoya, Japan

Cosponsored by the
International Society for Gravitational Physiology
and the
IUPS Commission on Gravitational Physiology



Final Program





INTERNATIONAL SOCIETY FOR GRAVITATIONAL PHYSIOLOGY

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Welcome to Nagoya, Japan

On behalf of the local organizing committee, I cordially welcome you to the 21st Annual Meeting of the International Society for Gravitational Physiology (ISGP) to be held in Nagoya, situated in the center of Japan. The meeting will be held in Nagoya International Center and Hotel Castle Plaza, both located just close to Nagoya JR (Japan Railways) Station with recently inaugurated high-rise twin towers. You may not lose your way looking up conspicuous twin towers.

Four symposia and two satellite symposia will be organized during the meeting along with voluntary oral and poster presentations. Japanese astronaut Chiaki Mukai, M.D. will present a special lecture on "*Space in Our Future*". Participants are invited to social events including Welcome Reception, Gala Dinner, Celebration Party, and Regional Tour to *Ise-Shima* National Park with a visit to *Ise-Jingu*, the oldest and most important Shinto shrine in Japan dedicated to the imperial household.

The beginning of April, the period for the meeting is the best season in Japan with cherry blossoms full in bloom. Nagoya and its vicinities are where the three greatest governors of feudal Japan, Nobunaga Oda, Hideyoshi Toyotomi and Ieyasu Tokugawa were born and original Japanese culture has grown up. Nowadays Nagoya has become a modern city with aerospace and automobile industries. We hope that you can enjoy not only the scientific meeting and discussion, but also our culture and traditional way of living.

We are looking forward to seeing you in Nagoya.

Tadaaki Mano,
President of ISGP

ORGANIZATION

Organized and Co-sponsored by:



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D. Linnarsson	Sweden
L. Macho	Slovakia
P. Norsk	Denmark
J. B. West	USA
W. Xiang	China
T. Yoshioka	Japan

Local Organizing Committee

- Satoru Watanabe (Professor Emeritus, Nagoya University)
- Kenichi Matsunami (Gifu University School of Medicine)
- Shigeo Mori (RIEM, Nagoya University)
- Hisao Seo (RIEM, Nagoya University)
- Junichi Sugeno (Aichi Medical University)
- Shiro Usui (Toyohashi Institute of Technology)
- Shunji Nagaoka (Professor, Fujita Health University School of Health Sciences)

Secretary General for the 21st ISGP Meeting

- Satoshi Iwase (RIEM, Nagoya University)

Supported by

- The City of Nagoya
- National Space Development Agency of Japan (NASDA)
- NASA
- Galileo Foundation
- Eisai Co., Ltd.
- Department of Autonomic Neuroscience, Research Institute of Environmental Medicine (RIEM), Nagoya University
- Danish Aerospace Medical Centre of Research (DAMEC Research A/S, National University Hospital)

GENERAL INFORMATION

Organizers

The 21st Annual International Gravitational Physiology Meeting is organized by the International Society for Gravitational Physiology (ISGP) and is cosponsored by ISGP and the IUPS Commission on Gravitational Physiology.

Professor Tadaaki Mano, President of ISGP, from Nagoya University is pleased to be the local host of the meeting.

Place of Meeting

Nagoya International Center (Nagoya Kokusai Center)
47-1, Nagono 1-chome, Nakamura-ku
Nagoya 450-0001
Japan

Telephone: +81 52 581 5678
Telefax: +81 52 581 5629

The Nagoya International Center is also the place of the Satellite Symposium on April 5.

Hotel

Hotel Castle Plaza
9-10, Meieki 4-chome, Nakamura-ku
Nagoya 450-0002
Japan

Telephone: +81 52 582 2121
Telefax: +81 52 582 8666

The Hotel Castle Plaza is also the place of the Satellite Symposium on April 3, the Welcome Reception, the Gala Dinner, and the Celebration Party.

Secretariat

Keiko Kato
Ai Sugiyama
Bobbi Jo Thompson
Lotte Rosenkrands

Registration

The registration desk outside the meeting room at the Hotel Castle Plaza will be open on Monday, April 3 from 15:00 to 19:00 and at the Nagoya International Center from Tuesday, April 4 to Friday, April 7 from 9:00 to 17:00.

Onsite Registration fees

Registrant	37,500 JPY
Student	10,000 JPY
Guest	16,000 JPY

The registration fee includes participation in:

- Scientific sessions
- Satellite Symposia
- Welcome reception
- Gala Dinner
- Celebration Party
- Bus tour to Ise-Shima National Park
- Coffee breaks

Lunch

On own expense at the hotel or nearby.

Lunch guide map will be provided at the information desk.

Transportation

There are airport buses available from the Nagoya International Airport to and from the JR (Japan Railways) Nagoya Station. The fare is 870 JPY. The running time is approximately 30 minutes. It takes 10-15 minutes on foot from the bus stop of JR Nagoya Station to the Hotel Castle Plaza. The participants can also use a taxi from the airport to the station. The taxi fare is approximately 5,000 JPY.

From Tokyo International (Narita) Airport, the Limousine Bus service and Airport Shuttle buses are available to JR Tokyo Station, the fare is 3,000 JPY. JR operates special limited express services on the Narita Express (NEX) from Narita underground station to Tokyo underground station in approximately 60 minutes, the fare is 2,940 JPY. Tokyo and Nagoya stations are connected by Shinkansen bullet train in 1 hour 40 minutes by *Nozomi* Superexpress (11,140 JPY) or 2 hours by *Hikari* Superexpress (10,380 JPY). The through fare from Narita Airport to Nagoya is 13,650 JPY (Nozomi) or 12,890 JPY (Hikari).

From Kansai International Airport (KIX), JR operates limited express *Haruka* to Shin-Osaka Station, where train exchange is available to Shinkansen for Nagoya with through fare of 8,430 JPY (Nozomi) or 7,970 JPY (Hikari).

Refer to Map 1 from Nagoya International Airport to Nagoya Station, Map 2 from Nagoya Station (or Meitetsu Bus Center) to Hotel Castle Plaza and Nagoya International Center, and Map 3 for the information on underground pass around Hotel Castle Plaza and Nagoya International Center.

ATTENTION

If you take a taxi to the hotel, be careful to tell the taxi driver the exact name of the hotel "**Hotel Castle Plaza**" slowly, because there is another hotel with similar name of "Hotel Nagoya Castle", which is located rather far from JR Nagoya Station.

SCIENTIFIC INFORMATION

Information to Chairpersons

The chairperson must confirm the presence of all speakers before each session, make sure that the session starts exactly at the time indicated in the program and that the session stays within the time limits.

Oral Presentations

Invited papers: 20 min for presentation and 5 min for discussion.
Free papers: 7 min for presentation and 3 min for discussion.

The speaker is responsible for preparing slides and handing them in to the slide projectionist. Slide carousels will be available for each speaker. Speakers should load their own slides prior to the session and label the carousel. A viewing area will be made available to screen slides. Video projection can be available for VHS videocassette with NTSC or PAL system when prior inquiry is made.

Poster Presentations

Since there will be a different set of posters each day, the presenter is requested to prepare the poster in the morning and take it down in the evening. The presenter is kindly required to be present at the poster as indicated in the program. The numbers on the poster boards correspond to the numbers indicated in this program. The poster size is 120 cm (4 ft) high and 175 cm (5.75 ft) wide.

Proceedings

Instructions for the preparation of Proceeding manuscripts has been emailed to all participants who have submitted abstracts. Please contact Dr. Fuller for further information. Only papers and posters presented at the meeting will be accepted for publication.

Satellite Symposia

A symposium on Spaceflight and Bone Metabolism will be held on Monday, April 3, 2000, from 16:30 to 17:45 at the Hotel Castle Plaza, co-sponsored by Eisai Co., Ltd.

A special lecture by Chiaki Mukai: "Space in our future" followed by Special Comments by Valery Polyakov will be held on Monday, April, 3, 2000, from 18:00 to 19:00 at the Hotel Castle Plaza.

A symposium on the biological research facilities of the International Space Station is planned to be held on the evening of Wednesday, April 5, 2000, at the Nagoya International Center. Further details on this session will be available at the meeting.

SOCIAL EVENTS

Welcome Reception

A Welcome Reception will be held on Monday, April 3, 2000, at 19:30 at the Hotel Castle Plaza.

Gala Dinner

A Gala Dinner at the Hotel Castle Plaza will be held on Thursday, April 6, 2000, at 19:00 (reservation requested).

Celebration party

A buffet party in celebration of Professor Mano's new position as Director of Tokai Central Hospital will be held on Friday, April 7, 2000, from 19:00 at Hotel Castle Plaza, sponsored by Department of Autonomic Neuroscience, RIEM, Nagoya University (reservation requested).

Regional Tour to Ise-Shima National Park

A tour to Ise-Shima National Park is planned for Saturday, April 8, 2000. We will visit Ise Jingu Shrines, the most important and historical Shinto Shrines in Japan, and Mikinoto Pearl Island, both situated in the Ise-Shima National Park (reservation requested).

Optional Tours

Full and half day tours to Kyoto will be available on own expense through Japan Travel Bureau, Inc. Group Tours Office Nagoya Nishiki. "21st Annual International society for Gravitational Physiology" DESK ATTENTION: Ms. Harumi Harada, Ms. Kaori Ichikawa, Mr. Hideki Hashizume.
Telephone: +81 52 951 8444, Telefax: +81 52 961 2253,
e-mail: ichikawa@mail.nishikijtb-unet.ocn.ne.jp

	Monday, April 3	Tuesday, April 4	Wednesday, April 5	Thursday, April 6	Friday, April 7	Saturday, April 8
09.00		Opening session & Welcome	Symposium II: Mechanisms of Microgravity Induced Orthostatic Intolerance: Implications for Effective Countermeasures 09.00 – 12.00 <i>Coffee break</i> 10.15 – 10.45	Symposium III: Gravity and the Musculoskeletal System 09.00 – 12.00 <i>Coffee break</i> 10.15 – 10.45	Symposium IV: Model Systems for Studying Development in Altered Gravity 09.00 – 12.00 <i>Coffee break</i> 10.15 – 10.45	Regional Tour to Ise-Shima National Park 09.00 – 15.30
10.00		Symposium I: Current Concepts in Gravitational Physiology 09.10 – 12.10 <i>Coffee break</i> 10.25 – 10.55				
11.00						
12.00		Lunch 12.10 – 14.00	Lunch 12.00 – 14.00	Lunch 12.00 – 14.00		
13.00						
14.00		Free papers I 14.00 – 16.00	Free papers I (cont.) 14.00 – 15.00	Free papers II (cont.) 14.00 – 15.20	Free papers III (cont.) 14.00 – 15.00	
15.00		Registration <i>Hotel Castle Plaza</i> 15.00 – 19.00	Free papers II 15.00 – 16.00	Free papers III 15.20 – 16.00	Free papers IV 15.00 – 16.00	
16.00			Poster session I 16.00 - 17.00	Poster session II 16.00 - 17.00	Poster session III 16.00 - 17.00	
17.00		Satellite Symposium: <i>Hotel Castle Plaza</i> 16:30-19:00 Spaceflight and Bone Metabolism <i>Coffee Break</i> 17.45 – 18.00 Special Lecture: Space in our Future <i>C. Mukai</i> Special Comments <i>V. V. Polyakov</i>				
18.00				Satellite Symposium: <i>Nagoya International Center</i> International Space Station 18:00 -		
19.00				Gala Dinner <i>Hotel Castle Plaza</i> 19.00 -	Party in celebration of Professor Mano's new position as Director of Tokai Central Hospital <i>Hotel Castle Plaza</i> 19.00 -	
	Welcome Reception <i>Hotel Castle Plaza</i> 19.30 -					

PROGRAM

Monday, April 3, 2000

- 15:00 – 19:00** **Registration**
Hotel Castle Plaza
- 16:30 – 18:40** **Satellite Symposium**
Hotel Castle Plaza
Co-sponsored by Eisai Pharmaceutical Company
- 16:30 – 17:45** **Spaceflight and Bone Metabolism**
Chairmen: Y. Seino, C. Sekiguchi
- 16:30** **Bone Research for the Future: Countermeasure Development as the Target**
J. R. Shapiro
- 17:00** **Imaging Technological Analysis of Bone Change in Space and Vitamin K**
I. Kashima
- 17:30** **Special Comments: Bone Atrophy in Space**
F. Kambe, H. Seo
- 17:45 – 18:00** **Coffee Break**
- 18:00 – 19:00** **Special Lectures**
Chairman: T. Mano
- 18:00** **Space in our Future**
C. Mukai
- 18:30** **Special Comments with Video Presentation**
V. Polyakov
- 18:40** **General Discussion**
- 19:30 -** **Welcome Reception**
Hotel Castle Plaza

Tuesday, April 4, 2000

- 09:00 – 09:10** **Opening session & Welcome**
P. Norsk, Chairman of the Council of Trustees, ISGP
T. Mano, President, ISGP
- 09:10 – 12:10** **Symposium I: Current Concepts in Gravitational Physiology**
Chairmen: C. A. Fuller, P. Norsk
- 09:10** **Effects of gravity on plant growth**
G. E. Bingham
- 09:35** **Gravitational effects on the response to different stimulatory signals in T lymphocytes**
A. Cogoli
- 10:00** **Graded Mechanical Loading and Ibandronate as Countermeasure to Bone Loss**
J. R. Shapiro
- 10:25 – 10:55** **Coffee break**
- 10:55** **Effects of gravity on metabolism**
T. P. Stein
- 11:20** **Effects of gravity on the development of skeletal muscle**
K. M. Baldwin
- 11:45** **Highlights of human physiology in space**
P. Norsk
- 12:10 – 14:00** **Lunch**
- 14:00 – 16:00** **Free papers I**
Chairmen: A. R. Hargens, N. Suzuki
- 14:00** **Resting Energy Expenditure of Rats Acclimated to Hyper-Gravity**
C.E. Wade, M.M. Moran, J. Oyama
- 14:10** **Effects of Altered Force Environments on Plasma Leptin Regulation**
C.A. Fuller, L.E. Warren, P.M. Fuller, J.S. Hamilton, B.A. Horwitz
- 14:20** **The Heat Transfer from the Human Body to the Environment under -6 Head Down Tilt (HDT)**
K.A. Kirsch, A. Gil-Mendez, E. Koralewski, B. Johannes, H.-C. Gunga
- 14:30** **Prostaglandin H Synthase in Human K562 Cells under Simulated Microgravity**
M. Maccarrone, M. Bari, T. Lorenzon, A. Finazzi-Agrò

- 14:40 Examination of Microgravity Effects on Spontaneous Ca²⁺ Oscillations in AtT20 Pituitary Cells Using Heavy Water**
M. Ikeda, T. Shinoe, M. Hirono, T. Yoshioka
- 14:50 Histological Examination on Edema Formation in the Rabbit Brain Exposed to Head-Down Tilt**
R. Shimoyama, Y. Kawai
- 15:00 Rotation of Subjective Vertical is an Important Factor of Visually-Induced Motion Sickness**
N. Isu, T. Matsumoto, R. Aoki
- 15:10 Noninvasive Approach for Study of Human Reaction and Transferring Velocity of Nervous System**
T. Tsuda, S. Kitagawa
- 15:20 A Study of Orientation in a Zero Gravity Environment by Means of Virtual Reality Simulation**
H. Aoki, T. Yamaguchi, R. Ohno
- 15:30 Search for Molecules that are Biological Indicators of Gravity Stress in the Human Body**
J. Nomura, Y. Arase, Z. Chen, T. Sugita, S. Sugaya, S. Takahashi, K. Kita, N. Suzuki
- 15:40 Unique Postural Control of Upside-Down Swimming Catfish, *Synodontis Nigriventris*, not Affected by the Change of Gravity**
K. Ohnishi, T. Yamamoto, A. Takahashi, H. Tanaka, M. Koyama, M. Masukawa, T. Ohnishi
- 15:50 The Behavioral Response of Zebrafish to Hypergravity Conditions**
E.M. Goolish, K. Okutake

16:00 – 17:00 Poster session I

Wednesday, April 5, 2000

- 09:00 – 12:00** **Symposium II: Mechanisms of Microgravity Induced Orthostatic Intolerance: Implications for Effective Countermeasures**
Chairmen: B. D. Levine, S. Iwase
- 09:00** **The renin-angiotensin system and orthostatic tolerance**
P. Norsk
- 09:25** **Cardiac mechanics and regulation of stroke volume**
B. D. Levine
- 09:50** **Reflex regulation of the vascular resistance**
S. Iwase
- 10:15 – 10:45** **Coffee break**
- 10:45** **Peripheral Vascular Responses to Adrenergic Stimulation: Insights from Animal Models**
O. Vinogradova
- 11:10** **Regulation of the venous capacitance**
Q. Fu
- 11:35** **Summary and Future Directions**
V. A. Convertino
- 12:00 – 14:00** **Lunch**
- 14:00 – 15:00** **Free papers I (cont.)**
Chairmen: A. R. Hargens, N. Suzuki
- 14:00** **The Research of Combined Effects of Microgravity and Space Radiation**
E.A. Ilyin
- 14:10** **Developing Protocols for Recombinant AAV-Mediated Gene Therapy in Space**
S. Ohi
- 14:20** **Optimizing Life Sciences Glovebox Design for International Space Station**
G. Murthy, T. Ueno, R. Tal, R. Brewer, H. Fujino, D. Rempel
- 14:30** **Enzymic Chemical Reaction under Microgravity Environment in Space**
T. Ohnishi, A. Takahashi, K. Ohnishi, T. Nakano, S. Nagaoka
- 14:40** **Tensile Stress Induced Osteoblast Differentiation and Osteogenesis in Mouse Calvarial Suture in Culture: Possible Involvement of BMP-4 and other Genes**
H. Kawashima, M. Ikegame, J. Shimomura, O. Ishibashi, T. Komori, T. Noda, H. Ozawa

- 14:50 Dental Emergencies and Dental Maintenance in Space**
C. Savin
- 15:00 – 16:00 Free papers II**
Chairmen: T. Mano, L.-F. Zhang
- 15:00 Microgravity Induced Cardiovascular Deconditioning: Peripheral Effector Mechanism Hypothesis and Gravity-Based Countermeasure**
L.-F. Zhang
- 15:10 Closed-Loop Estimation of the Open-Loop Carotid Sinus Baroreflex Transfer Function for the use of Animal Experiments in Space**
T. Kawada, T. Sato, T. Shishido, M. Sugimachi, K. Sunagawa
- 15:20 Regulation of Haemodynamics After Adaptation to Tail Suspension in Sympathectomized Rats**
I. Kharchenko, O. Tarasova, A. Borovik, O. Vinogradova
- 15:30 Study of the Norepinephrine (NE) Kinetics in the Rat with Central Hypervolemia as a Model of Microgravity Induced Cardiovascular Deconditioning (CVD)**
E. Maignan, E. Martel, M. Safar, J.-L. Cuhe
- 15:40 Effect of Position on Sympathetic Control of Hemodynamics during Parabolic Flight in Humans**
S. Iwase, C. Jian, A. Kamiya, D. Michikami, F. Qi, H. Kitazawa, T. Mano, C. Mukai, S. Nagaoka
- 15:50 Comparison of Effects of Graded Water Immersion and Posture Change on Cardiovascular Responses and Cerebral Circulation in Humans**
T. Kamo, B. Pump, A. Gabrielsen, P. Norsk
- 16:00 – 17:00 Poster session II**
- 19:00 – Satellite Symposium: Biological Research on the International Space Station**
(Details to be announced).

Thursday, April 6, 2000

- 09:00 – 12:00** **Symposium III: Gravity and the Musculoskeletal System**
Chairmen: V. R. Edgerton, R. R. Roy
- 09:00** **Responses of Load Bearing and Non-Load bearing Spinal Motor and Sensory Neurons of Rodents to Spaceflight**
A. Ishihara
- 09:25** **Dependence of Normal Development of Skeletal Muscle in Neonatal Rats to Load Bearing**
Y. Ohira
- 09:50** **Changes in Modes of Locomotion Imposed by Gravity, Air and Water**
D. Carrier
- 10:15 – 10:45** **Coffee break**
- 10:45** **Accommodation of Gravity in the Motor Systems Controlling the Wings Compared to the Legs**
G. E. Goslow Jr.
- 11:10** **Modeling the Neuromechanical Control of Locomotion in Humans over a Range of Gravitational Forces**
M. K. Day
- 11:35** **Was the Acquisition of Bipedal Stepping in Primates really a “Big Deal”?**
V. R. Edgerton
- 12:00 – 14:00** **Lunch**
- 14:00 – 15:20** **Free papers II (cont.)**
Chairmen: T. Mano, L.-F. Zhang
- 14:00** **Comparison of Cardiovascular Responses to Water Immersion and Head-Down Tilt in Humans**
M. Shiraishi, M. Schou, M. Gybel Jensen, J. Warberg, N.J. Christensen
- 14:10** **Vasomotor Sympathetic Nerve Responses to Static Exercise using Leg Atrophic Muscles after Head-Down Bed Rest**
S. Atsuta, A. Kamiya, D. Michikami, Q. Fu, S. Iwase, T. Mano
- 14:20** **Effects of Aging on Leg Venous Hemodynamics during Lower Body Negative Pressure in Humans**
Q. Fu, S. Iwase, Y. Niimi, A. Kamiya, D. Michikami, T. Mano
- 14:30** **Arterial Baroreflex Control of Sympathetic Vasoconstrictor Traffic and Orthostatic Intolerance after Head-Down Bed Rest**
A. Kamiya, D. Michikami, Q. Fu, S. Atsuta, S. Iwase, T. Mano

- 14:40 Responses of Skin Blood Flow and Sweating to Static Leg Exercise after Bed Rest**
H. Usui, D. Michikami, A. Kamiya, Q. Fu, J. Cui, S. Iwase, S. Atsuta, T. Mano
- 14:50 Muscle Sympathetic Nerve Responses to Static Handgrip Exercise after 14 Days Simulated Microgravity Exposure**
D. Michikami, A. Kamiya, Q. Fu, J. Cui, S. Iwase, H. Usui, S. Atsuta, T. Mano
- 15:00 Alterations in Renal Responsiveness to Aldosterone during Exposure to Head-Down Tilt Bedrest**
V.A. Convertino, J.J. Elliott, D.A. Ludwig, C.H. Wade
- 15:10 Regulation and Distribution of Body Fluid during a 6-Day Head-Down Tilt Study in a Randomized Cross-Over Design**
C. Drummer, M. Heer, M. Joosten, I. Störmer, C. Hesse, L. Beck, G. Wolfram, F. Baisch
- 15:20 – 16:00 Free papers III**
Chairmen: B. S. Shenkman, H. Seo
- 15:20 Changes in Muscle Architecture during Prolonged Bed Rest**
T. Fukunaga, H. Akima, K. Kubo, Y. Ichinose, Y. Suzuki, Y. Kawakami
- 15:30 Significant Delay in the Rate of Post Exercise Oxidative Phosphorylation in Human Calf Muscle after 7 Days of HDT Bedrest Measured Non-Invasively by ³¹P MRS**
J. Zange, S. Baerwalde, K. Müller
- 15:40 Muscle-Derived Serum Enzyme Accumulation after Gz Acceleration Test in Rhesus Monkeys Exposed to Bedrest**
B.S. Shenkman, S.A. Goncharova, L.B. Strongonova, T.L. Nemirovskaya, I.B. Kozlovskaya
- 15:50 Mechanical Properties of Chronically Inactive Rat Soleus**
R.R. Roy, H. Zhong, R. Monti, K. Vallance, J. Kim, V.R. Edgerton
- 16:00 – 17:00 Poster session III**
- 19:00 - Gala Dinner**
Hotel Castle Plaza

Friday, April 7, 2000

- 09:00 – 12:00** **Symposium IV: Model Systems for Studying Development in Altered Gravity**
Chairmen: M. L. Wiederhold, T. Shimizu
- 09:00** **Otoliths and their analogs developed in altered gravity**
M. L. Wiederhold
- 09:25** **The influence of gravity on postnatal development in a mammal**
K. Walton
- 09:50** **Vestibular ontogeny of warm-blooded vertebrates: Four models for study in altered gravitational fields**
T. A. Jones
- 10:15 – 10:45** **Coffee break**
- 10:45** **Mutant Medaka fish having a deficiency in otolith-vestibular system and their behavior in microgravity**
K. Ijiri
- 11:10** **A model for studying the baroreflex in microgravity and hypergravity**
T. Shimizu
- 11:35** **Influence of microgravity on the development of the vestibular neuronal circuits in the rat**
J. Raymond
- 12:00 – 14:00** **Lunch**
- 14:00 – 15:00** **Free papers III (cont.)**
Chairmen: B. S. Shenkman, H. Seo
- 14:00** **Does Water Loss Increased by Head-Down Tilt Bed Rest Relate to Decrease of Leg Muscle Mass?**
Y. Suzuki, H. Kobayashi, H. Akima, T. Fukunaga, Y. Haruna, A. Gunji
- 14:10** **Tail-Suspension Sequentially Changes the Expression of Rat Muscle Proteases and Cysteine Supplementation Prevents Loss of Muscle Weight in Tail-Suspended Rats**
T. Nikawa, S. Takeda, M. Ikemoto, C. Watanabe, T. Kitano, K.M. Baldwin, R. Izumi, I. Nonaka, S. Teshima, K. Rokutan, T. Towatari, K. Kishi
- 14:20** **Microgravity-Induced Plasticity of Postural and Locomotor Muscles in Mammals**
B.S. Shenkman, T.L. Nemirovskaya, I.N. Belozeroва, I.B. Kozlovskaya
- 14:30** **Already 24 Hours of Immobilization Induce Bone Resorption as Shown by Bone Resorption Markers**
M. Heer, N. Kamps, A. Boerger, C. Korr, C. Mika, C. Drummer

- 14:40 Testosterone Urinary Excretion Rate Increased During Hypergravity in Male Monkeys**
F. Strollo, L. Barger, C. Fuller
- 14:50 Rotation in Clinostat Results in Apoptosis of Osteoblastic ROS 17/2.8 Cells**
D. Sarkar, T. Nagaya, K. Koga, F. Kambe, Y. Nomura, H. Seo
- 15:00 – 16:00 Free papers IV**
Chairmen: L. Simon, H.-C. Gunga
- 15:00 The Vascular Endothelial Growth Factor during Thermoneutral (34.5-35.5 °C) and Warm Water Immersion (39.0 °C)**
H.-C. Gunga, K.A. Kirsch, B. Johannes, L. Roecker, L.-E. Boldt
- 15:10 Embryonic Development of Medaka Fish under a Simulated Microgravity using a Three-Dimensional Clinostat**
K. Nagao, K. Ijiri
- 15:20 Properties of Bombyx Silk Protein Produced under Clinorotation**
T. Furusawa, T. Sugimura, M. Ichida, E. Kotani, H. Sakabe, T. Watanabe, M. Imamizo, A. Higashibata, T. Nakano, S. Nagaoka
- 15:30 Morphometric Analysis of Dendritic Tree of Cerebellar Purkinje-Cells**
L. Simon, D. Káldy, G. Héja, T. Kiss, T. Bakó
- 15:40 Commissural Effects in the Otolith System in Cats**
Y. Uchino
- 15:50 Semicircular Canal and Otolith Convergence on Vestibulo-Ocular and Vestibulospinal Neurons in Cats**
X. Zhang, M.M. Zakir, H. Meng, H. Sato, Y. Uchino
- 16:00 – 17:00 Poster session IV**
- 19:00 – 21:00 Party in celebration of Professor Mano's new position as Director of Tokai Central Hospital**
Hotel Castle Plaza

Saturday, April 8, 2000

- 9:00 – 15:30 Regional Tour to Ise-Shima National Park**

POSTER SESSIONS

Tuesday, April 4, 2000

16:00 – 17:00 **Poster session I**

- 1. Changes of Mesophyll and the CO₂-Assimilation Rate in Arabidopsis Thaliana (L.) Heynh. Plants Grown in Clinostat**
N.I. Adamchuk, O.O. Stasick
- 2. Hypergravity Effects on LH, FSH and PRL Levels in Lactating Rat Dams**
L.A. Baer, A.E. Ronca, C.E. Wade
- 3. Effect of Microgravity on Photosynthetic Pigments Content in Plants**
T. Cherevchenko, N. Zaimenko, J. Guikema, D. Chapman
- 4. Evaluation of Psychological Effects due to Bed Rest**
Y. Ishizaki, H. Fukuoka, T. Ishizaki, T. Katsura, C.S. Kim, Y. Maekawa, M. Fujita
- 5. The Effect of Hypergravitational Stress on a Status of the Antioxidant System of Rats**
N. Karbashevska, V. Baraboy
- 6. Microgravity Mediated the Ferritin Accumulation in Soybean Root Cap Cells**
D.O. Klymchuk, E.L. Kordyum, T.V. Vorobyova, C.S. Brown, D.K. Chapman
- 7. Wheat Streak Mosaic Virus Reproduction in the Plats of Triticum Aestivum as Affected by Simulated Microgravitation**
L. Mishchenko
- 8. Effects of Microgravity on Soybean Seedlings Susceptibility to Phytophthora Sojae**
O. Nedukha, J. Leach, E.L. Kordyum
- 9. The Biological Effect of Prolonged Slow Clinorotation on the Protein Amount in Two Chlorella Species**
A.F. Popova
- 10. Body Mass, Food and Water Intake, and Activity of Pregnant and Lactating Rat Dams during 1.5-G Centrifugation**
A.E. Ronca, L.A. Baer, N.A. Mills, E.M. Sajdel-Sulkowska, C.E. Wade
- 11. Mutation Modulating Activity in Human Serum Factors Induced After Parabolic Flight**
S. Takahashi, X. Jun-Chi, J. Nomura, S. Sugaya, K. Kita, N. Suzuki

- 12. Animal Centrifuge**
J.J.W.A. van Loon, H.A.A. de Jong, R.J. Wubbels
- 13. Influence of Clinorotation on Cell Structure of Potato Minitubers**
I.V. Vasiltsov
- 14. Cardiac Tele-Echography by Ultrasound 3D Realtime Acquisition and 2D Reconstruction**
N. Tobal, S. Besnard, J. Roumy, S. Herault, J.M. Pottier, P. Arbeille
- 15. Effect of a Venotonic Agent on the Main Arteries and Veins during a 5 Day HDT**
J. Roumy, S. Herault, N. Tobal, S. Besnard, P. Arbeille
- 16. Body Temperature and Skin Blood Flow during a 14-day Bed-Rest in a Head-Down Tilt Position in Humans**
J. Cui, Y. Niimi, S. Iwase, D. Michikami, Q. Fu, T. Mano

Wednesday, April 5, 2000

16:00 – 17:00

Poster session II

1. **Cardiovascular Peripheral Effector Mechanism in Postflight Orthostatic Intolerance: A Simulation Study**
W.-Y. Hao, L.-F. Zhang, X.-Y. Wu
2. **Clinical Effects of Elastic Bandage on Neurogenic Orthostatic Hypotension**
Y. Hasegawa, Hakusui, Y. Hirayama, T. Ieda, Y. Koike, Y. Matsuoka, A. Takahashi
3. **Mechanical Tensile Properties of the Aortic Wall in the Premature Rat Exposed to the Microgravity Environment during Space Flight for 16 Days**
S.-I. Katsuda, T. Shimizu, M. Yamasaki, H. Waki, T. Nagayama, H. O-Ishi, K. Katahira, H. Wago, T. Okouchi, Y. Miyamoto, M. Miyake, M. Hasagawa, S. Matsumoto, M. Kanako, S. Nagaoka, C. Mukai, T. Izumi, K. Yanagawa, M. Uemura
4. **Induced Suit Immersion Orthostatic Untolerance: Prediction and Support-Effect of IMBP-Drugs**
N.G. Lacota, A.N. Kotov
5. **Vertical and Horizontal Postures during Suited Immersion: Similarity and Differences According to some Body Functions**
I.M. Larina
6. **Heat Shock Protein 70 and its mRNA Expression in Myocardium of Simulated Weightless Rats**
C. Liu, Z.-B. Yu, L.-F. Zhang, H.-Y. Ni
7. **Vasoconstrictor Responsiveness of Hind Body Vascular Beds is Diminished in Tail-Suspended Rats**
J. Ma, L.-N. Zhang, L.-F. Zhang
8. **Sympathetic and Cardiovascular Responses to Short Period of Microgravity Induced by Free Drop**
H. Morita, N. Fujiki, Y. Tsuchiya, T. Miyahara, K. Tanaka
9. **Effect of Aging on Muscle Sympathetic Nerve Activity and Peripheral Venous Pressure**
Y. Niimi, S. Iwase, Q. Fu, A. Kamiya, D. Michicami, T. Mano
10. **Effects of Supine Floating on Heart Rate, Blood Pressure and Cardiac Autonomic Nervous System Activity**
M. Nishimura, S. Onodera
11. **Cardiovascular Variability after 4 Hours Head Down in Symptomatic and Non Symptomatic Subjects**
G. Raimondi, F. Iellamo, R. Balocchi, S. Chillemi, S. Sacco, J.M. Legramante

- 12. Influence of the Gravity on the Flow Distribution of Red Blood Cells in Microcirculation**
N. Tateishi, Y. Suzuki, M. Shirai, N. Maeda
- 13. Time-Course of Cerebral Oxygenation and Cerebral Blood Volume during +Gz Acceleration**
C.C. Tran, J.C. Bouy, P. Van Beers, G. Florence, D. Lagarde, E. Tinet, S. Avriillier, J.P. Ollivier
- 14. Recording of Blood Pressure, Heart Rate and Aortic Nerve Activity during Parabolic Flight in the Rat via Radio-Telemetry**
H. Waki, T. Shimizu, K. Katahira, T. Nagayama, M. Yamasaki, S. Katsuda
- 15. Age Dependence and Correlation of Heart Rate Variability, Systolic Blood Pressure Variability and Baroreflex Sensitivity**
S.-Y. Wang, L.-F. Zhang, X.-B. Wang, J.-H. Cheng
- 16. Structural and Functional Characteristics of the Aortic Nerve in the Rabbit Raised in Head-Down Tilt Posture**
M. Yamasaki, T. Shimizu
- 17. Changes in Myocardial Contractility and Contractile Proteins after Four Weeks of Simulated Weightlessness in Rats**
Z.-B. Yu, J.-X. Bao, J. Ma, L.-F. Zhang
- 18. Daily Head-Up Tilt or Standing Can Prevent Vasoreactivity Changes in Arteries of Simulated Weightless Rats**
L.-N. Zhang, F. Gao, J. Ma, L.-F. Zhang

Thursday, April 6, 2000

16:00 – 17:00

Poster Session III

- 1. Antigraviceptive Neck Muscle Responses to “Moving Up and Moving Down” in Human**
M. Aoki, X. Han, H. Yamada, T. Muto, H. Satake, Y. Ito, K. Matsunami
- 2. Alterations in Skeletal Muscle Energy Metabolism under LBNP are Independent from Blood Flow**
S. Baerwalde, K. Müller, N. Maassen, J. Zange
- 3. Effects of Repetitive Gz-Acceleration on Structural and Metabolic Profile of M.Vastus Lateralis in Monkeys Exposed to 30-Day Bedrest**
I.N. Belozeroва, O.A. Matveeva, S.L. Kuznetsov, T.L. Nemirovskaya, B.S. Shenkman
- 4. Gender Difference of Bone Metabolism to 20-Days Bed Rest Immobilization**
M. Fujita, Y. Maekawa, C.S. Kim, Y. Ishizaki, H. Fukuoka
- 5. Effects of Clinostat-Microgravity on Bone and Calcium Metabolism in Rats**
S. Fukuda
- 6. Muscle Mitochondrial Changes by Experimental Immobility and Hindlimb Suspension**
Y.-I. Goto, H. Komaki, F. Igarashi, I. Nonaka
- 7. Influence of Hindlimb Unloading on Muscle MHC Isoforms Shifts in Tenotomized Rats**
T. Hashimoto, Y. Kaga, H. Tachibana, S. Yamasaki, H. Senge, T. Bamba, S. Taguchi
- 8. Effects of 9 Weeks Hindlimb-Unloading on Locomotor Patterns in Adult Rats**
F. Kawano, T. Nomura, M.S. Kang, J.H. Lee, E.Y. Han, Y.C. Chiu, Y. Sato, Y. Ohira
- 9. Bed Rest Immobilization on the Day 14th does not Disrupt the Basic Circadian Rhythm of Bone Resorption**
C.-S. Kim, Y. Maekawa, M. Fujita, N. Sato, M. Nishimuta, Y. Ishizaki, F. Otha, H. Fukuoka
- 10. Veloergometry: Non-Standard Means of Application**
N.G. Lacota
- 11. Immobilization Osteopenia Might be Caused by Transient Over-Expression of Both Bone-Resorbing Cytokines and Calcium Sensing Receptor in the Peripheral Blood Mononuclear Cells**
Y. Maekawa, M. Fujita, C.S. Kim, Y. Ishizaki, T. Esashi, H. Fukuoka

- 12. Selective Activation of Human Soleus and Medial Gastrocnemius Muscles during Walking in Water**
T. Miyoshi, T. Satoh, K. Nakazawa, H. Yano, T. Komeda
- 13. Effects of 9 Weeks Hindlimb Suspension on Neuromuscular Activity Patterns in Rat**
T. Nomura, F. Kawano, Y. Sato, Y. Ohira
- 14. Disorder of Clonogene Activity of Osteogene Cells-Precursors of Human Bone Marrow Tissue under Long-Term Axial Underloads**
L.M. Panchenko, V.S. Astakhova
- 15. The Ultrastructural Changes of the Osteocytes under Conditions of Microgravity**
N.V. Rodionova, V.S. Oganov, N.V. Zolotova
- 16. H-Reflex and Motor Evoked Potential Changes during Head Down Bed Rest**
T. Sato, T. Miyoshi, H. Sekiguchi, K. Yamanaka, M. Miyazaki, K. Nakazawa, S. Igawa, H. Yano, H. Takeoka
- 17. Elaboration of On-Board Automated Training System**
V.D. Sonkin, V.V. Zaitseva, M.V. Burchick, V.V. Sonkin

Friday, April 7, 2000

16:00 – 17:00

Poster session IV

- 1. Altered Gravity Changes the Calcium Homeostasis in Root Hairs of *B. Vulgaris***
G.V. Shevchenko, E.L. Kordyum
- 2. Effects of X-ray Irradiation during Unweighting on Histochemical Properties of Skeletal Muscles in Rats**
H. Tachibana, Y. Kaga, T. Hashimoto, S. Yamasaki, H. Senge, S. Taguchi
- 3. Effects of Calcium-Supplement on the Myosin Heavy Chain Expression of Skeletal Muscles in SHR Rats following Spaceflight (STS-80)**
S. Taguchi, S. Yamasaki, T. Hashimoto, H. Tachibana, Y. Kaga, S. Fukuda, Y. Yamori, D. McCarron, D. Hatton
- 4. Hypergravity Effects on Osteoclasts Activity**
A. Nemoto, T. Uemura
- 5. Effects of Simulated Microgravity on Immunoreactivity of Conjugated-Ubiquitin of Muscle Spindles of Soleus in Rats**
H.-M. Zhang, X.-L. Fan
- 6. Simulated Hypogravity Stimulates Cell Spreading and Wound Healing in Cultured Human Vascular Endothelial Cells**
Y.A. Romanov, N.V. Kabaeva, L.B. Buravkova
- 7. Role of Cerebellar and Vestibular Structures in Adaptive Compensation of Motor Disorders Due to After-Effects of Microgravity**
R. Grigorian, G. Aizikov, Y. Kreidich, V. Mazur
- 8. Does the Vertical Semicircular Canal Influence the Subjective Visual Vertical?**
M. Iida, K. Hitouji, M. Takahashi
- 9. Acceleration and Velocity Signals Trigger Otolithic Eye Movements during Lateral Translation**
N. Katayama, S. Mori
- 10. Time Perception and Autonomous Nervous System (ANS) under Head Down Tilt (HDT)**
K.A. Kirsch, E. Koralewski, A. Schernick, N. Toman, H.-C. Gunga
- 11. Search for Gravity-Responsive Genes by PCR-Based mRNA Differential Display in Human Cells**
K. Kita, T. Moriya, Y.-P. Wu, S. Sugaya, S. Takahashi, J. Nomura, N. Suzuki
- 12. Inflight and Postflight Alterations of Ultrastructure of Brain Locus Coeruleus in the Rats Flown in Space**
I.B. Krasnov, L.N. Dyachkova

- 13. Nociceptive Responses and Immunohistochemical Changes in the Rat Brain under Gravity Stress**
Y. Kumei , K. Toda, Y. Kawauchi, R. Shimokawa, H. Shimokawa, K. Makita
- 14. Electrophysiological Rating of Vestibular and Acoustical Systems Interaction in the Brainstem**
E.E. Sigaleva, I.B. Kozlovskaya, E.I. Matsnev
- 15. A New Current Dipole Tracing Method From EEG Which is Very Useful in Research of Human Brain Activity in the Space Station**
X.E. Han, K. Matsunami, S. Homma, K. Deguchi, K. Huda, D. Kondou, T. Ojika
- 16. Changes in Kinetics of Cerebral Autoregulation with Head Down Bed Rest in Women**
A. Pavy-Le Traon, M.C. Costes-Salon, P. Vasseur-Clausen, M. Parant, A. Maillet, G. Geraud
- 17. The Range Scale for the Expert Assessment of Weightlessness Syndrome**
V.V. Polyakov, N.G. Lacota, A.M. Yvyanskiy
- 18. Functional Significance of Changes Lepidium Sativum Root Apex Cell Nucleoli under the Conditions of Altered Gravity**
M.A. Sobol