

Publication list Prof. Dr. M. Heer

Diploma Thesis

Serologische Untersuchungen von hitzedenaturiertem Rind- und Schaffleisch.
Rheinische-Friedrich-Wilhelms-Universität, 1987

Dissertation

Einfluss alimentär erhöhter Kochsalzzufuhr auf den Wasser- und Elektrolythaushalt des Menschen, 1996

Habilitation

Physiological changes in humans under immobilization - Epidemiological evidence and nutritional interventions, 2004

Peer reviewed publications and reviews

1. **Heer M**, Goerlich R. (1988) Serologische Untersuchungen von hitzedenaturiertem Rind- und Schaffleisch. Arch Lebensmittelhyg, 39: 78-79
2. Drummer C, Lang RE, Baisch F, Blomqvist G, **Heer M**, Gerzer R. (1991) Effects of saline loading during head down tilt on ANP and cyclic GMP levels and on urinary fluid excretion. Acta Astronautica, 23: 25-29
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13. Grigoriev AI, Wegmann HM, Larina IM, **Heer M**, Smirnova TM. (1995) Water Immersion: Analysis of diurnal rhythms of water and electrolyte excretion. *Aerospace and Environmental Medicine*, 29 (N6): 21-26
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Books & Book articles

1. Drummer, C, **Heer, M**. Fluid balance, kidney function and the adaptation to microgravity. In: De Santo, N.G.: *Acid-Base Balance: from Bench to Bedside*, Istituto Italiano per gli Studi Filosofici, Naples (1999) 103-112
2. **Heer M.**, Drummer C. Body weight changes, fluid balance, and natriuretic peptides in space. In: De Santo, N.G., Cirillo M., Papalia T., De Napoli N.: *Edema: from Bench to Clinic*, Istituto Italiano per gli Studi Filosofici, Naples (2000) 247-257
3. **Heer M**. Fernweh. Space Food zwischen technischer Innovation und physiologischer Notwendigkeit. In: *Ernährung in Grenzsituationen*, Dr. Rainer Wild Stiftung (2001), Springer-Verlag, Berlin
4. **Heer M**, Baecker N, Zwart SR, Smith SM. Interactions among artificial gravity, the affected physiological systems, and nutrition. In: *Clement & Buckley, Artificial Gravity*, Springer, New York, USA, pp 249-270, 2007
5. Smith, SM, Zwart, SR, Kloeris, V, **Heer, M**. *Nutritional Biochemistry of Space Flight*, Nova Publishers, 2009
6. Frippiat JP, **Heer M**, Choukèr A. Considerations for Preventive and Therapeutic Strategies. In: *Stress Challenges and Immunity in Space*, Springer Berlin Heidelberg, pp359-361, 2012
7. **Heer M**, Baecker N, Smith SM, Zwart SR. Nutritional Countermeasures for Spaceflight-Related Stress. In: *Stress Challenges and Immunity in Space*, Springer Berlin Heidelberg, 387-403, 2012
8. Smith SM, Zwart SR, Heer M. *Human Adaptation to Spaceflight: The Role of Nutrition*, National Aeronautics and Space Administration, 2014
9. **Heer M**, Baecker N, Smith SM, Zwart SR. Nutritional Countermeasures for Spaceflight-Related Stress. In: *Stress Challenges and Immunity in Space*, Springer Berlin Heidelberg, 593-616, 2020

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11. Smith SM, Zwart SR, **Heer M**. Human Adaptation to Spaceflight: The Role of Nutrition, National Aeronautics and Space Administration, 2nd edition, 2021

Invited presentations

1. Heer M, Einfluß erhöhter Kochsalzzufuhr auf den Wasser- und Elektrolythaushalt (1995), DLR Inst. für Luft- und Raumfahrtmedizin, Köln
2. Heer M, Kontrollierte Nährstoffzufuhr und Monitoring des Calciumstoffwechsels bei Weltraumflügen (1997), Osteoporose-Diagnostik 2000, München
3. Heer M, Länger fliegen durch gesunde Ernährung? Fortbildungsveranstaltung der Fliegerärzte von NRW, 09.05.1998, Köln
4. Heer M, Changes in biomarkers of bone turnover during 4 month head-down tilt (HDT) IWG Meeting, 17th June 1998, ESA/ESTEC, Noordwijk
5. Heer M, Nutrient supply during recent European mission. Workshop on Integrative Physiology, September 6-9 1998, Bad Honnef
6. Heer M, Hat die Ernährung einen Einfluß auf den Gesundheitszustand von Astronauten? Ergebnisse aus verschiedenen Raumfahrt-Missionen. XXX. Jahrestagung des Internationalen Förderkreises für Raumfahrt Hermann Oberth-Wernher von Braun (IFR) e.V. 24.-27.06.1999, Salzburg
7. Heer M, Does self-catering of astronauts during interplanetary flights meet the **nutrient** needs? Workshop on Advanced Life Support 13./14.04.99, ESA/ESTEC, Noordwijk
8. Heer M, Nutrition, disease, bone metabolism and space research. Opening Ceremony of the Virtual Campus, Erasmus User Centre in ESTEC, ESA, 08.09.2000, Noordwijk
9. Heer M, Fernweh. Space Food zwischen technischer Innovation und physiologischer Notwendigkeit. 7. Heidelberger Ernährungsforum 'Ernährung in Grenzsituationen', 04./05.10.2000, Heidelberg
10. Heer M, Knochenstoffwechsel bei jugendlichen Patientinnen mit Anorexia Nervosa und diättherapeutische Maßnahmen 14.11.2000, DLR Inst. für Luft- und Raumfahrtmedizin, Köln
11. Heer M, Is there a potential for nutrients to counteract bone loss?, 'Food in Space' Symposium, 19.10.2000, Parma, Italien
12. Heer M, Nutrition in Space. Masters in Nephrology, 25.05.2001, Neapel, Italien
13. Heer, M, Nutrition in Space and Immobility: the skeleton, 24th ESPEN Congress, 31.08. – 04.09. 2002, Glasgow, Grossbritannien
14. Heer M, 'Ernährung in Schwerelosigkeit'. Fortbildungsveranstaltung für die Gruppe Muskel- und Knochenstoffwechsel (D. Felsenberg) an der Humboldt-Universität Berlin, 18.03.2002, Berlin
15. Heer M, What role do cation balances play in the genesis of new questions about hyponatremia: from bed to bench and back. Renal week of the American Society of Nephrology, 30.10. – 4.11. 2002, Philadelphia, USA
16. Heer M, Nutritional Concerns During Long Space Flights. 2nd Congress of the European Chapter of the American College of Nutrition, November 15-16 2002, Athens, Greece.
17. Heer M, 'Ernährung in der mobilen Gesellschaft', Universität Dortmund, 06.02.2003, Germany
18. Heer M, Schwerelosigkeit/Immobilisation und Knochenphysiologie. AKE, DGEM und GESKES Jahrestagung, 12. - 14.06.2003 Linz, Österreich

19. Heer M, Nutrition in Space. Workshop ESA/EAC, 20.- 24. October 2003, Cologne, Germany
20. Heer M, Knochenstoffwechsel bei Astronauten. Osteologie 2004, Leipzig, 03.-07.03.2004, Deutschland
21. Heer M, Decoupling of sodium and fluid regulation in space: possible mechanisms. 25th ISGP-meeting 07.-11.06.2004, Moskau, Russland
22. Heer M, Microgravity effects on body composition. 1st International Conference on Gravity and Cardiovascular System, Modena, June 18.-19., 2004
23. Heer M, Nutrition and bone. 26. Meeting of the ESPEN, Lisbon, 11.-14.09.2004, Portugal
24. Heer M, Nutritional effects during microgravity, Biovision, Lyon, 11. – 15. 04. 2005, Frankreich
25. Heer M, Effects of bed rest and salt intake on bone turnover. 'Sindroma da Allettamento: Aspetti Fisiopatologici e riabilitativi'. Udine, 13.05.2005, Italien
26. Heer M, Nutrient supply: Impacts on the musculoskeletal system in microgravity and simulation studies. Sino-German Workshop, 17.-22.04.2006, Xi-An, China
27. Heer M, How the body manages salt - Part I, EUSalt, 15.-16.05. 2006, Rom, Italien
28. Heer M, How the body manages salt - Part II Does increasing salt intake always lead to extracellular volume expansion? EUSalt, 15.-16.05. 2006, Rom, Italien
29. Heer M, Non-osmotic sodium storage as a mechanism for blood pressure control. Meeting of the Scandinavian Physiological Society, Reykjavik, 10.-14.08.2006, Island
30. Heer M, Osmotically inactive sodium retention is correlated with low-grade metabolic acidosis, 2nd Acid-base Forum, München, 07.-09.09.2006, Deutschland
31. Heer M, Evidence for non-osmotic sodium storage in humans, Seminar at the Panum-Institute Kopenhagen, 24. April 2007, Denmark
32. Heer M, Changes in metabolism in humans in space, ISGP Meeting 08. – 13. April 2007, San Antonio, USA
33. Heer M, Bone turnover in immobilization: Impact of nutrients, Humans In Space Meeting 20. – 24. Mai 2007, Peking, China
34. Heer M, The fate of ingested sodium in the body, 16.-20.07.2007 GSSI Scientific Conference 'Sodium balance and exercise', Gatorade Sports Science Institute, USA
35. Heer M, Artificial gravity: Effects on bone turnover, Medicine & Mobility, 13. - 15.09.2007, Köln, Deutschland
36. Heer M, Standardized bed rest studies: A model to investigate the musculoskeletal system, 1st Canadian Bed Rest workshop, 12.-13.11.2007, London, Ontario, Canada
37. Heer M, Impacts on nutrients on bone turnover in bed rest, Annual meeting of the Canadian Society of Exercise Physiology, 14.-17.11.2007, London, Ontario, Canada
38. Heer M, Integrative Physiology: Effects of high NaCl intake. 29th International Gravitational Physiology Meeting, 22. – 27.06. 2008 Angers, France
39. Heer M, Interactions between high salt intake and the musculoskeletal system, 37th COSPAR Scientific Assembly, 13.-20.07.2008, Montreal, Canada
40. Heer M, Should we change astronauts' diet to save their bones? Concord Hospital Seminars, 09.12.2008, Sydney, Australia
41. Heer M, Nutrition and its impact on bone metabolism in analog studies for spaceflight. 4th UK Space Biomedicine Conference 2009, 7th November 2009, Cambridge, UK
42. Heer M, Kochsalz und dessen Auswirkung auf den Knochenstoffwechsel. Knochen und Muskeln: Neue Welten, 20. -21.11.2009, Berlin, Deutschland
43. Heer M, Osmotically inactive sodium storage and acid-base balance. Neurovascular impairment induced by environmental conditions: Molecular, cellular and functional approach, 10.-14-03.2010, Angers, F

44. Heer M, Impact of acid-base balance on bone metabolism in microgravity, Lifestyle and Ageing, 4.-5.10.2010, Pisa, I
45. Heer M. End of the Shuttle Era: Effects of short-term space flight on metabolism and nutrition. 32nd Annual International Gravitational Physiology Meeting, 02. – 06.11. 2011, San Jose, California, USA
46. Heer M. Acid-base balance and the musculoskeletal system, 33rd Annual Meeting of the International Society of Gravitational Physiology, June 18-22. 2012, Aberdeen, UK
47. Heer M. Space exploration: What are the nutritional requirements?, 34th Annual Meeting of the International Society of Gravitational Physiology, June 23.-28. 2013, Toyohashi, Japan
48. Heer M, Baecker N and Frings-Meuthen P. High dietary NaCl- and protein intake: effects on bone turnover, 19th Humans In Space Meeting 08.-12. July 2013, Cologne, Germany
49. Heer M. Is bone turnover in bed rest, and strategies used to mitigate it, valid for aging processes? 66th Annual Meeting of The Gerontological Society of America, 20. – 24. November 2013, New Orleans, MD, USA
50. Heer M. Nutrition physiology in aging, bed rest and space flight, 35th Annual International Gravitational Physiology Meeting & 1st Aging in Space Symposium, 17- June 2014, Waterloo, Canada
51. Heer M. Nutrition and movement (muscle-bone and joint system) Defining Healthy Aging: From Science to Practice, the Link to Diet and Nutrition, ILSI North America, Pre-Conference Workshop, Nov. 5th 2014, Washington DC, USA
52. Heer M. Nutrient supply and the musculoskeletal system: results from space and analog studies, 37th Annual International Gravitational Physiology Meeting, 5-10 June 2016, Toulouse, France
53. Heer M. Spielt Salz eine Rolle für die Osteoporoseentwicklung? 14. Fachgespräch zum Thema: „Salz“, Hessisches Ministerium für Umwelt, Klimaschutz, Landwirtschaft und Verbraucherschutz, 21. March 2018, Wiesbaden, Germany
54. Heer M. Nutrition and Space Travel: an accelerated model for ageing;
- Understanding the key nutritional challengers and practical solutions
- Learnings from an extreme model of accelerated ageing. 8th Active, Performance & Sports Nutrition Summit 2018: Great new insights on creating more business and innovation value, 12.-14. June 2018, Rotterdam, The Netherlands

Non-peer reviewed publications

1. **Heer M**, Baisch F, Beck L (1990) Long-term effects of lower body negative pressure. ESA WPP-015, Vol. 2.
2. Baisch F, Beck L, Maass H, **Heer M**, Plath G, Blomqvist G, Gaffney A, Buckey J, Hillebrecht A, Schulz H, Meyer M, Kropp J, Ten Harkel J, Patat F, Arbeille Ph (1990) Effects of a 10-day period of -6° head down tilt (HDT). The Physiologist Vol 33 (Suppl.): S163-S164.
3. **Heer M**, Baisch F, Blomqvist G, Drummer C, Gerzer R (1990) Effects of 10 days 6° HDT on water- and electrolyte metabolism. The Physiologist, Vol 33 (Suppl):S165-S166
4. Gaffney A, Buckey J, Lane L, Hillebrecht A, Schulz H, Meyer M, Baisch F, Beck L, **Heer M**, Maass H, Arbeille Ph, Patat F, Blomqvist G (1990) The effects of a 10-day period of head down tilt on the cardiovascular responses to intravenous saline loading. The Physiologist Vol 33 (Suppl.): S171-S172.
5. Drummer C, **Heer M**, Molz B, Schloßberger M, Stadeager C, Röcker L, Norsk P, Strollo F, Baisch F, Warberg J, Christensen NJ, Gerzer R (1990) Physiology of body water and salt regulation Part I: Circadian rhythms of endocrine systems and urinary

- electrolyte excretion. Proceedings of the "Fourth European Symposium on Life Science Research in Space", ESA SP-307: 95-98
6. Drummer C, **Heer M**, Molz B, Schloßberger M, Stadeager C, Röcker L, Norsk P, Strollo F, Warberg J, Christensen NJ, Gerzer R (1990) Physiology of body water and salt regulation Part II: Volume and electrolyte homeostasis after an acute saline infusion. Proceedings of the "Fourth European Symposium on Life Science Research in Space", ESA SP-307: 99-102
 7. Drummer C, Lang RE, Baisch F, Blomqvist G, **Heer M**, Gerzer R (1991) Effects of saline loading during head down tilt on ANF and cyclic GMP levels and on urinary fluid excretion, *Acta Astronautica* 23:25-29
 8. Baisch F, Gauger J, **Heer M**, (1991) Classification of the free fluid reservoir in the calf by electrical impedance tomography. *The Physiologist* Vol 34 (Suppl.): S181-S182.
 9. **Heer M**, Kropp J, Maass H, Röcker L, Baisch F (1992) Dependence of blood volume changes on oral sodium uptake. *The Physiologist* Vol 35 (Suppl.): S113-S114.
 10. Gerzer R, Drummer C, **Heer M** (1994) Antinatriuretic kidney response to weightlessness. *Acta Astronautica* 33: 97-100
 11. Gerzer R, **Heer M**, Drummer C (1996) An overview of body fluid metabolism at actual and simulated microgravity (review). *Medicine in Science in Sports and Exercise*. 28 (Suppl)
 12. Drummer C, **Heer M**, Herten M, Gerzer R (1997) Regulation of volume homeostasis in reduced gravity: possible involvement of atrial natriuretic peptide, renal natriuretic peptide and cyclic GMP. *ESA Proceedings SP-1191*: 71-76
 13. Norsk P, Stadeager C, Johansen LB, Christensen NJ, Warberg J, Bie P, Drummer C, **Heer M**, Gerzer R, Röcker L, Gunga HC, Strollo F (1997) Renal and endocrine responses in human beings to an isotonic saline infusion during microgravity. *ESA Proceedings SP-1191*: 77-70
 14. Drummer C, **Heer M**. Fluid Balance, Kidney Function and the Adaptation to Microgravity. In: De Santo NG (Ed) *Acid-Base Balance: from Bench to Bedside*. Instituto Italiano per gli Studi Filosofici, Naples (1999) Chapter 7, 103-112
 15. **Heer M**, Drummer C. Body weight changes, fluid balance, and natriuretic peptides in space. In: De Santo N.G., Cirillo M., Papalia T., De Napoli N.: *Edema: from Bench to Clinic*, Istituto Italiano per gli Studi Filosofici, Naples (2000) 247-257
 16. Drummer C, **Heer M**, Joosten M, Stoermer I, Hesse C, Beck L, Wolfram G, Baisch F (2000). Regulation and distribution of body fluid during a 6-day head-down tilt study in a randomized cross-over design. *J Gravitational Physiology* 7 (2), P187-P188
 17. **Heer M** (2000) Zweifel an der Lehrmeinung: Überraschende Ergebnisse einer Studie zur Kochsalzzufuhr. *DLR-Nachrichten*, November, 42-45
 18. Mika C, **Heer M** (2001) Das Kopfunterexperiment. *Ignition* 2001, September, 20-23
 19. **Heer M** (2007) Erfahrungen der Ernährungsphysiologie im Weltraum für die Lösung von Problemen auf der Erde. In: *Unsere Zukunft 2020*, Universum Verlag, 117 - 134

Abstracts

1. Drummer C, Baisch F, Heer M, Lang RE, Blomqvist G, Gerzer R (1989) Effects of head down tilt on the response of ANF and cGMP to fluid loading. (31. Intern. Congr. of Physiol. Sciences, Helsinki) *Proc. Int. Union Physiol. Sci.* 17:266A
2. Baisch F, Beck L, Heer M, Maass H, Blomqvist G, Gaffney F, Buckley J, Hillebrecht A, Schulz H, Meyer M, Gerzer R, Drummer C, ten Harkel D, Karemaker J, Patat F, Arbeille Ph (1989) Responses to body fluid shifts with 10 day head down tilt (HDT). (31. Intern. Congr. of Physiol. Sciences, Helsinki) *Proc. Int. Union Physiol. Sci.* 17:107A

3. Gerzer R, Drummer C, Lang RE, Baisch F, Blomqvist G, Heer M (1989) Effects of saline loading during head down tilt on ANF and cyclic GMP levels and on urinary fluid excretion. 8. IAA Man in Space Symposium, Tashkent, Abstract Vol T-13
4. Heer M, Baisch F, Blomqvist G, Drummer C, Gerzer R, Hinghofer-Szalkey, Kropp J, Maass H (1989) Effects of 10 days 6° HDT on water- and electrolyte metabolism. Eleventh Annual Meeting IUPS Commission on Gravitational Physiology (Int. Union of Physiological Sciences), Lyon, 43
5. Drummer C, Heer M, Molz B, Schloßberger M, Stadaeger C, Röcker L, Norsk P, Strollo F, Baisch F, Warberg J, Christensen NJ, Gerzer R (1990) Physiology of body water and salt regulation Part I: Circadian rhythms in plasma levels and urinary excretion of hormones. Fourth European Symposium on Life Science Research in Space, Triest, ESA SP-307:50
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