

NUTRIM School of Nutrition and Translational Research in Metabolism



ANNUAL
REPORT

2014



Contents

Preface

I am pleased to present to you the Annual Report of NUTRIM offering a flavour of our critical mass, infrastructure and academic activities mainly focused on educational and scientific achievements in 2014.

NUTRIM strongly believes in connecting and integrating different disciplines to create truly new scientific insights and innovative health solutions for society. Within Maastricht University Medical Centre (MUMC+) “Metabolism and nutrition” is prominently positioned as innovation platform which stimulates an outlook of our research to specific disease profiles as well as to healthy living. This also allows us to optimally contribute to a paradigm shift from reactive medicine to predictive, preventive, personalized and participatory (P4) medicine. In 2011 we initiated the interfaculty research programme “Eatwell” (www.um-eatwell.nl) to join unique strengths of Maastricht University within the nutrition and health domain and accelerate novel insights from biomedical research into effective health promotion strategies. The first awarded projects ended in 2014 and we are now exploring how to optimally link “Eatwell” to other initiatives at the Maastricht Health Campus and at the Greenport Campus Venlo within the Knowledge Axis Limburg. To optimally anticipate on new regional and (inter)national developments, we decided to extend the management of our four research lines with a co-research line leader. We welcome Patrick Schrauwen (Research Line 1), Steven Olde Damink (Research Line 2), Jeroen Kooman (Research Line 3) and Maurice Zeegers (Research Line 4) in the team.

In 2011 NUTRIM obtained a prestigious grant by the national research council NWO for the Graduate programme “Metabolism and Chronic Disease”. In 2013, after a tough competition, the first PhD positions were awarded to the first four talented students (two basic scientists and two medical doctors). NUTRIM will continue the Graduate Programme by allocating a maximum of three PhD positions each year using institutional funding combined with a financial contribution by the selected supervisory team. An excellent and personal insight in the ambitions and experiences of the NUTRIM Graduate Programme is provided by the interviews with respectively the first awarded PhD students and the responsible NUTRIM graduate programme committee (page 22).

Every year NUTRIM welcomes new members and has to say farewell to others. 36 Students started their PhD project, 47 students defended their thesis in 2014, and all of them

obtained a new professional challenge at the University, in the Clinic or in Industry. Nicole Bouvy was appointed Professor of “Innovative Surgical Techniques” and Chris Evelo Professor of “Bioinformatics for integrative systems biology” while Prof. Wim Saris and Prof. Marleen van Baak held their valedictory lecture. For his many years of service to society, Wim Saris was appointed Officer in the Order of Orange Nassau by His Royal Highness. As first and former Director of NUTRIM (1992-2005) Wim has also greatly contributed to the success of our Research School.

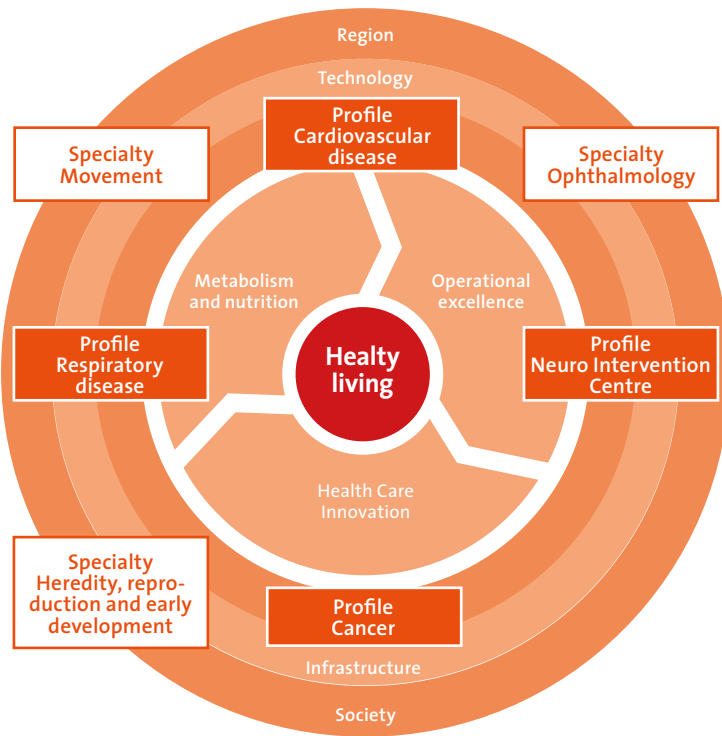
I would like to thank the scientific staff, support staff, students and our external partners for their valuable contribution to NUTRIM in a pleasant atmosphere, and look forward to a bright future in a challenging academic climate.

Annemie Schols, Director NUTRIM

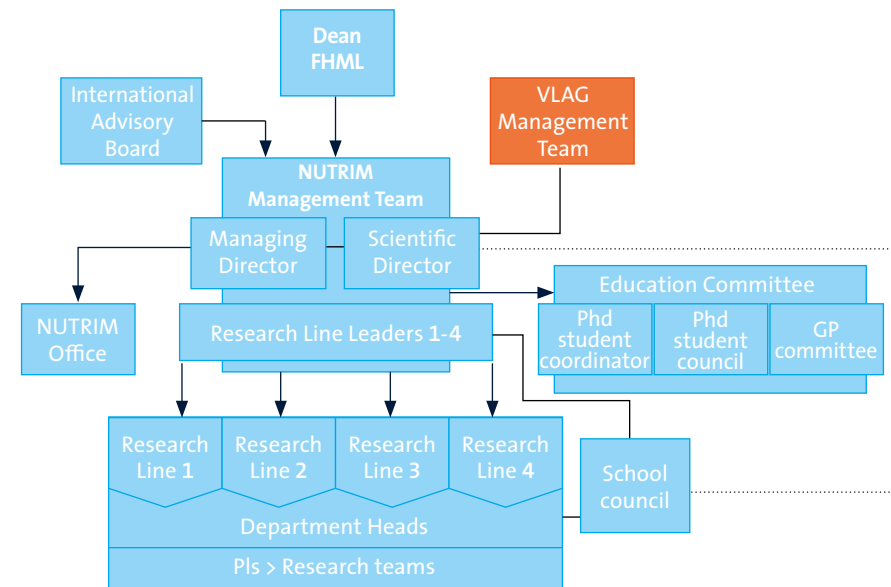


Organisation

Academic profile of Maastricht UMC+



Organisation schedule NUTRIM



The mission of NUTRIM is to promote translational research into chronic metabolic and inflammatory disorders with a high societal burden that will contribute to personalized lifestyle and medicine approaches. In its PhD programme NUTRIM aims to meet the demand for scientists who are acquainted with novel fundamental research concepts and are equipped to optimize the translation from science to the clinic and to public health.

The mission is implemented by the following objectives:

- To enable and manage an excellent research programme that encompasses the entire spectrum of basic, translational, clinical, and prevention projects providing NUTRIM with a distinct international health sciences profile that optimally fits within the Maastricht UMC+ care vision and organization.
- Availability of unique patient cohorts and biobank as well as an internationally distinct, state of the art infrastructure for metabolic phenotyping allowing a network-based approach linking tissue and organ systems within chronic metabolic disorders.
- To mentor scientists at different stages of their academic career.
- To facilitate the sharing of knowledge and expertise both within the national graduate School VLAG and by collaboration with other universities, research institutions, and national and international networks.

Collaborating Departments

Anatomy & Embryology
Bioinformatics
Clinical Chemistry
Genetics & Cell Biology
Health Promotion
Human Biology
Imaging including Nuclear Medicine and Radiology
Internal Medicine
Medical Microbiology
Movement Sciences
Ophthalmology
Paediatrics
Pharmacology & Toxicology
Plastic Surgery
Respiratory Medicine
Surgery

Research

Research within NUTRIM is structured in four research lines:

Research line 1 Metabolic Syndrome

Programme 1: Energy balance and obesity
Programme 2: Diabetes and cardiovascular disease risk

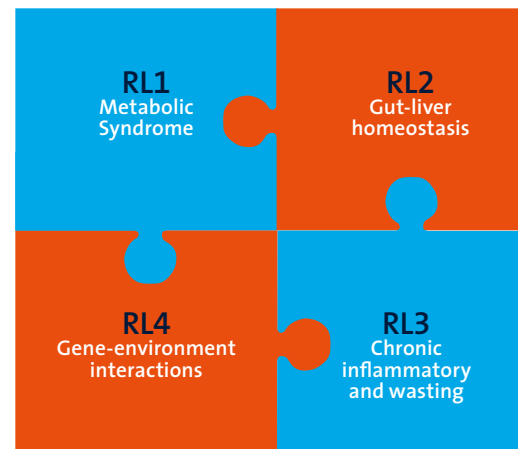
Research line 2: Gut-liver homeostasis

Programme 1: Gut-liver metabolism
Programme 2: Intestinal integrity and defence

Research line 3: Chronic inflammatory disease and wasting

Programme 1: Inflammation and oxidant-antioxidant networks
Programme 2: Skeletal muscle weakness in ageing and disease

Research line 4: Gene-environment interactions



Research

Research Line 1 'Metabolic Syndrome'

Research line leader: Prof. Dr. R.P. Mensink, Professor of Molecular Nutrition with emphasis on lipid metabolism; Department of Human Biology

Co-Research Line Leader: Prof. P. Schrauwen, Professor of Metabolic aspects of type 2 diabetes mellitus; Department of Human Biology

Tenured faculty: Scientists

Department of Health Education

Prof. Dr. S.P.J. Kremers, Professor of Prevention of Obesity

Prof. Dr. N.K. de Vries, Professor of Health Education and Promotion

Dr. P.T. van Assema

Dr. R.M. Meertens

Dr. J.M. de Nooijer

Department of Human Biology

Prof. Dr. M.A. van Baak, Professor of the Physiology of Obesity

Prof. Dr. E.E. Blaak, Professor of the Physiology of Fat Metabolism

Prof. Dr. F. Brouns, Professor of Health food innovation

Prof. Dr. W.D. van Marken Lichtenbelt, Professor of Ecological Energetics and Health

Prof. Dr. R.P. Mensink, Professor of Molecular Nutrition with emphasis on lipid metabolism

Prof. Dr. J. Plat, Professor of the Physiology of Nutrition with special attention for Sterol Metabolism

Prof. Dr. W.H.M. Saris, Professor of Human Nutrition

Prof. Dr. P. Schrauwen, Professor of Metabolic aspects of type 2 diabetes mellitus

Prof. Dr. M.S. Westerterp-Plantenga, Em. Professor of Regulation of Food Intake

Prof. Dr. K.R. Westerterp, Em. Professor of Human Energetics

Dr. T. Adam

Dr. G.H. Goossens

Dr. J. Hoeks

Dr. G. Plasqui

Dr. K. Venema

Department of Imaging

Prof. Dr. F. Mottaghy, Professor of Nuclear Medicine

Dr. M.E. Kooi

Dr. V. Schrauwen-Hinderling

Department of Internal Medicine

Dr. B. Havekes

Department of Movement Sciences

Prof. Dr. M.K.C. Hesselink, Professor of Movement Sciences

Department of Ophthalmology

Dr. T. Berendschot

Department of Surgery

Prof. Dr. N. Bouvy, Professor of Innovative Surgical Techniques

Prof. Dr. L.W.E. van Heurn, Professor of Child Surgery

Tenured faculty: Support staff

Department of Health Education

L.M.J. Kolenburg

Department of Human Biology

H. Aydeniz

A.P. Gijzen

G. Hul

M.M. Hulsbosch

P.F.M. Schoffelen

W.B.M. Sluijsmans

J.H.C.H. Stegen

J.L.J. Wouters

Department of Movement Sciences

Dr. G. Schaart

C.F.P. Kornips

Research

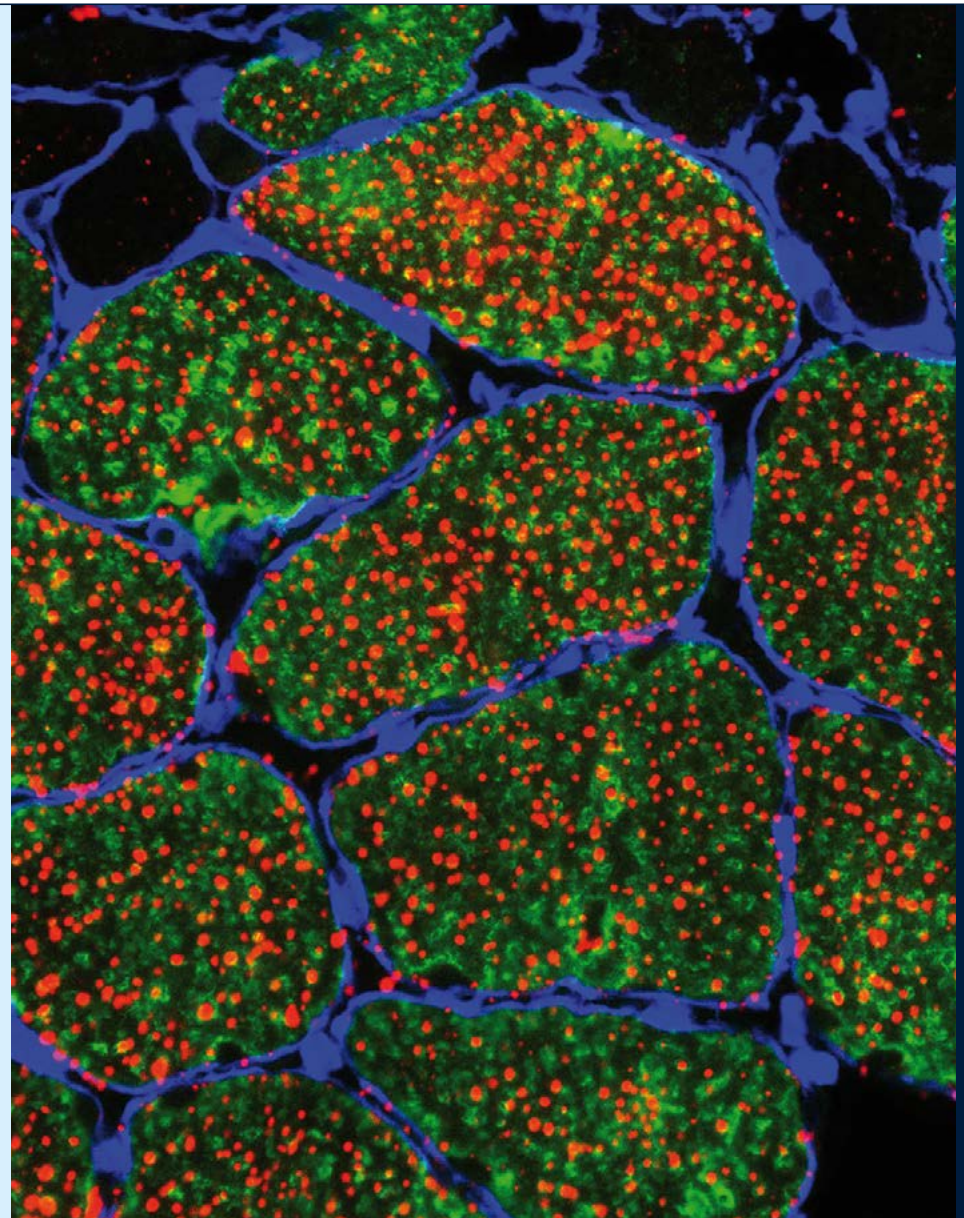
Research within Research Line 1 is concentrated around two complementary and interacting research programmes.

Programme 1.1: Energy balance and obesity

One main focus of programme 1.1 is on intervention strategies for long-term maintenance of energy balance and food intake. Studies are centred on relations between diet(ary components), energy expenditure, physical activity and body composition. The number of studies on (neuro)endocrine mechanisms, brain signalling, and genetic predisposition is increasing. The purpose of another line of research within programme 1.1 is to understand and influence health/energy balance-related behaviours, also in interaction with biological factors, and to develop interventions suitable for large-scale dissemination.

Programme 1.2: Diabetes and cardiovascular disease risk

The research of programme 1.2 aims to identify / characterize how nutrition, physical activity, environmental factors, and clinical interventions can have beneficial molecular, metabolic and functional effects. Focus is on skeletal muscle, (brown) adipose tissue, blood vessels, the liver, and the intestine. Studies are in particular designed to obtain insight into the relationships between life-style, lipid and glucose metabolism and low-grade systemic inflammation. Knowledge obtained from studies under 'normal' conditions is applied to study and understand metabolic disturbances involved in aetiology of e.g. type 2 diabetes mellitus and cardiovascular disease.



List of ongoing PhD Studies in 2014

Title of research

Adipogenic capacity as a mediator of weight gain
Adipokines and metabolism
Age, health and physical activity
An adipocytes-driven mechanism for weight regain after weight loss: the yo-yo effect
Analysis of fibre fermentation in microbiota from lean and obese individuals
Anti-reflux surgery
Bariatric Surgery in Children; BASIC trial
Bioactive ingredients for health
Blunted beta2-adrenergic responsiveness in obesity: role of hypoxia?
Brown adipose tissue activity and thyroid hormone
Brown fat metabolism: effects of cold acclimatisation
Building European governance on overweight and obesity: political, legal and scientific perspectives
Cellular and molecular aspects of weight regulation: The adipose tissue
Coaching on Lifestyle (Cool) project: Evaluation of a lifestyle coach pilot
Complications after abdominal surgery: anastomotic leakage, adhesions and wound dehiscence
Determinants of long-term maintenance of intervention-induced lifestyle changes in chronically ill patients
Dietary fatty acids and cardiometabolic health
Dietary polyphenols as modulators of lipid oxidation and mitochondrial function
Droplets preventing the overflow: PLIN5-coated lipid droplets in insulin sensitivity and mitochondrial function
Dynamic LED lighting, thermal comfort, health, and energy savings in buildings
Ectopic fat
Effects of diet and dietary components on human endothelial function
Effects of dietary factors on HDL functionality
Effects of dietary ingredients on vascular function via increasing apoA-I production
Effects of differential gut and systemic SCFA availability on parameters of body weight control and insulin sensitivity
Effects of knock down of gut microbiota by antibiotics on parameters of body weight control and insulin sensitivity
Effects of short-term dietary intervention on molecular signatures in man
Emerging role for autophagy in human adipocyte lipid metabolism and metabolic diseases like type II diabetes
Endocrinologic regulation of lipolysis in obese subjects: Impact of exercise intervention
Evaluating Obesity Treatment
Exercise programs and physical activity in COPD

PhD Student

Stefan Camps
Birgitta Kolk
Giulio Valenti
Roel Vink
Marisol Aguirre Morales
Selwyn van Rijn
Yvonne Roebroek
Nadine Severins
Karianna Teunissen-Beekman
Evie Broeders
Anouk van der Lans
Daphne Pommé
Freek Bouwman
Celeste van Rinsum
Kevin van Barneveld
Jessie Meis
Dorien Pieters
Jasper Most
Sabine Daemen
Marije te Kulve
Lucas Lindeboom
Sanne van der Made
Charlotte Talbot
Lotte Smolders
Emanuel Canfora
Dorien Reijnders
Stan Gaj
Qing Xu
Kenneth Verboven
Eric Aller
Willem Gosens

Factors influencing diet and physical activity among Canadian Inuit
Fatty acid handling in the obese hypertensive state
Focus on resistance: an innovative, resistance-based intervention to improve body composition and to promote physical activity in adolescents (12-18 years) with overweight or obesity
How to prevent pressure ulcers
Human brown adipose tissue in type 2 diabetes
Immune modulation by plant sterols and stanols
Intraperitoneal Mesh Adhesion Formation in Ventral Hernia Repair
Kidney donation after cardiac death: Identifying pathological processes in ischemia-reperfusion injury and developing strategies to enhance transplant outcome
Influence of circadian rhythm, glucocorticoids and their receptors on human energy metabolism
Long-term outcomes after ileal pouch-anal anastomosis in children and adults
Meshes and intra-abdominal adhesions
Mitochondrial lipotoxicity and diabetes: human studies
Muscle mitochondrial malfunction in type 2 diabetes
New insights into anastomotic leakage following colorectal surgery
Normal body weight but adipose body composition: determinants, metabolic consequences and the interaction with physical activity and diet
Nutritional modulation of apoA-I production
The role of oxygen tension in adipose tissue dysfunction in the pathophysiology of obesity and type 2 diabetes
Optimizing the beneficial health effects of exercise for diabetes: focus on the liver!
Oxyphytosterols: the answer to the controversy about the potential atherogenicity of plant sterols
Parenting practices related to children's snack intake
Personalised nutrition; An integrated analysis of opportunities and challenges
Please treat again later! Fine-tuning treatment-timing in type 2 diabetes mellitus
Preservation of metabolic flexibility by acetyl carnitine formation
Prevention of diabetes through lifestyle intervention: Effect on the brain.
Prevention of diabetes through lifestyle intervention: Effects in children
Prevention of obesity in childhood
Process and impact evaluation of the 'gezonde slagkracht' programme
Regulating muscle mitochondrial capacity in type 2 diabetes, the large potential of small microRNA inhibitors
Relation between thermo-physiology and behavioural control of body temperature
Relevance of vascular function markers

*Victor Akande
Rudi Stinkens
Gill ten Hoor*

*Luuk de Wert
Mark Hanssen
Florence Brüll
Marc Schreinemacher
Tim van Smaalen*

*Dirk van Moorsel
Joyce Manyi Bakia
Leontine van den Hil
Lena Bilet
Ellen Lenaers
Audrey Jongen
Siti Wulan
Sophie van der Krieken
Max Vogel
Bram Brouwers
Sabine Baumgartner
Dorus Gevers
Cyril Marsaux
Jan Hansen
Yvonne Bruls
Mathijs Drummen
Ike Dorenbos
Manon Ernst
Kimberly Grêaux
Dennis Dahlmans
Hannah Pallubinsky
Peter Joris*

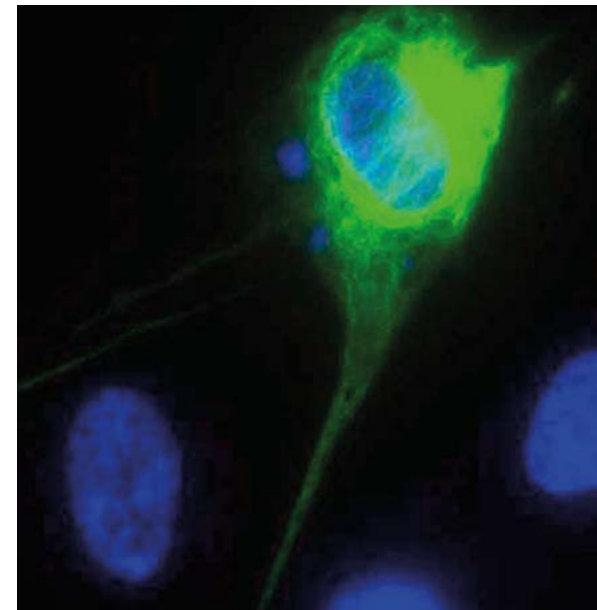
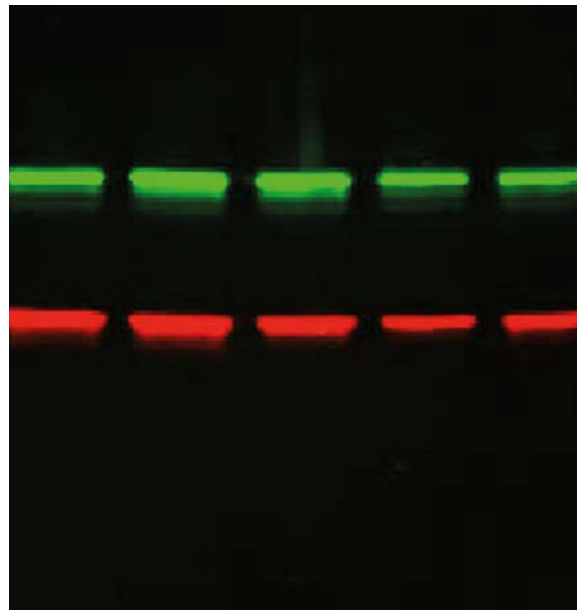
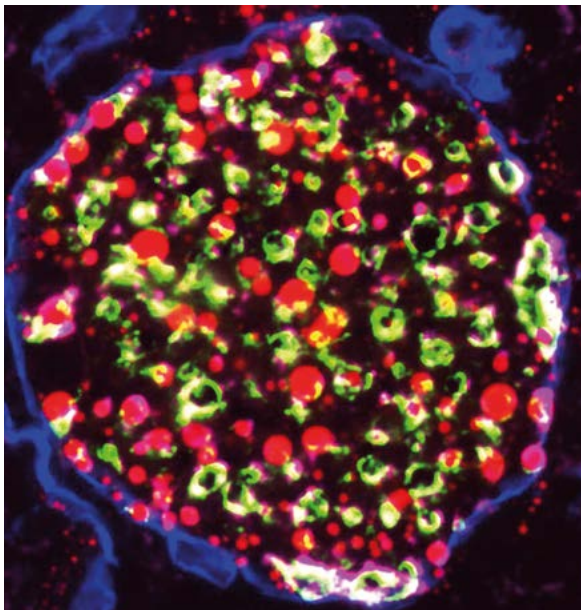
List of ongoing PhD Studies in 2014

Title of research

- Role of resveratrol in prevention of type 2 diabetes
- Specifying fatty acid composition of myocellular lipid droplets by microscopy
- Surgical treatment of morbid obesity in adolescents
- Tailoring an existing life style intervention to reduce metabolic syndrome in individuals with low SES from different ethnic origins
- The might of microRNA in muscle mitochondrial metabolism
- The prevention of anastomotic leakage and adhesions after colorectal surgery
- The search for the ileal mesh: New materials in hernia surgery
- The significance of brown adipose tissue and muscle thermogenesis for development of obesity
- Thermogene ingredients
- Vascular function and comorbidity in subjects with diabetes
- What does a diabetic patient 'need,' to eat healthy, exercise and to stop smoking

PhD Student

- Marlies Ligt*
- Anne Gemmink*
- Givan Paulus*
- Dorit Teuscher*
- Alexandre Houzelle*
- Anne-Claire Bosmans*
- Ruben Vogels*
- Maarten Vosselman*
- Pilou Janssens*
- Thomas van Sloten*
- Robin van Lieshout*



Research line 2 'Gut-liver homeostasis'

Research line leader: Prof. Dr. A.A Masclee, Professor of Internal Medicine, in particular Digestive Diseases; Department of Internal Medicine, section Gastroenterology

Co-Research Line Leader: Dr. S.W.M. Olde Damink; Department of Surgery

Tenured faculty: Scientists

Department of Anatomy & Embryology

Dr. S.E. Köhler

Department of Genetics & Cell Biology

Dr. R. Shiri-Sverdlov

Department of Internal Medicine

Prof. Dr. A.A.M. Masclee, Professor of Internal Medicine in particular Digestive Diseases

Dr. J.M. Conchillo

Dr. D.M.A.E. Jonkers

Dr. G.H. Koek

Dr. M.J. Pierik

Dr. F.J. Troost

Department of Medical Microbiology

Dr. J. Penders

Department of Paediatrics

Dr. A.C.E. Vreugdenhil

Dr. D.A. van Waardenburg

Department of Surgery

Prof. Dr. C.G.M.I. Baeten, Professor of Colorectal Surgery

Prof. G. Beets, Professor of Surgical Oncology

Prof. Dr. C.H.C. Dejong, Professor of HepatoPancreatoBiliary Surgery

Dr. K. Lenaerts

Dr. S.W.M. Olde Damink

Dr. M. Poeze

Dr. S.S.M. Rensen

Dr. F. Schaap

D. S. Xanthouleas

Tenured research support staff

Department of Genetics and Cell Biology

P. van Gorp

Department of Internal Medicine

M.A.M. Hesselink – van der Kruijs

M. Elizalde Vialta

B.T.C. Boonen

Department of Surgery

B.T.C. Boonen

Dr. H.M.H. van Eijk

M. Hadfoune

Programme 1: Gut-liver metabolism

Research in programme 1 with respect to gut liver metabolism is focused on inter-organ adaptive responses to alleviate compromised liver function under conditions of stress, obesity, metabolic syndrome, liver failure, and systemic insults (sepsis, ischaemia). A close interaction between clinicians and basic researchers in RL2 has resulted in a truly translational approach and setting with 1) excellent surgical models (major liver surgery, resections) for metabolic studies 2) focus on obesity and metabolic syndrome, Non Alcoholic Fatty Liver Disease (NAFLD) and Non Alcoholic SteatoHepatitis (NASH) in cooperation with surgical clinics for bariatric surgery) and 3) animal models for liver regeneration and NASH, allowing us to explore it's underlying molecular mechanisms. In NASH cholesterol metabolism in Kupffer cells is a focus and collaboration with groups working on atherosclerosis has been established (CARIM). Disturbances in the enterohepatic circulation (EHC) are another central theme in which research focuses on the role of bile salt signalling in the aforementioned disorders.

Programme 2: Intestinal integrity and defence

Research in programme 2 focuses on barrier (dys) function in the gastrointestinal tract, innate immune defence, luminal factors (microbiota, nutrients, chemicals), the neuro-endocrine-immune system and gut brain axis in health and disease. Since the start of RL2 in 2008 we have focussed research on intestinal integrity and defence on specific disease entities within the Maastricht UMC+ with clinical expertise at academic level patient care. Intestinal homeostasis is studied in several preclinical human and animal models in which disruption of intestinal integrity is central, such as intestinal ischemia-reperfusion, intestinal hypo perfusion, food deprivation, parenteral nutrition and obesity. Population based, well phenotyped cohorts form the basis of programme 2. These cohorts consist of: a) IBD (chronic inflammatory bowel diseases), a population based cohort of 6000 patients from the South Limburg region (biobank n=2000, research data base coupled to EPD (Electronic Patient Dossiers) b) IBS (Irritable Bowel Syndrome) cohort of 600 well phenotyped patients with 300 controls (biobank, patient data) and c) colonic polyps cohort (n=10.000; GROW, collaboration with NUTRIM for sec prevention (diet, lifestyle)) d) patients with NAFLD and NASH (cohort started in 2014) These population based well phenotyped cohorts allow research with focus on interaction between chronic disease, inflammation, lifestyle and diet, metabolism, (epi) genetics and malignant transformation.



List of ongoing PhD Studies in 2014

Title of research

Alterations during gut Ischemia/Reperfusion
Arginase: Effector or bystander molecule in asthma?
Bile salt toxicity and hepatic regeneration in the small liver remnant after partial hepatectomy
Decreased arginine de novo synthesis as cause of multiple organ failure during sepsis: mechanistic studies in experimental and human sepsis
Diet and disease activity in patients with Inflammatory Bowel Disease
Disease mechanisms and markers for non-alcoholic steatohepatitis in a population with non-alcoholic fatty liver disease
Does AMPK alter cholesterol trafficking to inhibit hepatic inflammation?
Effect of the probiotic LCS on symptoms, visceral sensitivity and faecal flora in patients with IBS
Effects of nutritional intervention on gut health and metabolic function in health and obesity
Epidemiology and risk factors of microscopic colitis
Exploring new targets in the prevention and treatment of human intestinal ischemia/reperfusion injury
Integrated care for inflammatory bowel disease patients in the Netherlands with the novel telemedicine tool myIBDcoach: a randomized controlled trial
Intestinal cell damage, inflammation and wound healing in major gastrointestinal surgery
Intestinal flora and innate immunity in IBD and after pouch surgery
Intestinal microbiota in IBD
Inventory of human SCFA metabolism and microbiota
Irritable Bowel Syndrome: Assessment of Individual symptom patterns
Lysosomes in metabolic inflammation
Metabolic and signalling pathways in steatosis and steato hepatitis
Modulation of ammoniogenesis in patients with hepatic encephalopathy
NASH : exploring the gut-liver axis
Non-alcoholic fatty acid disease
Non-invasive markers of disease activity in inflammatory bowel diseases
Novel diagnosis and treatment options for non-alcoholic steatohepatitis
Novel insights in pancreatic cancer cachexia
Nutrient sensing in the gut with emphasis on the role of the enteric nervous system
Optimisation of the treatment of patients with an enterocutaneous fistula
The role of the farnesoid X receptor in the development of intestinal and liver damage
Pathophysiology of Irritable Bowel Syndrome - Involvement of nociceptive processing
Perturbed enterohepatic circulation and signalling of bile salts; pathological role in liver disease and therapeutical options
Pharmacoepidemiology of Inflammatory Bowel Disease in The Netherlands

PhD Studen

Dirk Schellekens
Roy Cloots
Kim van Mierlo
Nina Wijnands-Kentgens
Corinne Spooren
Pauline Verhaegh
Jieyi Li
Annemieke Thijssen
Bouke Salden
Bas Verhaegh
Inca Hundscheid
Marin de Jong
Kostan Reisinger
Wout Mares
Danyta Tedjo
Evelien Neis
Lisa Vork
Tom Houben
Tine Comhair
Liliane Mpabanzi
Rogier de Ridder
Tim Hendrikx
Alexander Bodelier
Mike Jeurissen
David van Dijk
Mark van Avesaat
Ruben Visschers

Zsa Zsa Weerts
Kiran Koelfat
Steven Jeuring

Research

Title of research

Phenotypic characterization, visceral perception and intestinal permeability in IBS
Preventing progression of burn depth (and enhancing wound healing) by supplementation of pharmaco-nutrients in a mice cutaneous burn wound model
Prevention of diabetes through lifestyle intervention: Effects in children
Quality and safety of colonoscopy
Remnant liver function and volume assessment in resectional liver surgery
Role of arginine in B-cell development
Role of bone metabolism and perfusion in the development of fracture non-union
Short-chain fatty acid administration and its influence on insulin sensitivity and obesity
The effect of a high-protein diet on fatty liver
The effect of pulmonary inflammation on protein turnover and their regulatory processes in skeletal muscle
The effects of pre- and probiotics on intestinal barrier function and immune function
The ORANGE II trial. An international multicentre randomised controlled trial of optimised recovery after left lateral hepatic sectionectomy:
Laparoscopic versus open surgery within an enhanced recovery programme
The ORANGE II-Trial: An international multicentre randomised controlled trial of optimised surgical recovery after left lateral hepatic sectionectomy:
open versus laparoscopic surgery within an enhanced recovery ERAS® programme
The role of digestive enzymes and protease-activated receptor-2 in the pathophysiology of human intestinal ischemia-reperfusion and pancreatitis
The role of intestinal barrier function in liver cirrhosis
The role of oxidative stress in NASH
The role of the novel semi-synthetic flavonoid monoHER in the prevention of sinusoidal obstruction syndrome in patients undergoing oxaliplatin-based chemotherapy before partial liver resection
The secrets of interval colorectal cancers: biology or technology?
Towards a psycho-neuro-physiological model in irritable bowel syndrome
Usefulness of I-FABP in the diagnosis of celiac disease

PhD Student

Zlatan Mujagic
Kim Wehrens
Elke Dorenbos
Ankie Dirrix-Reumkens
Toine Lodewick
Selvakumari Sankaranarayanan
Dennis Meesters
Kirsten van der Beek
Sonia Garcia Caraballo
Chiel de Theije
Ellen Wilms
Simon Dello

Edgar Wong-Lun-Hing

Claire Leenarts
Kirsten Pijls
Sofje Walenbergh
Junfang Zhao

Chantal le Clerq
P. van der Veek
Marlou Adriaanse
Fabiënne Smeets
Martijn Arts

Research line 3 'Chronic inflammatory disease and wasting'

Research line leader: Prof. L.J.C. van Loon, Professor of Exercise Physiology and Nutrition; Department of Movement Sciences

Co-Research Line Leader: Prof. J.P. Kooman, Professor of the Pathophysiology of Chronic Renal Failure; Department of Internal Medicine, section Nephrology

Tenured faculty: Scientists

Department of Health Promotion

Dr. A. Oenema

Department of Internal Medicine

Prof. Dr. J. Kooman, Professor of the Pathophysiology of Chronic Renal Failure

Dr. J.P.W. van den Bergh

Dr. M.H.L. Christiaans

Department of Medical Microbiology

Prof. Dr. P.H.M. Savelkoul, Professor of Medical Microbiology

Dr. F.R. Stassen

Dr. P.F.G. Wolffs

Department of Movement Sciences

Prof. Dr. L.J.C. van Loon, Professor of Exercise Physiology and Nutrition

Dr. K. Meijer

Dr. H.H.C.M. Savelberg

Dr. L.B. Verdijk

Department of Paediatrics

Prof. Dr. L.J.I. Zimmermann, Professor of Paediatrics

S. Straetemans

Dr. G. van Well

Department of Plastic Surgery

Prof. R.R. van der Hulst, Professor of Plastic, Reconstructive and Hand Surgery

Department of Respiratory Medicine

Prof. Dr. A.M.W.J. Schols, Professor of Nutrition and Metabolism in Chronic Diseases

Prof. Dr. E.F. Wouters, Professor of Pulmonology

Dr. H.R. Gosker

Dr. R.J.C. Langen

Dr. N. Reynaert

Department of Toxicology

Prof. Dr. A. Bast, Professor of Human Toxicology

Dr. G.R.M.M. Haenen

Dr. G. Hageman

Dr. G.J. den Hartog

Dr. A. Weseler

Tenured faculty: Support staff

Department of Medical Microbiology

M.L. Boumans

C.C. Driessen

G.E.L.M. Grauls

Department of Movement Sciences

P.J.B. Willems

A.H.G. Zorenc

Department of Respiratory Medicine

E. Ten Hoor - Groot

M.C.J.M. Kelders

Ch. de Theije

Department of Toxicology

R.J.A. Bartholomé

M.J.H.J. Reijnders-Dritty

Research

Programme 1: Host-defence and metabolic networks

This programme focuses on the study of innate immunological processes in relation to a variety of environmental exposures like smoke, inorganic dust, particulate matter and bacterial and viral organisms in stable conditions and during exacerbations of COPD. Moreover, understanding of the cellular and molecular redox-regulating mechanisms in inflammation is important to design anti-oxidant strategies for the treatment of various inflammatory disease conditions, with relevance also beyond COPD. More insight into these mechanisms may also aid in the prevention or treatment of muscle wasting, as well as other systemic complications in chronic diseases and cancer cachexia. Research on oxidant-anti-oxidant balances in local and systemic compartments forms an important topic in this programme.

Programme 2: Skeletal muscle weakness in ageing and disease

Skeletal muscle tissue exhibits a remarkable plasticity in response to the environment. Questions concerning the control, reversibility, and functional consequences of adaptive modifications of muscle architecture are key domains of the research of programme 2. Programme 2 covers the broad spectrum of disturbances in energy and substrate metabolism to molecular mechanisms and modulation of muscle protein synthesis, breakdown and regeneration, translating into phenotypic alterations in muscle structure and function as well as body composition. In addition, the role of shared pathophysiological mechanisms, such as inflammation and oxidative stress, in the pathogenesis of systemic complications of ageing and chronic organ diseases are studied in a translational manner. Moreover, the assessment of physical (in)activity and performance in both health and disease forms an important line of research.

Whereas a significant part of this programme is dedicated to studying ageing in healthy subjects, the most important disease studied in this programme is COPD. COPD is a highly prevalent chronic disease that can serve as a model for understanding systemic consequences of other chronic diseases, such as chronic kidney disease, type 2 diabetes, rheumatoid arthritis and heart failure. It becomes increasingly clear that shared underlying mechanisms can be identified in the pathogenesis of systemic complications of different chronic diseases, which are in itself models of premature ageing. The interaction between investigators focusing on muscle metabolism and body composition phenotypes in healthy ageing and those focusing on chronic diseases in this RL provides ample opportunity for identification of underlying mechanisms for muscle wasting and abnormalities in body composition such as seen in cachexia, sarcopenia or sarcopenic obesity. This may facilitate the design of innovative treatment strategies supporting more healthy ageing, even in those patients with chronic organ diseases. In addition to chronic organ diseases, cancer cachexia represents an important model of acute muscle wasting. The study of the pathophysiology and phenotyping of the most important wasting conditions encountered in clinical practice in this RL guarantees considerable societal impact. Recently, the programme has been further strengthened by including the study of bone disorders in ageing and chronic disease, applying state-of-the-art diagnostic techniques. The study of the musculoskeletal interaction provides more insight into the pathogenesis and diagnosis of systemic complications of chronic disease.

List of ongoing PhD Studies in 2014

Title of research

Adaptation profile to optimize interaction between user and arm orthosis (ADAPT)
A-footprint
Ambulatory monitoring of knee loading during ADL, towards personalized treatment and rehabilitation strategies for knee osteoarthritis patients
Antioxidants in NASH
Assessment of fracture healing and bone strength by high-resolution peripheral quantitative computer tomography (HRpQCT)
Beet-ing your competitors; Dietary nitrate to enhance sports performance
Bioactivity of flavonoid metabolites
Biomechanical Determinants of Injury Risk in Long-distance Running
Cachexia in COPD and lung cancer
Cardiovascular aspects in COPD patients
Centraal vet en perifere spier: partners in crime in COPD
Clinical benefits of nutritional intervention in the elderly
Clinical outcome of nutritional rehabilitation on physical functioning and cardiometabolic risk profile in COPD patients with muscle atrophy
Daily physical activity levels in COPD
Determinants of long-term maintenance of intervention-induced lifestyle changes in chronically ill patients
Development of the M2Health Index
Education and integrated care in advanced COPD
Effectiveness and cost-effectiveness of package 3 of the BeweegKuur, a lifestyle intervention for people with an overweight related health risk
Electro stimulation of skeletal muscle tissue to prevent muscle atrophy
Epithelial cell plasticity and alveolar wall remodelling in COPD
Evaluatie van de nieuwe borstconstructietechniek Autologe Vettransplantatie (AFT)
Evaluation of bone erosions in rheumatoid arthritis and osteoarthritis by high-resolution peripheral quantitative computer tomography (HRpQCT) compared to standard imaging techniques
Evaluation of the interaction between COPD and the presence of vertebral fractures, bone strength and thoracic spine deformities in the ECLIPSE study
Exercise programs and physical activity in COPD
Exosomes derived from the airway epithelium - Immune regulators with a role in COPD?
Focus on resistance: an innovative, resistance-based intervention to improve body composition and to promote physical activity in adolescents (12-18 years) with overweight or obesity
Gene profiling of LPS-a benzoapyrene coated crystalline silica in lung epithelial cells and fibroblast
Gene profiling of the response of bronchial epithelial cells to particles
Improving mobility in diabetic patients through resistance training

PhD Student

Hans Essers
Michiel Oosterwaal
Ruud Gransier
Bregje van de Wier
Joost de Jong
Kristin Jonvik
Kristien Lemmens
Robert Mann
Karin Sanders
Lowie Vanfleteren
Rosanne Beijers
Marika Leenders
Coby van de Bool
Anouk Vaes
Jessie Meis
Sarah Mount
Ana Stoilkova
Brenda Berendsen
Marlou Dirks
Irene Eurlings
Todor Krastev
Andrea Scharmga

Mayke van Dort
Willem Gosens
Birke Benedikter
Gill ten Hoor

Paul Peeters
Timothy Perkins
Herman Ijzerman

Research

Title of research

Inter-individual susceptibility for viral and / or bacterial respiratory infections in humans
Interrupting sitting time improves insulin sensitivity and lipid metabolism in people with diabetes mellitus type 2
Investigating obesity as adjuvant on (extra-) pulmonary immunity in lung disease: grave consequences?
Liraglutide with or without NEAT in type 2 diabetes mellitus: Effects on HbA1c, weight, blood pressure, quality of life and health care costs
Long distance effective utilitarian biking
Lower limb muscle function in COPD (Eclipse)
Make or break' skeletal muscle: regulation of muscle plasticity by GSK-3b
Micro-architecture of hand joints in rheumatic diseases
MicroRNAs: critical modulators of the innate antiviral immune response in COPD exacerbations
Fluorescence imaging in abdominal surgery
Muscle health and function; Clinical nutrition
Muscle health and function; Sports nutrition
Muscle mass preservation
Musculoskeletal properties and fractures in patients with diabetes mellitus type 2.
Neuropsychological functioning in COPD
Nocturnal protein supply during sleep as a dietary strategy to improve muscle mass in elderly
Nutrition, medicine and health: claims and regulations
On measuring bone quality in fracture healing
Optimizing muscle protein synthesis in sports and healthy ageing.
Personalized multi body modelling
Physical activity and ADL in patients with COPD and/or CHF
Prospective evaluation of bone strength, physical activity, falls, subsequent fractures and mortality in patients presenting with a recent clinical fracture
Regulation of muscle oxidative phenotype by hypoxia in COPD
Sports nutrition and exercise metabolism
Subclinical phenotypical alterations in early chronic kidney disease
Survival of the weakest: the origin of atrophying species in COPD
Systemic effects and comorbidity in COPD are associated with markers of accelerated ageing
The effect of pulmonary inflammation on protein turnover and their regulatory processes in skeletal muscle.
The effects of physical activity and prolonged sitting on physical fitness and functioning
The impact of the macronutrient composition of a nutritional supplement on postprandial skeletal muscle protein synthesis in elderly
The negative effects of food supplements on elderly
The patient with a recent fracture, secondary osteoporosis and metabolic Bone Diseases (SECOB) and the Fracture Liaison Service
The prospects of vertebral and non-vertebral fractures

PhD Student

Charlotte Volgers
Bernard Duvivier
Niki Ubags
Dirk van Moorsel
Harry Haenen
Linda Veld op 't
Nicky Pansters
Michiel Peters
Carla Bellinghausen
Jacqueline van den Bos
Imre Kouw
Jorn Trommelen
Stefan Gorissen
Ellis de Waard
Candy Gijsen
Bart Groen
Alie de Boer
Frans Heyer
Andy Holwerda
Pieter Oomen
Rafael Barreto de Mesquita
Lisanne Vranken
Ilse Slot
Jean Nyakayiru
Remy Martens
Judith Ceelen
Poornima Gopal
Chiel de Theije
Jeroen van der Velde
Irene fleur Kramer
Misha Vrolijk
Sandrine Bours
Robert van der Velde

Title of research

The role of anti-oxidants and the compliment system in the pathophysiology of ischemia reperfusion injury in patients with breast reconstruction

The role of autophagy and satellite cell function in skeletal muscle plasticity

The role of JNK kinases and the Keap1/Nrf2 system in antioxidant mechanisms involved in drug induced liver injury.

From the experimental evidence up to the clinical level

The role of mitophagy in the loss of oxidative capacity in chronic disease

Transitions in dialysis: A survey on the effects of dialysis and transplantation on cardiovascular and nutritional state, physical activity and quality of life

Walking stability and efficiency in COPD patients

PhD Student

Marieke van den Heuvel

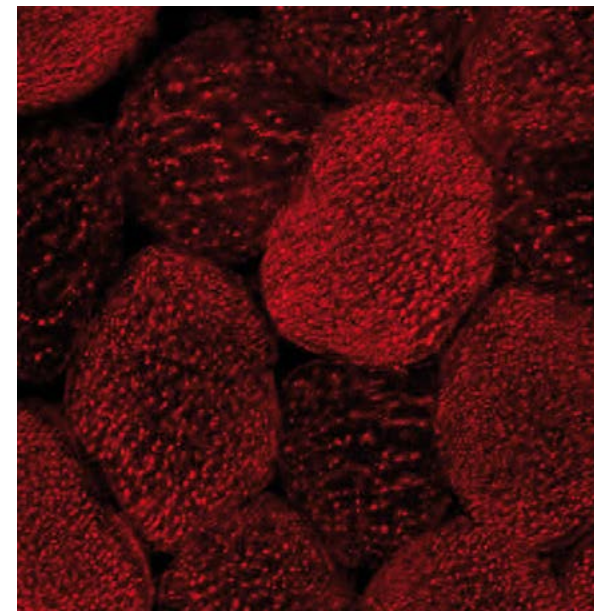
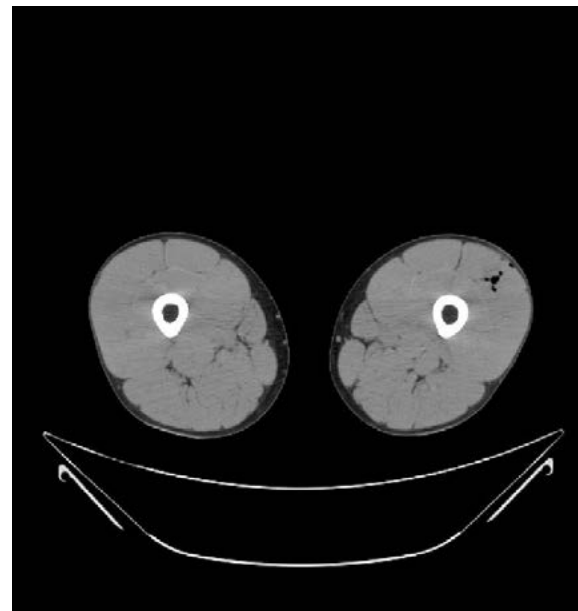
Anita Kneppers

Miguel Zoubek Aranda

Pieter Leermakers

Natascha Broers

Wai-Yan Liu



Research line 4 'Gene-environment interactions'

Research line leader: Prof. Dr. F.J. van Schooten, Professor of Genetic Toxicology; Department of Pharmacology and Toxicology
Co-Research Line Leader: Prof. M.P.A. Zeegers, Professor of Complex Genetics; Department of Genetics & Cell Biology, section Complex Genetics

Tenured faculty: Scientists

Department of Bioinformatics

Prof. C. Evelo, Professor of Bioinformatics for Integrative Systems Biology
Dr. S.L.M. Coort
Dr. L.M.T. Eijssen
Dr. E. Willighagen

Department of Clinical Chemistry

Prof. Dr. M. Dieijen-Visser, Professor of Clinical Chemistry
Dr. D. de Boer
Dr. P.P.C.A. Menheere
Dr. K.H. Wodzig

Department of Genetics & Cell Biology

Prof. Dr. M.P.A. Zeegers, Professor of Complex Genetics
Dr. M.J.F. Gielen

Department of Human Biology

Prof. Dr. E.C. Mariman, Professor of Functional Genetics
Dr. J.W. Renes

Department of Pharmacology & Toxicology

Prof. Dr. F.J. van Schooten, Professor of Genetic Toxicology
Prof. Dr. W. Passchier, Hon. Professor of Risk Analysis
Dr. A. Boots
Dr. J.W. Dallinga
Dr. R. L. Godschalk
Dr. C. Neef

Tenured faculty: Support staff

Department of Bioinformatics

N. da Silva Nunes

Department of Human Biology

F.G. Bouwman

Department of Toxicology

L.M. Maas
E.J.C. Moonen
D.M.F.A. Pachen
M.J. Reijnders-Dritty



Research

The major research area within research line Gene-environment Interactions is the combined effects of dietary and toxic (among other environmental) exposures and genetic background on chronic diseases. The research fits within the strategic programme of the Faculty Health Medicine and Life Sciences (FHML) and the Maastricht University Medical Centre+ (MUMC+) in which prevention of disease and quality of life is an important focus. The programme focuses on environment-diet-gene interactions in its basic and applied research into common chronic disorders. Traditionally, diseases of interest are inflammatory lung and bowel disease, metabolic syndrome, and cancer. The aim is to deliver internationally competitive translational research leading to prevention strategies in populations and improved treatment and disease management. The programme's objective is to develop and validate novel biological markers, environmental or behavioural factors that can help to determine pathological processes, with the aim to obtain early indicators to guide treatment or to protect health by adjusting diet. More recently nutrigenomics research is more focussed on health in which health is not just defined as the 'absence of disease', or 'a state of complete wellbeing (WHO definition 1948)' but more in terms of 'resilience', as 'the ability to adapt and to self-manage, in the face of social, physical, and emotional challenges'.

List of ongoing PhD Studies in 2014

Title of research

Adipogenic capacity as a mediator of weight gain
An adipocyte-driven mechanism for weight regain
An adipocytes-driven mechanism for weight regain after weight loss: the yo-yo effect
Cellular and molecular aspects of weight regulation: The adipose tissue
Connecting the worlds of semantic web and network biology
Development of high throughput toxicogenomics-based in vitro screens for rapid prediction of toxicity class
Emerging role for autophagy in human adipocyte lipid metabolism and metabolic diseases like type II diabetes
Flux visualization
HealthPotential: Unlock your secret to a healthy life
Identify markers of direct immunotoxicity using in vitro human cell models
In vitro and in vivo analysis of exhaled breath in lung diseases
Pulmonary inflammation in DNA damage and repair
Smoking and bladder cancer
Sound science: Selective citation in science based decision-making
Sugar-treated tobaccos are important sources for the production of aldehydes in cigarette smoke, and make a significant but preventable contribution to health risk
The investigation of biological processes involved with Nano toxicology to improve safety assessment of new nanomaterials, using systems biology approaches
The role of diet on the recurrence and progression of bladder cancer
The role of Nox4 in the lethal progression of pulmonary fibrosis - implications for new therapy strategies
Topography of smoking and smoke components exposure as assessed by biomarkers in human smoking trials
Twin research and environmental geocoding to unravel nature versus nurture
Usability study of pathway analysis combined with other data interpretation methods
Using metabolomic analysis of volatile organic compounds (VOCs) in breath as biomarkers for healthy and disturbed gut
Vital role of essential fatty acids for pregnant women

PhD Student

Stefan Camps
Nadia Roumans
Roel Vink
Freek Bouwman
Elisa Cirillo
Sandra Janssen
Qing Xu
Anwasha Dutta
Kelly Stewart
Jia Shao
Rianne Fijten
Quan Shi
Frits van Osch
Miriam Urlings
Nuan Ping Cheah

Bart Smeets

Sylvia Jochems
Carmen Veith
Charlotte Pauwels
Esmee Bijns
Martina Kutmon
Agnieszka Baranska

Nikos Stratakis

NUTRIM Graduate Programme: a new tradition

The first interview is with the four members of the committee who are responsible for the annual selection of the laureates.

The second interview features the four PhD students who were the first to receive the scholarship in 2013, which at the time was funded by NWO, the Netherlands Organisation for Scientific Research. In 2014 and 2015 NUTRIM has continued the programme with own scholarships.

Following an inspection of the quality of research and the programme track for master's and PhD students, NUTRIM was awarded the prestigious NWO Graduate Programme grant. The four-person 'GP committee' then selected the first four laureates, who commenced their PhD in summer 2013. The most important difference to a normal PhD tracks is the tremendous freedom granted to the PhD student to write his or her own research plan, to choose his or her own supervisors and also the emphasis on interdisciplinary collaboration. "Even though normal PhD students already receive plenty of opportunities in this area," stresses one committee member, "and you don't yet know whether these people will turn out to be good researchers," says another. The GP committee explains why NUTRIM is nonetheless happy to continue the programme.

Theoretically NUTRIM could have rested on its laurels after the award of the Graduate Programme grant by NWO. Once you've received the grant, as a school you aren't eligible a second time and moreover it's only after the PhD students have completed their tracks that you have a real picture of the programme's 'added value'. But the board saw it as a good beginning to a new tradition and so awarded several comparable scholarships in the following two years as well. Three-quarters of the money came from the programme's own budget and a quarter was guaranteed by the PhD thesis supervisor. In this way, the PhD student's salary is paid and he or she can apply on his or her own initiative for supplementary scholarships to cover other research costs.

The four members of the GP committee are sitting together at the table: Annemie Schols, Ronit Shiri-Sverdlov, Roger Godschalk and Harry Gosker. Coincidentally, the latter is also supervisor of one of the three PhD students who were awarded the scholarship in 2014. Only two of the three available scholarships were awarded in 2015 because there was no third candidate who met the criteria. Lowering the bar in order to fulfil the quota is not an option.

How do you select these PhD students?

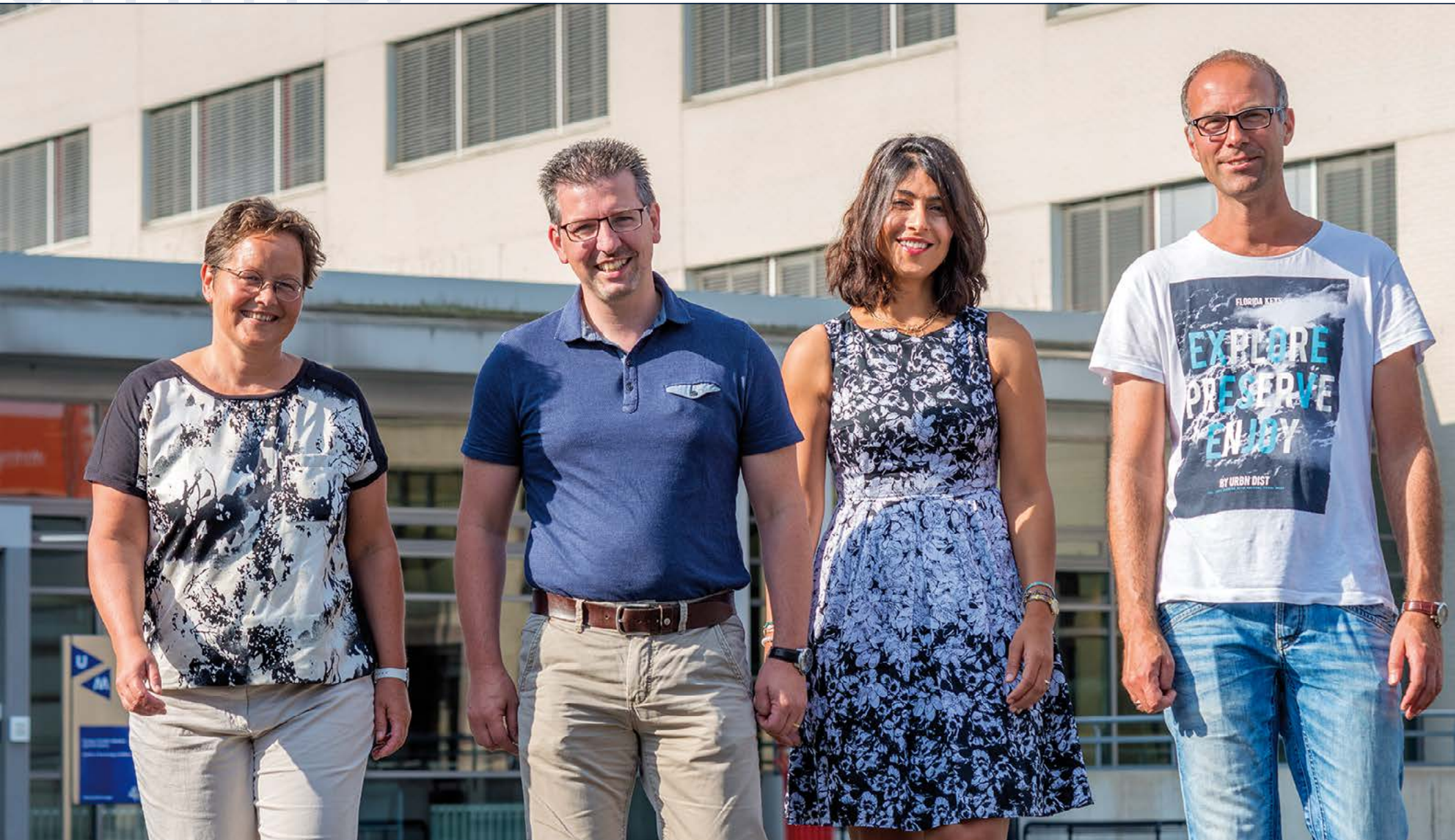
Gosker: "There are three rounds. In the first round we chiefly look at the CV. Someone who has spent a while studying abroad, who has already written a paper or acquired a scholarship, for instance, will already have an advantage. Things like this show that someone is rising above the average." Godschalk: "In the second round, external assessors judge the quality of the research proposal and the committee looks at things like: does it fit in NUTRIM and is optimum use made of all expertise present in the school." Sverdlov: "And the third round, the interview with the committee and a few other NUTRIM members, is very important as well. Then you can see whether someone has really come up with it all himself or herself, or whether it's more the work of an intended PhD thesis supervisor."

What distinguishes the laureates from normal PhD students?

Schols: "To begin with they have designed their own project, although we don't yet know whether that will ultimately be an advantage or disadvantage. They are innovative projects and thus are vulnerable as well. The ultimate result of the PhD dissertation may turn out very differently than anticipated." Gosker: "The expectation that they will collaborate on an interdisciplinary basis carries the risk of them biting off more than they can chew. And as a supervisor I notice that I approach such PhD students a little more reservedly than I do others, even though I think that self-reliance is important in every PhD track." Godschalk: "Normal PhD students are encouraged to work together as well, of course, but these people already have more of an innate drive to do this. They are intrinsically motivated to carry out research." Sverdlov: "Things seem to go more easily for them, especially at the start, because they begin the PhD track with more self-confidence." It almost sounds like an ideal form for all PhD tracks.

Schols: "You have to be realistic: not everyone has what it takes. You have all kinds of PhD students and I don't even think it would work if you had only this type of PhD student in a research group. Someone who begins slowly and uncertainly can still become a successful researcher with good supervision. We put these PhD students on a pedestal to some extent, but they respond well to their special status. To give one example, this year they themselves organised the annual information meeting for new master's students. And I think it's great that some of the four from the first year's selection have indeed applied for supplementary scholarships and are thus empowering themselves to carry out their research in an optimum way. These four are going to make it."

amme:



Nonetheless, one female PhD student wonders whether she can combine a career in the scientific community with, say, a young family.

Godschalk: "If you decide to go into science then you must indeed be prepared to relocate now and again." Schols: "I think it's a pity she has doubts, all the more so because the climate for women with children has improved considerably in the scientific community since the time when I had mine." Sverdlov: "What I find ideal is that I can organise my own time and thus spend plenty of time with my four children. I can regularly pick them up from school and work in the evening or, if necessary, at night."

Schols: "It's easier here than if you work for a company, for instance. And yes, you have to put in long hours as a scientific researcher, but then your work also feels like a kind of hobby. In that respect I find the combination of training as a medical specialist and scientific research more problematic. It would be a pity if Van Dijk and Koelfat, for instance, weren't able to do any research during their years of specialisation. I regularly talk to the dean of the medical faculty here and at the hospital about this issue."

What motivates NUTRIM to continue to invest in this programme?

Gosker: "You retain talented researchers at your school, or you attract them here." Schols: "In principle the programme is open to external students as well, and in the future we can place a greater focus on this, for instance through the school network or the PIs. We have something to offer PhD students. As an institute we aim above all to facilitate researchers, in all kinds of ways. And we see this as a great instrument for getting researchers to work together, bottom up."

Gosker: "And with a bit of luck you also retain these researchers in the future, too."

Sverdlov: "I expect that this will benefit the level of NUTRIM in the long term. And nonetheless the experience is still very valuable for people aiming to get the scholarship, but who narrowly fail to make it." Schols: "I took on someone like that this year as a regular PhD student."

How do you think things can be improved in the future?

Schols: "We hope to inspire other schools within the faculty to continue this programme. If this can be taken up across the faculty then the resulting collaboration will be even broader, between institutes as well. And to some extent we're still searching for our role as committee after the laureates have been selected. We see them once a year and apart from that our door is always open to them. And so far there haven't been any situations

where we would have needed to intervene." Godschalk: "Of course, the progress of a project lies primarily with the PhD thesis supervisor and the other supervisors. We're more of a secondary sounding board." Schols: "But we make sure that the groups with whom our PhD students collaborate also get the credit for this, for instance as co-supervision. To this end we also hold a discussion with the designated supervisors regarding the definitive award of the scholarship. After all, this is a different kind of trajectory than the regular one." Sverdlov: "But all PhD students are given equal chances here." Schols: "Absolutely. And moreover, it's not a given that these people's PhD theses will be better than those of other PhD students." Sverdlov: "It's mostly a question of talent and hard work. And luck, too..."

Sverdlov:

"It's mostly a question of talent and hard work. And luck, too..."

The first four NUTRIM-NWO Graduate School laureates
“A PhD research project is like a painting”

In 2013 they were the first four young researchers to receive a prestigious NUTRIM-NWO Graduate School grant. They are hoping to complete their research projects, which they are completely organising themselves, in two years from now. How are they doing and what have they learned so far?

“A PhD research project is like a painting: you have an image in your mind, but it turns out very differently, and you may even need to cut out some parts of the work because you can see it’s not going to work out.”

According to the NWO website, the goal of the NWO Graduate Programme is to strengthen the PhD system by offering highly talented young researchers a PhD position at an outstanding research school. They write their own research proposal, which has better chances if it is based on an interdisciplinary approach, and they seek out their PhD thesis supervisor themselves. This formula appealed to the four researchers who stopped by for the interview this Friday morning.

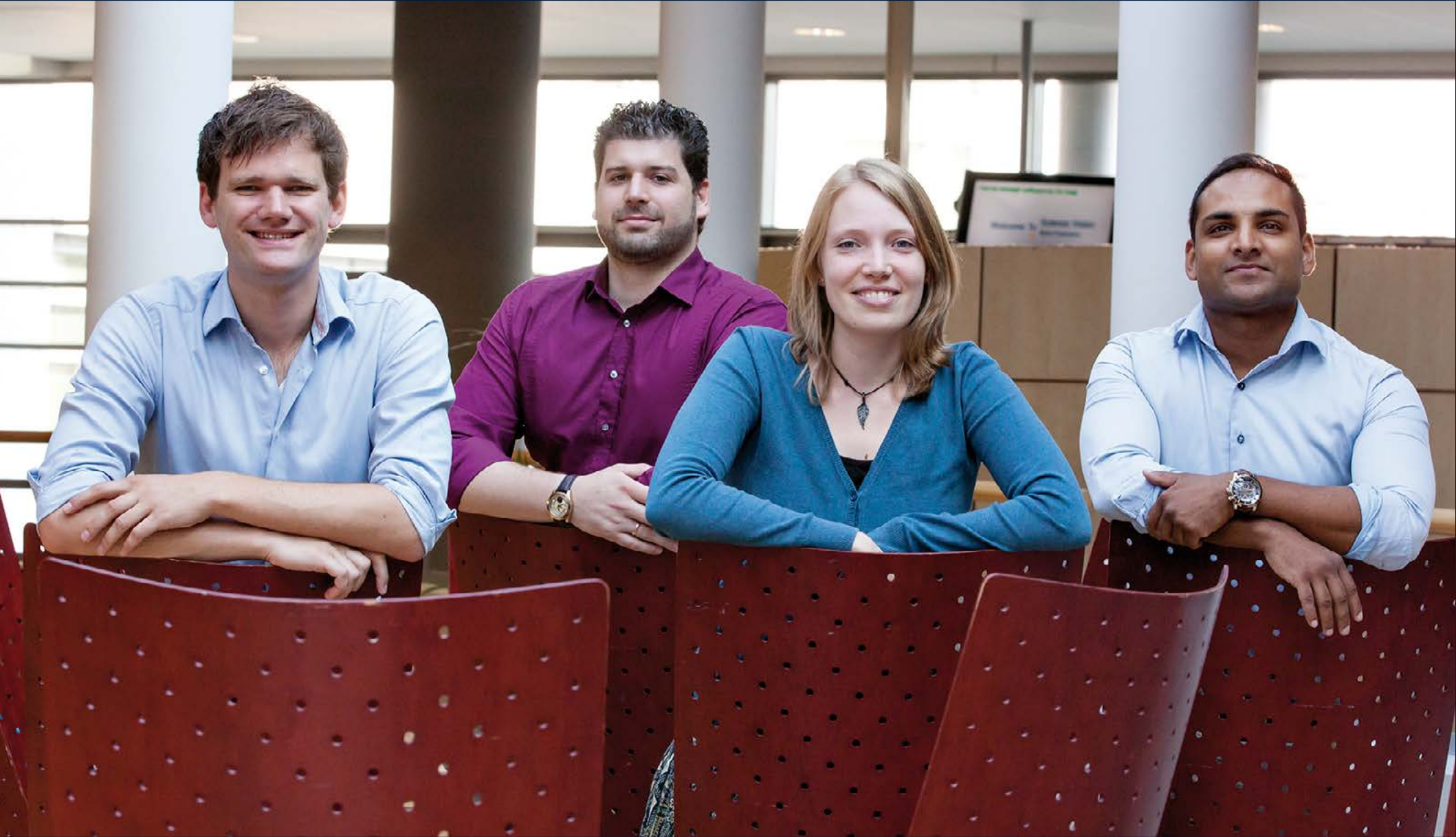
Birke Benedikter: “I really wanted to get a doctoral degree, but not just anywhere. I have specific interests and there weren’t many existing projects that gelled with these. Two weeks before the decision on this scholarship was announced it turned out I had been accepted at another PhD location. But I said no to that, even though I had not yet received this scholarship. It was simply something I really wanted.” David van Dijk feels just the same: “I didn’t want to do just any old PhD research and had been exploring my options for more than a year. I was very interested in cachexia and the theme fits this grant perfectly, because the problem doesn’t play out just at the level of surgery. It’s a metabolic issue and so it’s a pretty obvious step for me to call on other expertise within NUTRIM. And now I’m more of my own boss, too: I myself chose what I wanted to research and how.” Jan Hansen adds: “I found it really important to create my own project, because it’s amazingly motivating to research what you’ve come up with yourself. Of course, your supervisor helps you to steer your course, but you define your own direction. You don’t have that position when you start a project where the professor already has a four-year plan ready for you.” Van Dijk: “If you’ve come up with it yourself, you know exactly why you’ve made certain choices and it’s easier to take on the steering role.” Kiran Koelfat: “I come from the north of the Netherlands and actually I wanted to go back there after my master’s, but then I got this chance to write a research proposal. This subject was very new here and the environment is outstanding for the work. NUTRIM is a leader in the field of metabolism, so I decided to keep going here. And this is a good place for translating things to the level of the patient. That’s exactly what I wanted.”

A big family

All four are working together successfully with various sections or departments within NUTRIM. Koelfat: “There’s a great willingness to collaborate, and that’s a nice thing about this big family.” Hansen: “There are many possibilities for studying the human metabolism, from mass spectrometry to the Metabolic Research Unit Maastricht (M-RUM), and of course the international network of professors.” Benedikter: “My research and David’s are now being linked up by someone from the latest group of laureates from the Graduate Programme.” Hansen: “Because our projects are highly innovative and specific they’re not so easy to connect. And precisely this innovation was an important criterion for this scholarship.”

About once a year the researchers meet with the supervisory committee who selected them at the beginning of the process. Then they discuss the progress of the projects and

The first four NUTRIM-NWO Graduate School laureates



they can also contact the committee if they experience any sticking points, for instance with a supervisor. But the chances of this are fairly small, as they themselves recognise, because they have chosen their supervisors themselves. “We knew who we would be working with,” says Benedikter. In addition, this year they organised a mini-symposium at which they presented their research and they bump into each other in the corridors from time to time. Koelfat: “We’re a group – it feels that way because we all started at the same time and in principle we’ll be finishing together as well. We support each other, although we don’t see each other every week.” This isn’t so much at the level of content; it is more about moral support. Koelfat chuckles: “Then, sighing, we say, ‘We’ve only got two years left!’”

Focus

And that brings the conversation to the lessons learned in the first two years. Koelfat: “At a certain point I wanted to do far too many projects at the same time, but then my supervisor said – and rightly so – ‘Focus’. You’ve only got four years and then you need to deliver a clear answer to a question.” Benedikter: “Your supervisor helps you keep your goals realistic.” Koelfat: “You’re a bit like a young cook who opens a restaurant and has chefs from various restaurants looking over his shoulder.”

Above all Benedikter has learned to deal with frustrations. “You often have a nice hypothesis and all the literature points in one direction; you feel sure that an experiment will deliver a certain result. But when you carry it out you get the opposite, or even worse, nothing happens at all, you become more realistic about what doing research really involves.” Hansen: “I see a PhD research project as being like a big painting. You paint and you think: ‘This is going to be really nice, it’ll be finished in four years and every detail fits perfectly.’ And gradually you see: the bit at the top right doesn’t fit completely yet and you’d do better to cut off the piece at the bottom left because it’s not going to work out. It’s a flexible work of art and you have to learn that it changes over time. It won’t turn out the way you imagined at the start.” Benedikter: “If an experiment doesn’t deliver what it’s supposed to, then it’s up to you to decide when to stop because otherwise it’ll cost you a year.” Van Dijk: “What’s very important for me is to achieve some success in the interim in order to keep going. Because my research is so broad I can always continue with something else if one area isn’t going so well. Above all, I’ve learned to think scientifically. I had already done a fair amount of research, but I’ve become more critical and I now set up my research more thoroughly. At congresses I’m much more critical about other research.

I now see basic mistakes in other people’s results that I didn’t notice before.” Hansen: “You start to feel a sense of responsibility. All the data you send out into the world will be examined by everyone and basically they assume that what you have published is correct. So you also become more critical of your own work.”

Looking ahead

After another two years, the four years will be over. Van Dijk recently had a long talk with his supervisor in which they discussed what has been achieved and what should be realistic to complete before the summer of 2017. “Then the scholarship will really be over, so it’s important to finish then.” Benedikter: “It’s hard to look ahead because you never know how things will go. In the first six months I didn’t look ahead at all, and then the next six months went faster than expected. Sometimes you spend months on something you thought you could complete within three weeks. But I assume that I’ll get it finished on time.”

Koelfat: “A PhD is a process with ups and downs, and you spend most of the last year writing your papers. At the moment I’m still mostly busy collecting lots of samples.” Hansen: “After nine months I had to troubleshoot and remove a large part of my dataset, because unfortunately it didn’t produce anything. Oh well, that’s part of the work,” he laughs nonchalantly. Asked about this, he says: “I’ve got through the denial phase and now I’m in the acceptance phase. It would have been a nice cherry on the cake, but the study still stands.”

Permanent position

For two of the four the future is still not set in stone. Hansen: “I would like to continue doing research, and preferably in this field. I find the subject really interesting and I’ve already invested so much time in it that I’ve become part of the research community. But I don’t know whether this would be at a university or at a company.” Benedikter: “I enjoy doing research and would like to continue for another ten years. I also really like teaching, going to congresses and brainstorming with other scientists. The nice thing about this work is that you are constantly being encouraged to develop your abilities. But the research world is very uncertain, too. I would like to get a permanent position fairly soon, instead of having to move every two years - possibly with a young family - to another post-doc job.”

The ultimate role model for the two soon-to-be surgeons is Steven Olde Damink, who also combines work as a surgeon with a professorship, including a large laboratory and teaching tasks. Van Dijk: “I think that as a doctor you can easily bring research to the clinic

and vice versa, certainly if you've got a basic research background. Many clinics give their doctors time for scientific research, so you don't have to do it all in your own time."

Koelfat: "Although Steven also devotes his day off to science." Van Dijk: "Surgery is becoming ever more specialised: you need to do a minimum number of surgical procedures per year in order to be allowed to carry out a certain procedure, so if you decide to do more science, you have to be careful not to lose too much clinic time."

Koelfat: "Olde Damink is a role model because he seems to have found the balance between many different activities."

- **David van Dijk** (1987) studied medicine and then worked for a year and a half as a resident in the intensive care unit and the surgery department at Atrium MC in Heerlen. In 2013 he was hired at the Surgery Department of the MUMC+ to write a research proposal. The NWO Graduate Programme appealed to him because it offers participants the chance (and encourages them) to work on an interdisciplinary basis. "I work with more sections and departments at NUTRIM than I can count. I consciously chose to do broad research because I want to learn as much as possible in these four years."
Van Dijk is researching the extreme loss of weight and muscle (cachexia) suffered by cancer patients, especially those with pancreatic cancer. He is investigating various points of departure that could explain this extreme cachexia: protein metabolism, bacteria in the intestine, malabsorption and the destruction of fat and muscle cells by tumour cells.
- **Birke Benedikter** (1989) works in the Medical Microbiology and Respiratory Medicine Departments where she researches extracellular vesicles in Chronic Obstructive Pulmonary Disease (COPD); vesicles are small membrane bubbles or blisters secreted by cells which, thanks to their content (proteins, RNA, lipids) can influence the behaviour of other cells. "It has been established that these vesicles contribute to processes of inflammation in the lung such as asthma and sarcoidosis, but little is known so far about their role in COPD." Benedikter hopes to change this situation, for instance by using mass spectrometry. During her graduation internship in the Maastricht research master's in Biomedical Sciences she already worked on a small research proposal while at the Department of Medical Microbiology. "I don't like being told what I should research; I want to determine that myself. And that's something that immediately appealed to me about this scholarship."
- **Jan Hansen** (1986) also did the research master's in Biomedical Sciences in Maastricht, after having attended the Excellence Bachelor's Programme in Molecular Medicine in

Germany and having worked as an analyst for a year and a half. During his graduation internship with Prof. Patrick Schrauwen he studied metabolic disruptions in diabetes sufferers. Now, as part of the Human Biology Department, he is investigating whether these disruptions are related to the biological clock and whether this interaction can cause obesity and type 2 diabetes. "Over the last hundred years this clock has had to deal with the changes in lifestyle, such as 24/7 lighting, more food and less exercise. If you force mice to eat during the inactive phase of the day, for instance, then they get fatter than the mice who receive the same calories in the active phase.

I'm researching how the cell can use this clock to switch metabolic processes on and off as required. And which genes in that process can be related to target genes which we know are disrupted in obesity and type 2 diabetes." He is working at both the cellular level and with human studies.

- **Kiran Koelfat** (1985) completed the four-year Doctor-Clinical Investigator (AKO) master's in Maastricht. "I always wanted to be a doctor, but it was only through research activities during my bachelor's that I also became interested in research." The combination of clinical work and science is also reflected in his research subject. He is investigating the consequences of disrupted bile salt signalling for intestinal and liver function in patients with a perturbed enterohepatic cycle (the circulation of, among other things, bile salts between the intestine and the liver). Bile salts carry out important signalling function by activating nuclear and membrane-bound bile salt-sensing receptors present in both the small intestine and the liver. An interruption of this cycle causes intestinal and liver dysfunction, especially in patients with intestinal failure (short bowel and enterocutaneous fistulas). During his master's internship he discovered in a surgical animal model of an interrupted enterohepatic cycle that the activation of a bile salt receptor prevents liver damage and reduces the loss of intestinal fluid. In his PhD research project he hopes to translate this knowledge to the level of the patient by testing the concept in a relevant patient population.

Awards

Awards and personal grants

Coby van den Bool

Mariëtte Boon

Bram van den Borst

Christopher McCrum

Marlou Dirks

Gijs Goossens

Jessica Gubbels

Tim Hendrikk

Joris Hoeks

Boris Kingma

Kiran Koelfat

Ireneffleur Kramer / Martijn Poeze

Emmani Nascimento

Michiel Oosterwaal

Wim Saris

Dirk Schellekens and Givan Paulus

Lisje Schellen

Rutger Schols

Esther Sleddens

TIFN project team incl.

Frederik-Jan van Schooten

and Diasy Jonkers

Mireille Stijns

Carmen Veith

Carmen Veith

Luuk de Wert

ESPEN (European Society for Clinical Nutrition & Metabolism) Research Fellowship 2014

ZonMW Rubicon Award for research 'Becoming slimmer with fat'

NRS (Netherlands Respiratory Society) Swierenga Thesis Award 2014

Kootstra Talent Fellowship 2014 for talented PhD Student

ECSS (European College of Sport Science) Young Investigators Award

EFSD (European Foundation for the Study of Diabetes) - Novo Nordisk Rising Star Fellowship 2014

Veni Award for research 'A bigger picture: applying the ecological perspective to childhood overweight'

Kootstra Talent Fellowship 2014 for talented Postdoc

Vidi Award for research 'The Might of MicroRNA in Muscle Mitochondrial Metabolism'

2014 Temperature Young Investigator Award for the Best Paper on Thermal Physiology in a Changing Thermal World

NVGE (Netherlands association for Gastro-Enterology) Gastrostart subsidy

OTC grant 'Muscle atrophy in hip fractures'

DFN (Dutch Heart Foundation) - pilot grant

VvBN (Netherlands Society for Kinesiology) PhD Day Presentation Prize Human Movement Sciences

Royal Honour: Prof. saris was awarded a royal decoration at the occasion of his farewell lecture.

Prof. Saris was appointed Officer in the Order of Orange Nassau foto lintje opspelden

Maastricht UMC+ Science Day Poster Award

B.J. Max Prijs - TVVL Platform for Man and Technology

NVEC (Dutch Association for Endoscopic Surgery) Innovation Prize

NHS (Netherlands Heart Foundation) - Stipend Junior Postdoc

Joop Roels Impact Award 'Validation of biomarkers'

Kootstra Talent Fellowship 2014 for talented PhD Student

Unilever Research Prize 2014

Kootstra Talent Fellowship 2014 for talented PhD Student

Kootstra Talent Fellowship 2014 for talented PhD Student



Figures

Resources and funding

Three types of funding are distinguished. Direct funding originates from the central means of the University as provided by the government. Research funds comprise funding (received in competition) from national science foundations and governmental organizations such as NWO, STW, and KNAW. Finally, NUTRIM has contracts with third parties for specific (contract) research activities (industry, EU programmes) and project funding by charities. This also includes to some extent (relatively small) income from licenses on intellectual property of the University and royalties in relation to marketing of related products. Every year a significant part of NUTRIM's research programme is financially supported by external funding.

Funding 2014 at institutional level (in k€ and in % per year)

Funding	k€	%
Direct funding	€ 4,565	28%
Research funds	€ 1,643	10%
Contracts	€ 10,149	62%
Total	€ 16,356	100%

Input figures of scientific staff in fte as per 31 December 2014

Department	Direct funding		Research funds	Contracts	Total
	FHML	azM			
Anatomy & Embryology	0,25				0,25
Bioinformatics	2,00			1,25	3,25
Central Diagnostisch Lab		0,65			0,65
Genetics & Cell Biology	1,80		1,10	0,80	3,70
Health Promotion	1,30	1,50	1,00	2,20	4,50
Human Biology	6,10		1,80	5,00	12,90
Human Movement Sciences	2,50		1,00	2,80	6,30
Imaging incl. Nuclear medicine and Radiology	0,20	0,43		2,00	2,63
Internal Medicine	1,90	1,70		2,40	6,00
Medical Microbiology	0,80	0,20		0,20	1,00
Ophthalmology		0,20			0,20
Paediatrics		1,30	0,20		1,30
Pharmacology & Toxicology	3,91			2,50	6,41
Plastic Surgery		0,20			0,20
Respiratory Medicine	2,20		0,55	1,75	4,50
Surgery	1,95	2,15		2,30	4,10
Total	24,91	6,83	5,45	20,70	57,89

Output figures

The total number of full articles published in (Social) Science Citation indexed Journals was 435. NUTRIM publications are in various scientific domains listed in the table on the right. The scores in the figure represent the average impact factor*) of NUTRIM-publications in a domain versus the average impact factor*) of the journals in the domain. The schedule below shows that the average impact factors*) of NUTRIM-publications all domains are higher than the average of each domain.

*) Impact factors of 2013

Apart from publications in SCI-SSCI indexed Journals, NUTRIM researchers published 99 publications in non-SCI-SSCI indexed journals, in national journals, as also book chapters, books and other professional output, 32 letters to editor / editorials in SCI-SSCI indexed Journals and 47 theses.

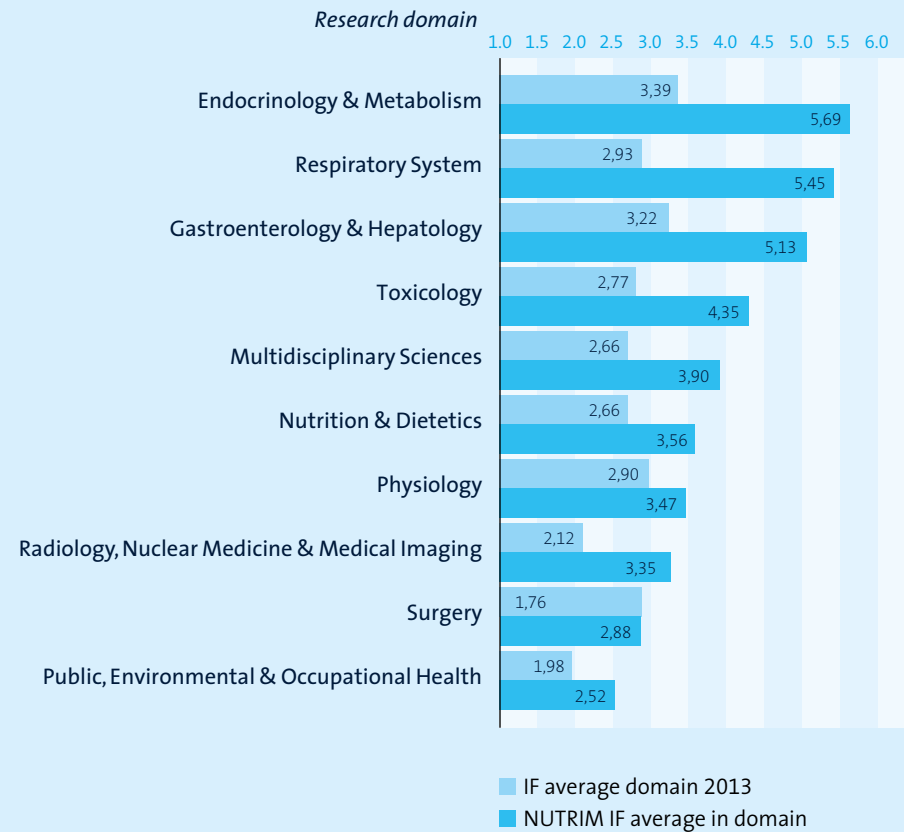
Societal impact and relevance

NUTRIM researchers are often in the news. They are interviewed for radio, television, newspapers, internet platforms, etc., in the Netherlands as well as abroad. They are also invited for lectures.

For an overview of media contacts in 2014 go to:

<http://www.maastrichtuniversity.nl/web/file?uuid=3c248d7b-ef91-472d-ba95->

NOTE: document in Dutch



Figures

NUTRIM Top publications

Percentage of NUTRIM publications in journals ranked Top 1 (top percentile), Top 10 (top decile) and Top 25 (top quartile) in corresponding domains:

Top 1	Top 10	Top 25
3.4%	28.7%	66.2%
Average if: 13.967	Average if: 7.181	Average if: 5.227
Highest if: 54.420	Highest if: 54.420	Highest if: 54.420
Lowest if: 2.927	Lowest if: 1.944	Lowest if: 1.944

For all NUTRIM 2014 publications go to:

www.maastrichtuniversity.nl/web/institutes/fhml/nutrim/publications.htm

List of research projects

List of research projects started in 2014

Project leader

Support > € 500,000

Willighagen E.
Schols A.M.
Schols A.M.
Loon van L.J.C.
Loon van L.J.C.
Hoeks J.

Title of research

e-NanoMapper - A database and ontology framework for Nanomaterials design and safety assessment
Sarcopenia and Physical frailty IN older people: multi-component Treatment strategies - SPRINTT
Eat Well Beats Globesity
Active aging
Defining the best dairy protein to facilitate post-exercise muscle protein synthesis
The Might of MicroRNA in Muscle Mitochondrial Metabolism / Vidi

subsidy/grant obtained from

EU
IMI
MUMC+
TI Food and Nutrition
Industry
ZonMw

Support € 200,000 - € 500,000

Bast A.

Risk communication

the Netherlands Food and
Consumer Product Safety Authority
Weijerhorst Foundation
TIFN
Dutch Digestive Foundation

Bergh van den J.P.W.
Blaak E.
Derikx J.

Various research projects on metabolic bone diseases, biomechanics and osteoporosis
Effect of prebiotic fibres on intestinal Health and Functioning
The role of digestive enzymes and protease-activated receptor-2 in the pathophysiology of human
intestinal ischemia-reperfusion and pancreatitis

NWO Social Sciences
Dutch Heart Foundation
CZ Insurance Company
RVO-NL

Gubbels J.S.
Kremers S.P.J.
Kremers S.P.J.
Marken Lichtenbelt van W.D.
Schols A.M.W.J.
Schooten F.J.
Schrauwen P.
Schrauwen P.
Zeegers M.P.A.

A bigger picture: applying the ecological perspective to childhood overweight
The context of childhood overweight: How parenting contributes to energy balance
Life style coach
Towards real energy performance and control by predicting monitoring, comparing and controlling
Synergy between Experimental research and Medical excellence to outweigh Cancer Cachexia
Topography of smoking and smoke components exposure as assessed by biomarkers in human smoking trials
Metabolic flexibility
Metabolic Homeostasis and mental and physical fatigue
Sound Science: Selective citation in science based decision-making

Maastricht UMC+
RIVM
Industry
Industry
CEFIC

Support € 100,000 - € 200,000

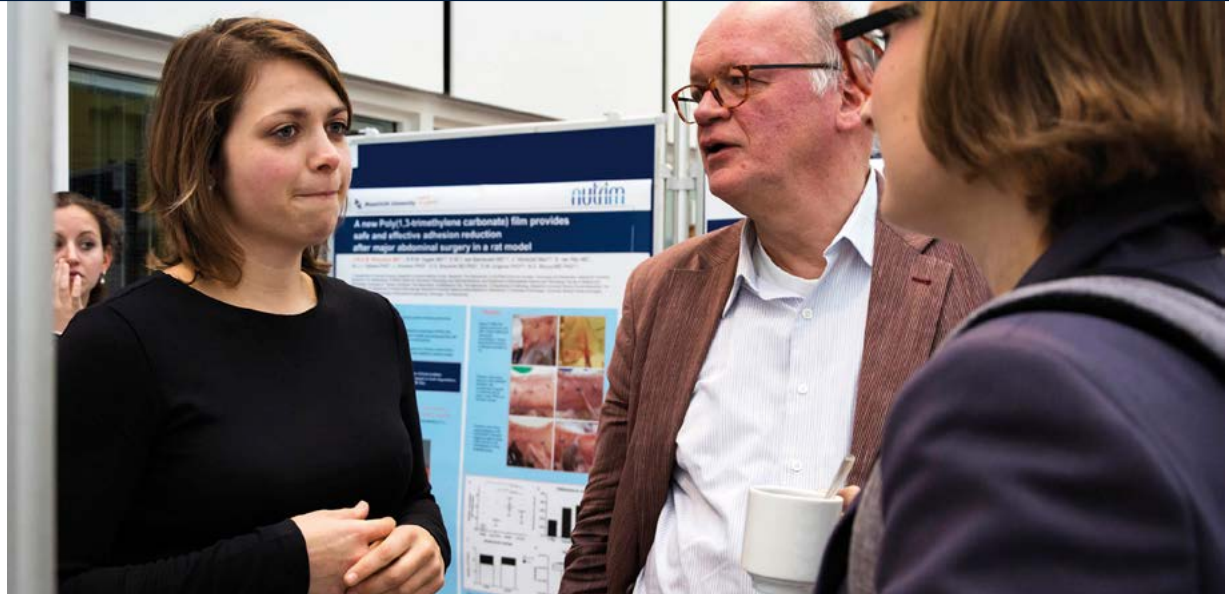
Blaak E.
Bouvy N.D.
Keszthelyi D.
Mariman E.
Masclée A.A.M.
Meijer K.

MIRDIET: Molecular biomarkers of food intake
New strategies to prevent anastomotic leakage after colorectal surgery
Research into visceral pain perception with high resolution fMRI
Lipid screening in (bio)materials by mass spectrometry
Gastrointestinal Health / Barrier and Immune
ADAPT. Adaptation profile to optimise interaction between user and arm orthosis

ZonMw
azM
Sint Annadal Foundation
ET
TI Food and Nutrition
STW

List of research projects started in 2014

<i>Savelberg H.H.C.M.</i>	SIT LESS3: The effect of low intensity physical activity on insulin sensitivity, mood and cognitive performance	Industry
<i>Schols A.M.W.J. / Remels A.</i>	Inactivation of GSK-3 β : A breath of fresh air in the regulation of skeletal muscle oxidative phenotype	Lung Fund
<i>Zeegers M.P.A.</i>	Diet, smoking and surviving bladder cancer: the Bladder Cancer Prognosis Programme	NUTRIM
<i>Zeegers M.P.A.</i>	Sound Science: Determinants of protocol provision, quality and concordance, an application within the research of phthalates	ECPI
Support < € 100,000		
<i>Blaak E.E.</i>	Targeting adipose tissue oxygen tension to improve insulin sensitivity in humans	
<i>Brouns F.J.P.H.</i>	Building European governance on overweight and obesity: political, legal and scientific perspectives	SWOL / NRF
<i>Keszthelyi D.</i>	EMS Pain measurement in IBS	Industry
<i>Kooman J.P.</i>	New methods for detoxification of blood: opening pathways to easier, safer, smaller and ultimately portable artificial kidney systems	Dutch Kidney Foundation
<i>Marken Lichtenbelt van W.D. / Boon M.</i>	Becoming slimmer with fat	NWO Rubicon Programme
<i>Meijer K.</i>	Active Health	OPZuid
<i>Meijer K.</i>	MOTEK: CAREN: Computer-assisted environment movement system ('Flight simulator') - 0,3 fte. technician support salary (L1 News item 14 October – in Dutch) http://www.mumc.nl/actueel/mumc-tv/3854451821001-flight-simulator-voor-maastricht-umc	Maastricht UMC+
<i>Mensink R.P.</i>	Food Biomarkers Alliance	ZonMw
<i>Olde Damink S.W.M.</i>	Molecular profiling by imaging mass spectrometry & development of temperature controlled sample sprayer	Province of Limburg
<i>Pierik M.J.</i>	Integrated care for inflammatory bowel disease patients in the Netherlands with the novel telemedicine tool myIBDcoach: a randomized controlled trial	azM Academic Foundation
<i>Pierik M.J.</i>	Diagnostic and prognostic biomarkers for inflammatory bowel disease	EU
<i>Poeze M. / I. Kramer</i>	Muscle atrophy in hip fractures	OTC Foundation
<i>Savelberg H.H.C.M.</i>	Improving the cost-effectiveness of therapeutic shoes for diabetic patients with a previous foot ulcer using an in-shoe pressure device	Industry
<i>Savelberg H.H.C.M.</i>	Effect of sitting less on glucose regulation in type 2 diabetes patients	Industry
<i>Schaap F.G.</i>	Effect of rifampicin on bile salt secretion; a PET-CT study in volunteers as prelude towards treatment of post-resectional secretory liver failure	Gastrostart
<i>Schols A.M.W.J.</i>	Nitrate supplementation to improve metabolic efficiency and enhance exercise training in patients with COPD	Espen
<i>Schrauwen P.</i>	Enhanced glucose clearance via bone morphogenetic protein 9 (BMP9) mediated activation of human brown adipose tissue metabolism in type 2 diabetes	Dutch Diabetes Fund
<i>Sverdlov R.</i>	Evaluation and validation of cathepsins as a biomarker for NASH	CTMM
<i>Zeegers M.P.A.</i>	Nutritional influence in early life and cognitive development of adolescents: the Maastricht Essential Fatty Acid Birth Cohort (MEFAB)	SWOL / NRF



Thesis defences and careers

Thesis defences and careers of finished PhD Students

In 2014 the unprecedented number of 47 theses was delivered. All PhD Students found jobs.

Employment after thesis defence:

Working in a scientific (and or clinical) setting in The Netherlands:	66%
Working in a scientific (and or clinical setting) setting abroad:	19%
Working in a non-scientific setting in The Netherlands:	11%
Working in a non-scientific setting abroad:	4%

Elhaseen Elamin

Present occupation: Postdoc at Maastricht University, NUTRIM, Department of Internal Medicine

Supervisor: Prof. Dr. A.A. Masclee

Thesis defence: 23 January

Title: **Ethanol and intestinal barrier: human intervention and mechanistic in vitro studies**

The main goals of the studies described in this thesis were to evaluate effects of moderate ethanol intake on small and large intestinal permeability in humans, and to study effects of ethanol and its metabolites including acetaldehyde and fatty acid ethyl esters (FAEEs) on intestinal epithelial barrier function, aiming to elucidate possible mechanisms in vivo and in vitro. The studies described in this thesis support the rationale for investigating effects of moderate ethanol intake and its oxidative and non-oxidative metabolites on intestinal epithelium. Although results were obtained in vitro, this thesis shows beneficial effects for the products of non-digestible fermentable dietary fibres SCFAs as preventive tools against ethanol-related barrier dysfunction. Studies addressing effects of

moderate ethanol consumption and its metabolites including acetaldehyde and FAEEs on intestinal barrier and the protective factors are critically important in the investigations toward the search of preventive and therapeutic strategies for ALD.

Anja Rosenow

Present occupation: Analytical Development Specialist at Genzyme, Antwerp Area, Belgium

Supervisors: Prof. Dr. E.C.M. Mariman, Dr. J.W. Renes

Thesis defence: 7 February

Title: **Identification and regulation of (novel) human adipokines: a proteomic approach**

Sanne Gerards

Present occupation: Postdoc at Maastricht University, NUTRIM, Department of Health Promotion

Supervisors: Prof. Dr. N.K. de Vries, Prof. Dr. S.P.J. Kremers, Prof. Dr. P.C. Dagnelie

Thesis defence: 12 February

Title: **Childhood obesity prevention; Rationale, implementation and effectiveness of the Lifestyle Triple P intervention**

This PhD research shows that parents play an important role in the development of childhood obesity. Parents of obese children are often unaware of their child's overweight, and they experience more problems raising their children. Children who are raised with both strict and involved styles eat healthier, are more physically active and weigh less. Furthermore, an intervention to prevent further weight gain in obese children (Lifestyle Triple P) was evaluated. This intervention is based on the Positive

Pedagogic Programme (Triple P) and is aimed at parents of obese children aged 4-8 years. Half of the 86 families participating received the intervention, which included group sessions and individual sessions by telephone addressing three themes: parenting, nutrition and physical exercise. The control group only received brochures on these themes. Although the intervention showed positive effects on both children and parents' behaviour, such as soft drink consumption, it proved to be ineffective in reducing further weight gain.

Madhu Katika

Present occupation: Senior Scientist at Twente University, The Netherlands

Supervisors: Prof. Dr. J Kleinjans, Prof. Dr. H. van Loveren, Dr. A. Peijnenburg (RIKILT), Dr. P.J. Hendriksen

Thesis defence: 12 February

Title: **Application of toxicogenomics to study direct immunotoxicants**

Caroline Khalid - de Bakker

Present occupation: Resident at Spitalzentrum Biel, Switzerland

Supervisors: Prof. Dr. A.A. Masclee, Prof. Dr. R. Stockbrügger, Dr. D. Jonkers

Thesis defence: 12 February

Title: **'Screening modalities for colorectal cancer: Results from a workplace based cohort in the Netherlands'**

Population screening by means of the faecal occult blood test (FOBT) was launched in the Netherlands in January 2014, making colorectal cancer screening a highly topical subject. Early detection of tumours and their pre-stages

s of finished PhD Students

(intestinal polyps) by means of the faecal test and colonoscopy can dramatically reduce the incidence and mortality of colorectal cancer. In the Netherlands, 2400 lives could be saved. This dissertation investigates the feasibility and diagnostic benefits of screening via colonoscopy in a defined population group. It also evaluates alternative screening methods, such as an immunological FOBT (FIT), lifestyle/risk factors and sigmoidoscopy. Further, faeces and blood were collected to identify and evaluate non-invasive markers for adenomas and/or colorectal cancer, as it is important to minimise patient discomfort and stress during examinations as far as possible.

Jennifer Ather

Present occupation: Lab Manager at the Department of Medicine, University of Vermont, USA

Supervisors: Prof. Dr. E.F. Wouters, Dr. Y. Janssen-Heininger, University of Vermont, USA

Thesis defence: 13 February

Title: [The epithelial-dendritic cell interface in pulmonary disease](#)

Asthma affects millions of people worldwide, and the incidence of this multi-faceted syndrome continues to rise. This thesis investigates the role of airway epithelial cells, which first encounter inhaled particles and pathogens, in the modulation of immune cell activities. The results demonstrate that specific airway epithelial signalling molecules orchestrate the downstream responses of innate and adaptive immune cells, thereby regulating pulmonary inflammation, the development of allergic asthma, and even the response to corticosteroids, a common treatment for asthma. This suggests that manipulation of a single cell type

in the lung could have multiple effects for the control of pulmonary disease.

Elisabeth Romme

Present occupation: Staff member of Ciro Horn

Supervisors: Prof. Dr. E.F.M. Wouters, Prof. Dr. F.W.J. Smeenk (Catharina Hospital Eindhoven), Dr. E. Rutten (Ciro Horn)

Thesis defence: 20 February

Title: [Bone imaging and strength in chronic obstructive pulmonary disease](#)

Chronic obstructive pulmonary disease (COPD) is a lung disease predominantly caused by smoking. COPD patients often suffer from osteoporosis and arteriosclerosis. This PhD dissertation describes a new method for the assessment of osteoporosis on chest computed tomography. Chest computed tomography is also used to assess arteriosclerosis. The study results show a relation between osteoporosis and arteriosclerosis. They also show that arteriosclerosis is an accurate predictor of death. This thesis finds that chest computed tomography provides information not only on pulmonary disorders, but also on non-pulmonary disorders, such as osteoporosis and arteriosclerosis.

Anke van Summeren

Present occupation: Project Engineer Basic Research at Estee Lauder Companies, Liège Area, Belgium

Supervisors: Prof. Dr. E. Mariman, Prof. Dr. J. Kleinjans, Dr. J. Renes

Thesis defence: 12 March

Title: [Proteomics investigations; Towards mechanisms and biomarkers for drug-induced hepatotoxicity](#)

Darren Booij

Present occupation: Plastic Surgeon at Orbis Medical Centre, Sittard and at Clinic Valkenhorst, Valkenburg a/d Geul

Supervisor: Prof. Dr. R.R.W.J. van der Hulst

Thesis defence: 14 March

Title: [Partial flap loss and fat necrosis in autologous breast reconstruction](#)

Stefania Tuinder

Present occupation: Staff member of Maastricht UMC+, Department of Plastic Surgery

Supervisors: Prof. Dr. R.R. van der Hulst, Dr. D.A. Lataster

Thesis defence: 14 March

Title: [Anatomical, radiological and clinical findings on perforator flaps](#)

Pieter Hoogland

Present occupation: Medical doctor at the Department of Surgery, Zuyderland Medical Centre, Heerlen

Supervisor: Prof. Dr. L.W.E. van Heurn

Thesis defence: 28 March

Title: [Kidney transplantation from donors after cardiac death](#)

Maurice Sillen

Present occupation: Physiotherapist / Project leader at Ciro Horn

Supervisors: Prof. Dr. E.F. Wouters, Dr. M.A. Spruit, Dr. F. Fransen (CIRO+BV Horn)

Thesis defence: 10 April

Title: [Neuromuscular electrical stimulation in dyspneic COPD patients: a new training modality](#)

This PhD dissertation focuses on neuromuscular electrical stimulation (NMES) and muscle strength training used as training forms for patients with chronic obstructive pulmonary disease (COPD) characterised by severe shortness of breath and muscle weakness. The effects of two different forms of NMES (high-frequency, HF-NMES and low-frequency, LF-NMES) and muscle strength training are compared with each other. In total, 120 subjects participated in this study. There was an increase in maximum muscle strength in patients in the HF-NMES group and the muscle strength training group, whereas there was no increase in the LF-NMES group. Endurance and quality of life increased in all groups. Moreover, these forms of muscle training have a minimal impact on these patients' respiratory system.

Menno Slingerland

Present occupation: Teacher at Fontys Sport-Hogeschool, Maastricht

Supervisors: Prof. Dr. M.K.C. Hesselink, Dr. L. Borghouts (Fontys Hogeschool / University Eindhoven)

Thesis defence: 16 April

Title: [Physical education's contribution to levels of physical activity in children and adolescents](#)

Physical education can play a potentially important role in stimulating children and adolescents to exercise more. Children spend a large part of their youths at school, where physical education is compulsory. This study shows that physical education is responsible for roughly one-third of the daily exercise requirements and that teachers could intensify this relatively easily, thereby leading to a higher contribution. An important objective of physical education is to motivate students to continue exercising throughout their lives. This dissertation proves that, as it is being

offered now, physical education does not necessarily achieve this.

Marjet Munsters

Present occupation: Start-up Clinical Research Associate at PPD (Research & Development in health and nutrition), Bennekom, The Netherlands

Supervisor: Prof. Dr. W.H.M. Saris

Thesis defence: 17 April

Title: [Dietary strategies to modulate the metabolic profile and substrate partitioning](#)

Jeroen Heemsker

Present occupation: Gastro-intestinal, Laparoscopic Surgeon at Laurentius Hospital, Roermond

Supervisors: Prof. Dr. C.G.M.I. Baeten, Prof. Dr. N. Bouvy

Thesis defence: 16 May

Title: [Robot-assisted laparoscopic surgery](#)

Laparoscopic surgery is designed to be minimally invasive for patients to ensure a faster recovery time. These surgeries, however, can be technically challenging. A surgical robot was therefore developed to assist the surgeon during the operation.

This study tested a daVinci robot in Maastricht. The use of a surgical robot in a laboratory (test) setting led to faster and more precise suturing, among other things. Its use in the operating room, however, was less beneficial: the robot was expensive and slow and did not lead to a better surgical outcome. For now, it seems that the daVinci robot offers little added value in a surgical setting.

Celine op den Kamp

Present occupation: Resident General Practitioner at Maastricht UMC+

Supervisors: Prof. Dr. A.M.W.J. Schols, Dr. A.C. Dingemans, Dr. R. Langen

Thesis defence: 16 May

Title: [Cachexia in patients with non-small cell lung cancer](#)

Cancer cachexia is a paraneoplastic feature that frequently occurs in patients with non-small cell lung cancer (NSCLC). Progressive body weight loss and disproportionate wasting of skeletal muscle are the most distinct characteristics of the syndrome. The presence of cancer cachexia is associated with major negative consequences, i.e. low tolerance and responsiveness to anti-tumour therapy, decreased muscle performance, declined quality of life and a significant increase in cancer-related mortality. Currently, no effective therapeutic intervention can prevent or reverse these negative consequences of cancer cachexia. Although studies in experimental cancer cachexia have increased our understanding on putative molecular mechanisms that lie at the basis of cancer cachexia, most of these findings remain to be validated in the different stages of cancer cachexia in the clinical setting. The current dissertation provides a comprehensive characterization of phenotypic aspects and molecular signatures of muscle atrophy involved in progressive stages of cachexia in patients with non-small cell lung cancer (NSCLC).

Fahad Gulraiz

Present occupation: Postdoc at Maastricht UMC+, Department of Medical Microbiology

Supervisors: Prof. Dr. C.A. Bruggeman, Dr. F. Stassen

Thesis defence: 22 May

Title: [Exogenous interferons for the prevention of respiratory viral infections: Evaluation of different aspects in vitro](#)

Bas van Bussel

Present occupation: Resident Internal Medicine at Maastricht UMC+

Supervisors: Prof. Dr C.D.A. Stehouwer, Dr. C.G. Schalkwijk, Dr. R.M.A. Henry

Thesis defence: 28 May

Title: [Endothelial dysfunction and low-grade inflammation: determined by diet and cause of arterial stiffness](#)

A healthy diet prevents cardiovascular disease from developing. Endothelium, a thin layer of cells lining the interior surface of blood vessels, plays an important role in the development of cardiovascular disease. This PhD dissertation investigates young, old, healthy and sick populations, and shows that a healthy daily diet (rich in fish, fruit, vegetables, low-fat dairy products and with moderate alcohol consumption) keeps endothelium “healthy”. This thesis, therefore, provides insight into the relation between diet and the development of cardiovascular disease and reveals the role of endothelium in particular.

Jan-Willem van Dijk

Present occupation: Teacher at HAN University, Nijmegen, The Netherlands

Supervisor: Prof. Dr. L.J.C. van Loon

Thesis defence: 5 June

Title: [Exercise strategies to optimize glycaemic control in type 2 diabetes](#)

This dissertation describes a series of experiments aimed at evaluating the modulatory effect of different exercise characteristics on glycaemic control. The volume of exercise (or exercise dose) is postulated as the main factor driving the subsequent improvements in glycaemic control. The other exercise characteristics, including the type, intensity, duration, and frequency of exercise, can be used to tailor exercise programs to the needs and capabilities of the individual patient with type 2 diabetes. In addition to structured exercise, also non-exercise physical activities, such as activities of daily living, are shown to be effective in improving glycaemic control. The novel information described in this dissertation can be used to optimize exercise therapy in the prevention and treatment of type 2 diabetes.

Max Moalin

Present occupation: Teacher at Zuyd Hogeschool / University, Heerlen, The Netherlands

Supervisors: Prof. Dr. A. Bast, Dr. G.R.M. Haenen, Dr. G.P.F. Strijdonck (Zuyd HS)

Thesis defence: 11 June

Title: [Quercetin and its methylated metabolites: the chemical basis of activity](#)

Matthew Randall

Present occupation: Postdoctoral Associate at the University of Vermont, College of Medicine, Burlington, Vermont

Supervisors: Prof. Dr. A. Bast, Dr. G.R.M. Haenen, Dr. A. van der Vliet (Un. of Vermont)

Thesis defence: 25 June

Title: [The selective toxicity of acrolein](#)

Acrolein, as an exogenous pollutant found in cigarette smoke, is commonly associated with cigarette smoke-related diseases. To design more efficacious therapeutics for this set of diseases we must understand how acrolein affects cellular physiology and manifested pathological conditions. The aim of this research was to further identify a role for acrolein in pathophysiology of cigarette smoke-related lung disease. In this thesis we identified that: (1) Acrolein not only directly promotes pro-inflammatory gene expression but also, indirectly via inhibition of glucocorticoid signalling; (2) Thioredoxin reductase alkylation by acrolein has a direct impact on the activation of mitogen activated protein kinases (MAPKs); (3) The ability for our cells to adapt to environmental toxins (such as acrolein) demonstrates their dynamic nature and flexibility; and (4) Protein alkylation by acrolein may reflect a reversible signalling mechanism rather than irreversible protein damage. Researchers are now challenged with rethinking how thiol-reactive compounds affect proteins and cell signalling pathways as well as how potential repair mechanisms and adaptation influence disease pathogenesis.

Bob Touwslager

Present occupation: Resident Paediatrics at Maastricht UMC+

Supervisors: Prof. Dr. L.J.I. Zimmermann, Prof. Dr. C.D.A. Stehouwer, Dr. A.L.M. Mulder,

Dr. M. Gielen

Thesis defence: 27 June

Title: [Short- and long-term cardiometabolic consequences of infant growth: size matters](#)

In this thesis, the ‘developmental origins of health and disease’ hypothesis is studied in healthy term children from birth to the age of two years in the context of endothelial function.

It was shown that accelerated growth is associated with impairment of endothelial function. This is supportive of a possible harmful role for accelerated infant growth in the development of later cardiometabolic diseases. Second, in a series of twin studies, the determinants and heritability of early growth were studied. In these twins the role of genetic and environmental factors in the associations between early life factors and later cardiometabolic diseases was furthermore examined in detail.

Eline van Ewijk

Present occupation: Postdoc at Maastricht University, NUTRIM, Department of Human Biology

Supervisors: Prof. Dr. P. Schrauwen, Dr. V. Schrauwen-Hinderling, Dr. E. Kooi

Thesis defence: 1 July

Title: [Magnetic resonance imaging and spectroscopy: a non-invasive window into lipotoxicity](#)

In obese people, fat also accumulates in non-adipose tissues (ectopic fat accumulation). This could cause adverse effects (lipotoxicity), which could play an important role in the development of chronic diseases, such as diabetes. This dissertation researched the relationship between ectopic fat accumulation, mitochondrial function in the heart and liver, and cardiac function using non-invasive magnetic resonance techniques (MR). We explain the complicated relationship between ectopic fat accumulation, mitochondrial function and organ function, which depend on the organ itself and the time the measurement is performed.

Els de Smet

Present occupation: Quality Control at Sharp Packaging Solutions, Antwerp, Belgium

Supervisors: Prof. Dr. J. Plat, Prof. Dr. R.P. Mensink

Thesis defence: 2 July

Title: [Plant stanol esters : focus on intestinal lipoprotein metabolism](#)

Plant sterols and stanols are natural food ingredients found in plants. It was already shown in 1950 that they lower serum low-density lipoprotein cholesterol (LDL-C) concentrations. Meta-analysis has reported that a daily intake of 2.5 g plant sterols/stanols reduced serum LDL-C concentrations up to 10%. Despite many studies, the underlying mechanism remains to be elucidated. Therefore, the proposed mechanisms that have been presented over the past decades will be described and discussed in the context of the current knowledge. In the early days, it was suggested that plant sterols/stanols compete with intestinal cholesterol for incorporation into mixed micelles as well as into chylomicrons. Next, the focus shifted toward cellular processes. In particular, a role for sterol transporters localized in the membranes of enterocytes was suggested. All these processes ultimately lowered intestinal cholesterol absorption. More recently, the existence of a direct secretion of cholesterol from the circulation into the intestinal lumen was described. First results in animal studies suggested that plant sterols/stanols activate this pathway, which also explains the increased faecal neutral sterol content and as such could explain the cholesterol-lowering activity of plant sterols/stanols.

Mariëlle Bouwens

Present occupation: Resident Gastroenterology at Maastricht UMC+

Supervisors: Prof. Dr. A. Masclee Dr. S. Sanduleanou

Thesis defence: 4 July

Title: [The serrated lesion: endoscopic characterization and clinical implications](#)

Colonoscopies may be used to detect and remove colon polyps, therefore preventing polyps with malignant characteristics from developing into colon cancer. This thesis shows that some of the 'serrated polyps', although previously considered to be benign polyps, do have the potential to develop into colon cancer. This thesis describes the endoscopic characteristics of and risk factors associated with serrated polyps in order to allow these polyps to be accurately identified. Furthermore, gastroenterologists carrying out endoscopies are found to be able to differentiate benign from malignant polyps in an accurate and correct way when examining the colon. In the long term, this may prove to be cost effective as it will no longer be necessary for pathologists to evaluate all polyps as is the case at present.

Celien Vreuls

Present occupation: Pathologist at Amphia Ziekenhuis, Breda, The Netherlands

Supervisors: Prof. C.H.C. Dejong, Dr. A. Driessen, Dr. G. Koek, Prof. S. Olde Damink

Thesis defence: 4 July

Title: [Sinusoidal obstruction syndrome: a multidisciplinary approach](#)

Christina Bosetti

Present occupation: Researcher at Istituto di Ricerche Farmacologiche 'Mario Negri', Milan, Italy

Supervisors: Prof. Dr. M.P.A. Zeegers, Dr. C. La Vecchia, Istituto di Ricerche Farmacologiche 'Mario Negri'

Thesis defence: 3 September

Title: [Epidemiology of pancreatic cancer: a global approach](#)

Samefko Ludidi

Present occupation: Scientific Health Consultant at Health by Science Company and at Maxima Medical Centre, Veldhoven, The Netherlands

Supervisors: Prof. Dr. A.A. Masclee, Dr. D. Jonkers, Dr. J. Conchillo

Thesis defence: 3 September

Title: [Clinical aspects of irritable bowel syndrome, with a special focus on visceral hypersensitivity and intestinal permeability](#)

Charlotte de Jonge

Present occupation: Surgical Resident at Zuyderland Medical Centre, Sittard

Supervisors: Prof. Dr. W.A. Buurman, Prof. Dr. N. Bouvy, Prof. Dr. J.W. Greve (Atrium), Dr. S.S. Rensen

Thesis defence: 5 September

Title: [Endoscopic treatment of obesity and metabolic disorder; Basic and clinical studies on the effect of the Duodenal-jejunal Bypass Liner](#)

The number of people who are overweight is increasing rapidly, as is the number of diseases associated with overweight such as diabetes and fatty liver disease. Weight loss surgery has been performed as a treatment for severely overweight individuals for many years. Recent research into

less invasive techniques resulted in the Duodenal-jejunal Bypass Liner (DJBL). This involves placing a flexible Teflon tube in the small intestine, just beyond the stomach, using laparoscopic surgery. This tube separates the flow of food from the digestive juices, thus delaying digestion. The DJBL is a highly promising technique: the study showed that patients treated with this technique lost weight and that their diabetes and fatty liver disease improved.

Ronald van Dam

Present occupation: Consultant / HPB Surgeon at Maastricht UMC+, Liver, pancreatic and minimal invasive surgery

Supervisors: Prof. Dr. C.H.C. Dejong, Prof. Dr. S.W. Olde Damink

Thesis defence: 12 September

Title: [Clinical optimization in liver surgery](#)

Susan Keino

Present occupation: Nutrition Educator at Moi University, School of Public Health, Kenya

Supervisors: Prof. Dr. H.W. van den Borne Dr. G. Plasqui

Thesis defence: 1 October

Title: [The double burden of malnutrition: A study of food security, physical activity and nutritional status among women and children in Narok Country, Kenya](#)

There is a growing concern over the increasing number of overweight in sub-Saharan Africa. Africa is still struggling with persistent food insecurity, hunger and undernutrition. Therefore the coexistence of both over and under nutrition – the Double burden of malnutrition is posing a challenge to policy makers. This study assessed the prevalence and risk factors of malnutrition among women and children

(<5yrs), assessing food insecurity, physical activity and body composition and the impact of physical activity and food insecurity on pregnancy outcomes. Over 70% of the household were categorized as food insecure, 5.6% of the women were underweight and over 35% were overweight. The activity levels among women were mainly sedentary and light (44.5% and 48.7% respectively). There is need for physical activity programs and nutrition education to curb growing numbers of overweight.

Jochen Raimann

Present occupation: Senior Principal Scientist at Renal Research Institute, New York

Supervisors: Prof. Dr. J. Kooman, Prof. Dr. P. Kotanko, New York Prof. Dr. N. Levin, New York, Dr. F. van der Sande

Thesis defence: 2 October

Title: [Clinical relevance of dialysate constituents in haemodialysis treatment: Focus on sodium and glucose](#)

For patients suffering from renal failure renal replacement therapy by means of dialysis is a life-saving procedure. Despite technological progress since the development of the first artificial kidney by Willem Kolff in the early 1940s in the Netherlands, outcomes in this population remain poor. Dialysate constituents do possibly affect outcomes and agreement on adequate prescription of dialysate composition is needed. Including reports of prospective and retrospective research this thesis aims to investigate the relationship between the dialysis prescription of glucose and sodium on various outcomes, and the value of longitudinal observation of serum sodium concentrations and blood pressure.

Bianca van Bree

Present occupation: Scientist at the R&D Department of Pharming Group N.V. Leiden, The Netherlands

Supervisors: Prof. Dr. P. Schrauwen, Prof. Dr. M.K.C. Hesselink, Dr. J. Hoeks

Thesis defence: 17 October

Title: [Mitochondria, lipotoxicity and skeletal muscle metabolism: Implications for type 2 diabetes mellitus](#)

Daniel Keszthelyi

Present occupation: Resident Internal Medicine at Maastricht UMC+

Supervisors: Prof. Dr. A. Masclee, Dr. F.J. Troost

Thesis defence: 23 October

Title: [The intestinal barrier function: An integrative approach to understanding gastrointestinal pathophysiology](#)

This thesis investigated the (patho)physiology of intestinal barrier function. Previous studies indicate that an impairment of the intestinal barrier appears to play a key role in the development of several diseases. In this thesis, we investigated specific aspects of intestinal barrier function, with particular emphasis on irritable bowel syndrome (IBS) and microscopic colitis.

In particular, we were interested in the possible role of serotonin in the regulation of the barrier function and its relation to visceral hypersensitivity. In this thesis, we showed that increased serotonergic metabolism after oral administration of the serotonin precursor, 5-hydroxytryptophan (5-HTP), resulted in increased visceral perception, and induced an increase in intestinal mucosal barrier function in healthy individuals. We hypothesized that this reaction takes place in the context of a protective reflex to prevent

the uptake of harmful substances into the lamina propria. In IBS patients, we saw an increased nociceptive and metabolic response to 5-HTP, without a reinforcement of the intestinal barrier. Failure to reinforce barrier function in response to potentially noxious stimuli, signalled through serotonin, may therefore represent an important pathophysiological mechanism in IBS and, in particular, visceral hypersensitivity.

Milan Geybels

Present occupation: Postdoc at Fred Hutchinson Cancer Research Centre, Seattle, USA

Supervisors: Prof. Dr. F.J. van Schooten, Prof. Dr. P.A. van den Brandt, Dr. B.A.J. Verhage

Thesis defence: 29 October

Title: [Advanced prostate cancer risk, selenium, and oxidative stress: The role of genetic variation and environment](#)

Mariëlle Coolen

Present occupation: Resident Surgeon at Maastricht UMC+

Supervisors: Prof. Dr. C.H.C. Dejong, Prof. Dr. S. Olde Damink

Thesis defence: 31 October

Title: [Enhanced perioperative care in liver and pancreat surgery](#)

This research aims to improve patient care after liver or pancreas surgery. An evidence-based accelerated recovery programme (Enhanced Recovery After Surgery, ERAS) was developed, implemented and evaluated; it reduces the stress reaction after such a procedure and accelerates the recovery, with no additional disadvantages. It appears that such a protocol indeed shortens the length of stay in hospital following surgery, without additional complications. However, following the protocol is more

difficult when complications occur. Patients and health care providers appeared positive about such a protocol, however they found a functional recovery more important than a quick discharge from hospital.

Steven Vanhoutvin

Present occupation: Clinical Projects Manager at Antoni van Leeuwenhoek Hospital (NKI) Amsterdam, The Netherlands

Supervisors: Prof. A.A. Masclee, Prof. Dr. R.J. Brummer, Dr. F. Troost, Dr. D.M.A. Jonkers

Thesis defence: 6 November

Title: [The colorectal response to butyrate in health and IBS](#)

Wim van den Hof

Present occupation: Postdoc at Maastricht University, Department of Toxicogenomics

Supervisors: Prof. Dr. J. Kleinjans, Dr. K. Wodzig

Thesis defence: 19 November

Title: [In vitro Toxicogenomics; unravelling the Mechanisms Underlying Drug-Induced Hepatotoxicity](#)

Although the current screening of new drugs relies heavily on animal testing, drugs considered to be safe based on the results of animal tests often turn out to be toxic to humans. The liver, which is the primary site of drug degradation and elimination, is particularly vulnerable to damage caused by drugs. The results of this study show that alternative methods instead of animal tests can be used to distinguish hepatotoxic from non-hepatotoxic substances. Furthermore, it is shown that more relevant information about underlying mechanisms of drug-induced hepatotoxicity can be obtained by combining several research techniques.

Danielle Boesten

Present occupation: Teacher Applied Science at Fontys Hogeschool / University, Maastricht

Supervisors: Prof. Dr. A. Bast, Dr. G.J. den Hartog

Thesis defence: 1 December

Title: [Polyols and polyphenols against glucotoxicity](#)

This thesis shows that certain food substances can have therapeutic implications for patients suffering from diabetes. One of the substances we studied is erythritol, a naturally-occurring substance which is present in small amounts in some fruits as well as beer and wine. It is shown that erythritol protects blood vessel cells (the lining of our vascular system) and beta cells (cells which produce insulin) against harmful effects of glucose. The substances we studied often had several small effects which together produced a large positive effect on cells. This is beneficial in the management of chronic diseases, because a 'gentle' approach is preferable to a 'harsh' approach in which a blow is struck, as is often the case with drugs.

Marlon Jetten

Present occupation: Postdoc at Maastricht UMC+, Department of Toxicogenomics

Supervisor: Prof. Dr. J. Kleinjans

Thesis defence: 5 December

Title: [Toxicogenomics responses in the in vitro liver; A view on human inter individual variation](#)

Toxicity for humans often is falsely predicted based on animal tests, possibly amongst others due to human inter individual variation. Human-based alternative screening methods are scarce. The liver, a primary site for toxicity, is a candidate for a human-based alternative model for safety screening. The aim of this study is to evaluate human inter individual variation in several liver-based in vitro cell

models. The results show that these models indeed can be used to evaluate inter individual variation, especially when several research techniques are combined. Possibly these models can be used to relieve the burden on animal-testing in the future.

Erik Ruijters

Present occupation: Product Development Manager at MagnaMedics Diagnostics BV, Maastricht

Supervisors: Prof. Dr. A. Bast, Dr. G.R.M.M. Haenen, Dr. A.R. Weseler

Thesis defence: 9 December

Title: [Health benefits of \(-\) - Epicatechin and other flavonoids](#)

Flavonoids are substances found in various food products. This study focusses on flavonols, a subgroup of the flavonoid family. Tea and cacao contain relatively high concentrations of one of these flavonols, epicatechin. The antioxidant and anti-inflammatory effects of epicatechin can have important implications for chronic inflammatory diseases such as rheumatoid arthritis, chronic enteritis, asthma and COPD. Our study results also show that flavonols have a positive effect on vascular health. During an eight-week period of flavonol intake from grape seeds vascular function in test subjects improved and blood markers of oxidative stress and inflammation were reduced. In addition, our findings suggest that epicatechin and other flavonoids counteract the effects of anti-inflammatory drugs. Therefore, it is conceivable that both will be prescribed simultaneously in the future.

Lieke Raaijmakers

Present occupation: Researcher at IVO Institute for lifestyle and addiction

Supervisors: Prof. Dr. N.K. de Vries, Prof. Dr. S.P.J. Kremers

Thesis defence: 10 December

Title: [Diabetes care and the introduction of a new standard in the Netherlands; A closer look from the perspectives of health care professionals and patients](#)

This thesis shows that the introduction of the Care Standard for diabetes (supported by the National Diabetes Action Programme) has made a positive contribution to the improvement of care given to patients suffering from diabetes in the Netherlands. The National Diabetes Action Programme has resulted in the implementation of the Care Standard for diabetes into the Dutch health care. Studies on patients suffering from diabetes show that support of autonomy and strategies designed to improve perceived patient competencies are important factors in future interventions aimed at the improvement of self-management and quality of life. In the future, an integrated multidisciplinary patient-focused approach to chronic diseases is needed.

Eveline Martens

Present occupation: Project Leader Clinical Studies at the Dutch Kidney Foundation, The Netherlands

Supervisors: Prof. Dr. M. Westerterp-Plantenga, Prof. Dr. R.D. Mattes (Purdue Un. US)

Thesis defence: 11 December

Title: [Interaction of dietary protein with energy balance](#)

This thesis studied the effects high-protein and low-protein diets have on food intake and energy consumption. In the laboratory restaurant, test subjects had daily low-protein, normal-protein or high-protein meals, each taken for

Thesis defences and careers of finished PhD Students

twelve days. They spontaneously ate less during high-protein meals than during low-protein and normal-protein meals. In a study which was carried out later, this satiating effect of proteins was reduced in test subjects who had high-protein or low-protein meals for twelve weeks while having to maintain their weight. The energy consumption was maintained in test subjects having high-protein meals, whereas it was reduced in test subjects having low-protein meals. Therefore, it was concluded that a high-protein diet may prevent weight gain due to its impact on satiation and food intake as well as energy consumption.

Morteza Enajat

Present occupation: Resident Plastic Reconstructive Surgery at VU Amsterdam, The Netherlands

Supervisors: Prof. R.R. van der Hulst, Dr. M.A.M. Mureau (Erasmus MC Rotterdam)

Thesis defence: 15 December

Title: [Deep inferior epigastric artery perforator flap breast reconstruction: optimizing of technique, perioperative measures, and outcome](#)

Hilda de Jong

Present occupation: Postdoctoral research fellow at The University of British Columbia, Vancouver Canada

Supervisors: Prof. dr. H. van Loveren, Prof. Dr. J.W. Cohen Tervaert Dr. R.J. Vandebriel (RIVM) & Dr. O.M. Klungel (RIVM)

Thesis defence: 18 December

Title: [Cardiovascular drugs and the risk of systemic autoimmune diseases Pharmacological and experimental approaches](#)



Tim Snijders

Present occupation: Post-doctoral fellow at McMaster University, Department of Kinesiology, Hamilton, Canada

Supervisors: Prof. Dr. L.J.C. van Loon, Dr. L. Verdijk

Thesis defence: 18 December

Title: [Satellite cells in skeletal muscle atrophy and hypertrophy](#)

Ageing is accompanied by loss of muscle mass and muscle strength. This results in limitations in daily life, less independence and reduced quality of life. Muscle stem cells (also called satellite cells) are essential for muscle tissue growth and maintenance. This thesis shows that a reduction in the number of satellite cells and/or their function may play an important role in the loss of muscle mass associated with ageing. Long-term strength training helps increase muscle mass/muscle strength and is associated with an increase in the number of satellite cells. Strength training should be an important part of intervention programmes to prevent loss of muscle mass with ageing.

Rutger Schols

Present occupation: Resident Plastic Surgery, Maastricht UMC+

Supervisors: Prof. Dr. L.P.S. Stassen, Prof. Dr. N.D. Bouvy, Dr. F.P. Wieringa (TNO)

Thesis defence: 19 December

Title: [Innovative optical techniques for intraoperative anatomical guidance; Surgical navigation beyond the limits of the human eye.](#)

Innovative optical techniques can improve the intraoperative identification and characterisation of vital anatomical structures, such as nerves, ureters, arteries and bile ducts. This is crucial in all sorts of surgical procedures, as

misidentification of these structures can lead to iatrogenic injury. This thesis focuses on two optical techniques: near-infrared fluorescence imaging using exogenic contrast for the identification of bile ducts, arteries and ureters; and diffuse reflection spectroscopy using endogenic contrast for the identification of new spectral contrasts of ureter, artery, parathyroid and nerve tissues that are invisible to the eye. While both techniques are subject to limitations, they have the potential to improve surgical care through better anatomical recognition. In addition, the newly discovered endogenic spectroscopic tissue contrasts provide insight into the development of a new generation of surgical cameras.

Education

The aims of our School specific PhD training programme is to cultivate research capabilities & broad understanding of human nutrition and metabolism, to provide PhD students with specific knowledge and skills needed for top-level research and to stimulate interdisciplinary training.

The goals are achieved by a mixture of professional and generic courses. To create more awareness among PhD students on the entire research portfolio of NUTRIM capita selecta are organised on a bi-weekly base during which leading institutional scientists provide state-of-the-art lectures on their area of expertise including their own data. All courses given are evaluated instantaneously and updated if appropriate on an annual basis.

Additionally participation in small scale journal clubs is stimulated, participation in 'thematic meetings' (e.g. training in knowledge transfer, valorisation and patent screening, career development) and NUTRIM supports participation in research management and/or board and council meetings (e.g. PhD council and departmental boards) Successful participation of the PhD training programme results in well-trained graduates who have developed an integrated view on most advanced and state-of-the-art topics in nutritional epidemiology and toxicology science, nutrition and metabolism in health and disease.

NUTRIM Lecture Series

In order to enhance the scientific standard of nutrition and to stimulate international exchange in this field, NUTRIM organizes five lectures yearly for which an international recognized expert in the field is invited to give a lecture and a Master class. The lectures cover all main research areas of NUTRIM and are not only aimed at a NUTRIM-wide audience but also at Dutch Universities and institutes within the field of nutrition, metabolism and toxicology, all food and pharma industry in the Netherlands and international universities and institutes within the EU region.

NUTRIM Capita Selecta

NUTRIM very much values the awareness among NUTRIM PhD Students on the entire research portfolio of NUTRIM. The Capita Selecta offer a wide range of subjects of that portfolio and aim to stimulate PhD Students to gain broader insights and interest in fields of research that are not necessarily their own field of expertise in order to stimulate and increase multi disciplinarity of our young researchers. Leading institutional scientists

provide state-of-the-art lectures on the area of their expertise including their own data. The lectures are organized in two modules and comprise a total of approx. 20 lectures.

PhD Students' Coordinator

Dr. Roger Godschalk, Assistant Professor, Department of Toxicology, is NUTRIM's PhD Students Co-ordinator. The PhD-students Co-ordinator monitors the continuity of progress of each individual PhD-student using the NUTRIM progress monitoring procedure, approves the supervision and education plans within 3 months after appointment of a PhD-student and ensures their annual adaptation. He furthermore acts as a trust person for the PhD-Students, exercising a critical attitude towards all parties involved (PhD-student, mentor, supervisor, programme leader) and, if necessary, meeting with personnel consultants. He coordinates a programme of high-quality special courses, he represents the School in the Interfaculty PhD-students Committee (IPC) and he is a member of NUTRIM's Council.

NUTRIM involvement in UM Master Programmes

Master 'Biomedical Sciences'

Exploring human health and disease

The 21st century may well be called the century of molecular biology. Amid wide-scale investments in life sciences all over Europe, there is a growing demand for highly specialised professionals in a range of life science fields. Biomedical Sciences focuses on state of the art methodology and the skills that enable researchers to unravel the molecular mechanisms in health and disease. You explore the relationship between human beings and their environment from molecule, to gene, to cell and organ, to individual and to entire populations.

Master 'Health Food Innovation Management'

Merging academia with industry

Health Food Innovation Management prepares you to understand the process of innovation in the food and beverage industry, with a specific focus on improving health and healthy eating behaviour by developing commercially relevant novel dietary intake concepts. Through a multidisciplinary learning approach, you will be prepared to help

transfer nutritional health science aspects into sound new product and marketing concepts. This programme thus fills the need for industry professionals who also have the expertise to properly interpret data and make food healthier in ways that are scientifically sound.

Master 'Health Education and Promotion'

Helping people be healthy

Health is one of the most important issues in our lives. Yet many people still do things that are risky for their health. And it's not easy to change this, since personal, environmental, social and political factors all influence individual behaviour. Health Education and Promotion focuses on the development, evaluation and implementation of health interventions at both the behavioural and environmental levels. The programme is interdisciplinary, training you as an expert in promoting health and well-being. Because after all, a gram of prevention is worth a kilo of cure!

Master 'Human Movement Sciences'

The biological basis of exercise

Human beings were designed for daily physical activity. But in the modern world our sedentary lifestyle has led to chronic diseases like obesity, cardiovascular disease and type 2 diabetes. Governments are increasingly recognising the importance of physical activity as a public health issue. This programme covers all aspects of the relationship between physical activity and health - from patients trying to get better, to individuals just trying to stay fit, to top athletes aiming for the pinnacle of their sport.

MINT postgraduate educational institute

MINT aims at enlarging professional knowledge and understanding of nutritional problems and disease related metabolic aberrations in chronic disease prevention and management. In addition, the institute wants to promote the correct implementation of available and novel intervention strategies in this field. Medical and paramedical professionals and scientists. The composition of a target group varies between courses. MINT organizes high quality courses for medical and paramedical professionals and scientists about clinical topics not yet covered by others, but for which the target group addresses a clear demand.

Lectures, master classes and courses 2014

Date	Activity
8 January	NUTRIM Capita Selecta by Dr. Leo Köhler 'Amino acid metabolism in the gut'
29 January	NUTRIM Capita Selecta by Dr. Gijs Goossens 'Adipose tissue dysfunction in obesity-related insulin resistance'
12 February	NUTRIM Capita Selecta by Dr. Ronit Shiri-Sverdlov 'The traffic jam in NASH: OxLDL in lysosomes'
26 February	NUTRIM Capita Selecta by Prof. Luc van Loon 'Ageing and muscle mass loss'
14 March	Gut & Liver Meeting, lecture by Prof. Dr. Kristin Verbeke 'Deciphering the impact of the gut microbiota in health and disease by analysing their metabolite'
26 March	NUTRIM Capita Selecta by Prof. Ellen Blaak 'Adipose tissue-muscle cross-talk in insulin resistance and diabetes'
2 April	NUTRIM Master Class by Prof. Dennis Bier 'Nutrition science and the media'
4 April	Valedictory lecture by Prof. Cor Baeten 'The way out'
9 April	NUTRIM Capita Selecta by Dr. Freddy Troost 'Gastrointestinal modulation of satiety'
9 April	International Society of Indoor Air Quality and Climate - ISIAQ / NUTRIM Symposium (pré conference) 'Counting the cost of comfort: beyond thermal comfort'
11 April	Lecture 'Mitochondrial protein homeostasis in the control of metabolism and aging', lecture by Dr. Riekelt H. Houtkooper
30 April	NUTRIM Capita Selecta by Prof. C. Evelo 'If haystacks get too big start looking for sewing machines instead of needles'
14 May	NUTRIM Capita Selecta by Prof. Stef Kremers 'Prevention of obesity'
14 May	Introductory lunch meeting for new PhD Students
16 May	Kick off meeting: MUMC+2020 project: 'Synergy between experimental research and medical excellence to outweigh cancer cachexia', incl. lecture by Prof. Ken Fearon 'Surgeon and professor of mechanisms and treatment of cancer cachexia'
16 May	Lecture by Prof. A. van der Vliet 'Dual oxidase in the respiratory epithelium. Role in injury responses and allergic inflammation'
28 May	NUTRIM Capita Selecta by Prof. Aalt Bast 'Nutritional Toxicology'
6 June	Farewell Symposium 'Nutritional Science in transition' incl. valedictory lecture by Prof. Wim Saris 'Something to chew on'
11 June	NUTRIM Capita Selecta by Dr. Jogchum Plat 'Towards understanding the pros and cons of plant sterols'
13 June	Gut & Liver Meeting, lecture by Dr. Sven van Ijzendoorn 'Complicating gut-liver cross-talk in a rare congenital diarrheal disorder'
23 June	Mini Symposium 'Possibilities with imaging techniques in metabolic research'
24 June	Symposium 'Systems Biology for Food, Feed and Health', at Wageningen University, cooperation with NUTRIM - Bioinformatics Department
25 June	NUTRIM Capita Selecta by Dr. Steven Olde Damink 'Interorgan perspective in (surgical) liver failure'
3 September	NUTRIM Capita Selecta by Dr. Kaatje Lenaerts 'Intestinal compromise, immunity and nutrition'
17 September	NUTRIM Capita Selecta by Prof. Edwin Mariman 'Cellular and molecular aspects of weight regain: the adipose tissue'
19 September	Inaugural lecture by Prof. Wouter van Marken Lichtenbelt: 'Light my fire'
8 and 22 October	Workshop 'Presentation and Pitching for PhD Students'
15 October	NUTRIM Capita Selecta by Prof. F.J. van Schooten 'Biomarkers of health and disease'
17 October	Inaugural Lecture by Prof. Stef Kremers: 'Obesitaspreventie met pieken en dalen'
29 October	NUTRIM Capita Selecta by Prof. Margriet Westerterp-Plantenga 'Food intake regulation: Energy- and reward-homeostasis'
5 and 19 November	Workshop 'Presentation and Pitching for PhD Students'

Date

12 November

21 November

26 November

3 December

12 December

17 December

Activity

NUTRIM Capita Selecta by Dr. Kenneth Meijer 'Economics of human locomotion'

Inaugural Lecture by Prof Jogchum Plat: 'Voedingswetenschappen; Vereeuwigd met de erfenis van Hippocrates'

NUTRIM Capita Selecta by Prof. Wouter van Marken Lichtenbelt 'Energy metabolism, thermo regulation, brown fat activity and ageing'

NUTRIM Capita Selecta by Prof. Maurice Zeegers 'Unlock your secret to a healthy life'

NUTRIM Symposium 'Adipose tissue dysfunction in obesity', incl. valedictory Lecture by Prof. Marleen van Baak: 'Over gewichtige zaken'

Annual NUTRIM Symposium, theme 'Connect. Engage. Inspire'

Translational research infra

Translational research infrastructure

NUTRIM research achievements are made possible by collaboration of open-minded basic scientists and clinical opinion leaders and an excellent infrastructure.

Examples

Human surgical models

*Human intestinal ischemia-reperfusion model

A segment of healthy jejunum **01** is usually resected in patients undergoing pylorus-preserving pancreaticoduodenectomy. After isolation of a small part **02**, ischemia is induced by placing two vascular clamps **03**, which results in discoloration of the jejunal wall **04**. By removing clamps, reperfusion is initiated. Histological assessment of intestinal tissue (**05-A**, control) reveals damage after ischemia (**05-B**), and reperfusion (**05-C+05-D**).

*Obesity treatment **06**. Endobarrier duodenal/jejunal bypass liner (DJBL). This device constitutes a 60 cm open teflon sleeve, which is placed endoscopically in the proximal small intestine, effectively excluding this part of the gut from exposure to food.

Human tissue analysis

* Brown Adipose Tissue

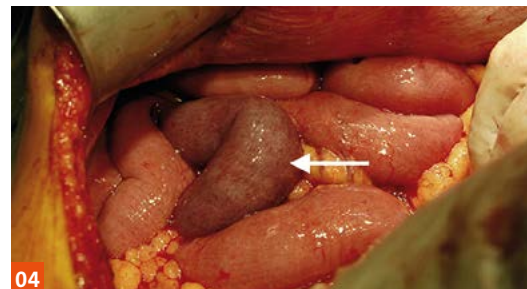
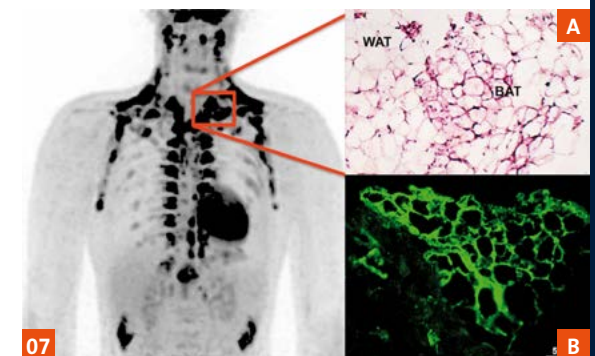
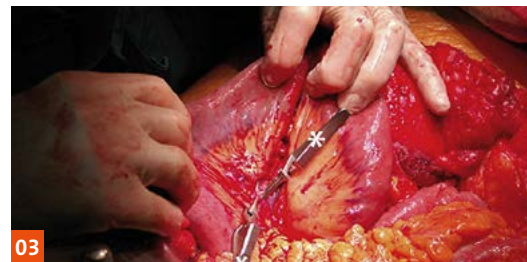
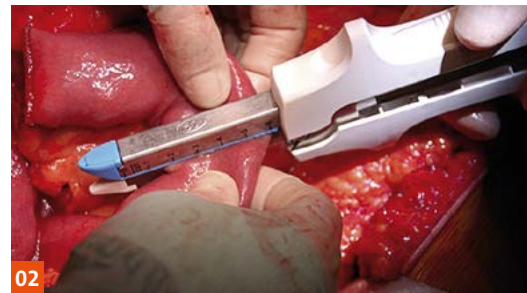
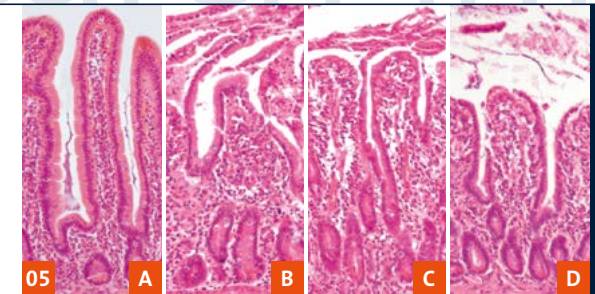
Figure 1 **07**: Brown adipose in adult man. FDG-PET-CT image of lean young adult man after cold exposure showing BAT activity in supraclavicular and paravertebral areas. **A** HE-stained slide showing typical multivacuolar brown adipocytes (BAT) and univacuolar white adipocytes (WAT).

B Immunofluorescence stained slide showing the BAT-unique protein UCP1 that facilitates heat production in BAT (UCP1 in green).

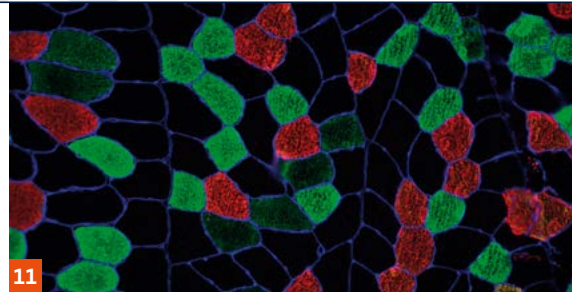
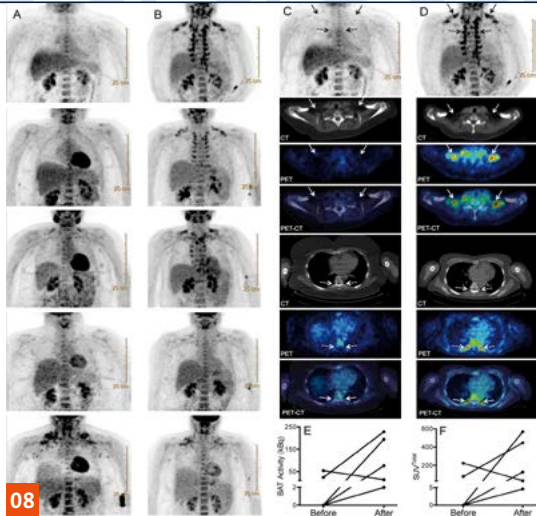
Figure 2 **08**: Brown adipose tissue (BAT) activity before and after weight loss.

Figure 3 **09**: Brown adipose tissue activity during ISO infusion and cold.

* In vitro research **10**: 3D cell culture. In this model intestinal epithelial cells form a 3-dimensional spheres structure, enabling the investigation of nutritional components on intestinal barrier function foto 3D cell culture.



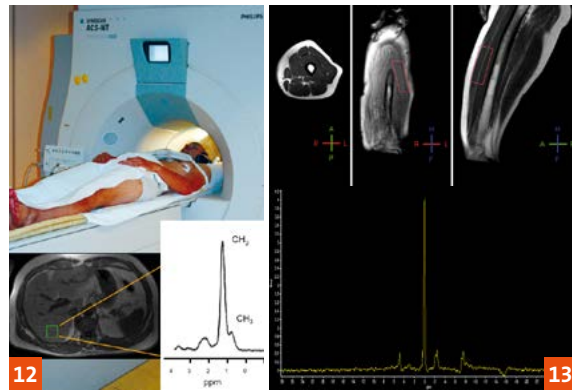
Structure



* Muscle fibre typing of human skeletal muscle **11**: Red cells represent slow oxidative type 1 fibres, green cells represent fast glycolytic type 2 fibres. In blue the basal membrane protein laminin is visualised.

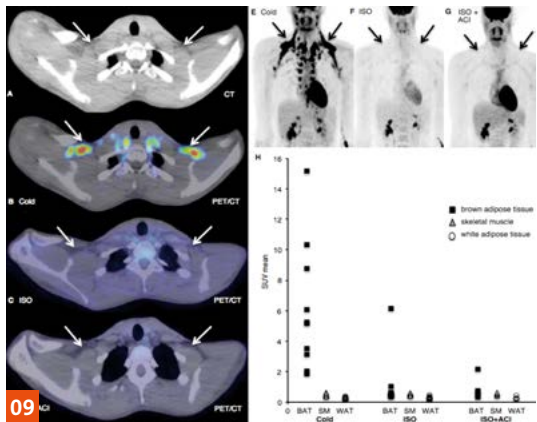
Imaging - non-invasive investigation of metabolism

* Ectopic fat content in skeletal muscle, the heart or liver can be measured by ¹H-MRS, an example of the liver is shown in figure **12**. High-energy metabolites, such as ATP or Phosphocreatine can also be quantified by ³¹P-MRS in these organs (example of a skeletal muscle spectrum in figure **13**). These techniques are valuable tools in evaluating the effects of physiological interventions.



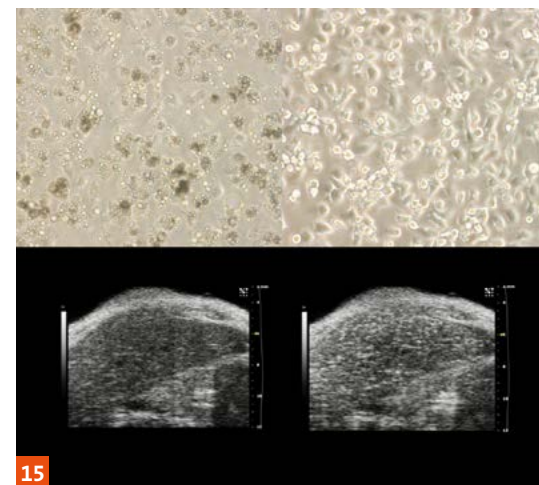
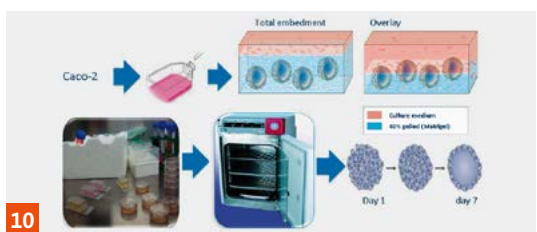
* Muscle Function and "In-Vivo" Anatomy

Muscle capacity is determined from dynamometry experiments. The HPL has a BIODEX III dynamometer is used to characterize the force and power capacities of muscle groups. **14**



* Developing Non-Invasive Imaging of Liver Inflammation

Figure **15**: Microscope view of cultured bone marrow derived Macrophages and an ultrasound view of a mouse liver.



Translational research infrastructure

Figure 2 **16**: VisualSonics Vevo2100 High-Frequency, High resolution digital imaging platform.

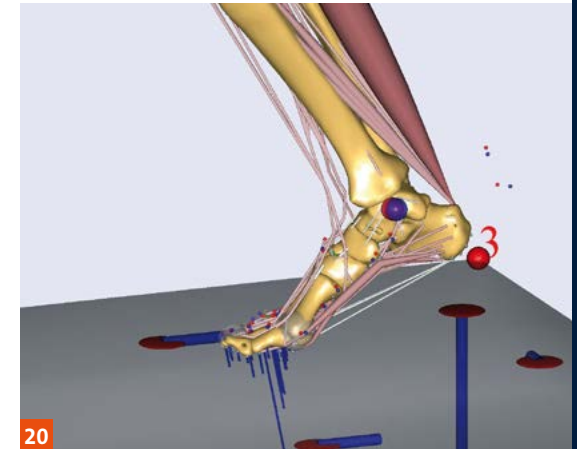
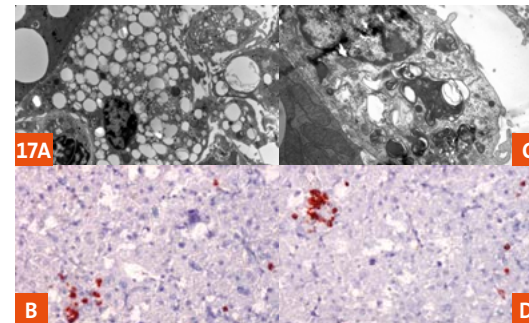
Figure 3 **17**: Electron Microscopy and Light Microscopy photos from a mouse liver. **A+C** EM photos of a Kupffer cell loaded with fat **B+D** Light microscopy photos of the liver stained for a Kupffer cell marker.

* In vivo Research **18**: Fully automated liquid chromatography mass spectrometry systems together with stand-alone HPLC systems and surrounding equipment, for metabolic research.

Modelling

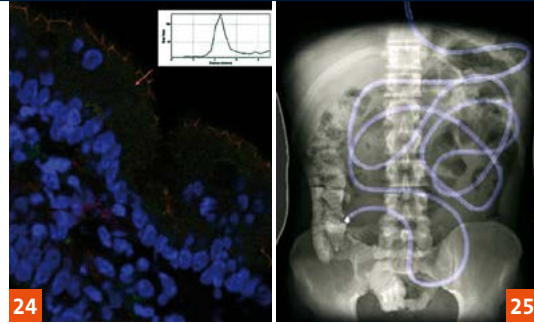
* In collaboration with the Netherlands Consortium for Systems Biology applications are developed that can be used to see results from modelling studies and genomics experiments next to each other **19**.

* 3D Capture and Muscle-Skeletal Modelling **20**: Muscle-skeletal performance of specific activities of daily life (e.g. walking, stair climbing, etc.) offering important information on coordination patterns and the stability and economy of the activity. (Meijer picture marker set, Glasgow/Maastricht foot model, movies stair climbing).





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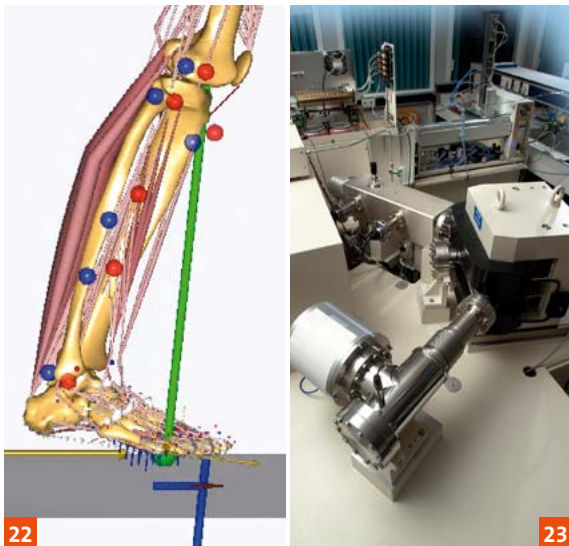
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Proof of concept: human experiment. Subjects undergoing various types of measuring, examples of research projects

* Metabolic Research Unit Maastricht (MRUM) **21**: The Metabolic Research Unit Maastricht (MRUM) is a facility with highly sensitive equipment for the studies in the field of energy expenditure, substrate utilization and other in-vivo metabolism.

* The Human Performance Laboratory **22**: Muscle dysfunction due to chronic disease, (e.g. suffering from Diabetes, COPD, Osteoarthritis, Osteoporosis, Obesity and Frailty) and or disuse, important determinants of adverse muscle skeletal loading, poor movement performance and reduced mobility in daily life.

*Stable Isotope Methodology **23**: Stable isotope tracers provide a safe and powerful tool to investigate carbohydrate, fat, and protein metabolism in vivo in humans. A stable isotope tracer is made by labelling a molecule (e.g., glucose, free fatty acid, or amino acids) with one or more atoms to make it distinct from the naturally occurring molecule (tracee) to allow its detection.

* Serotonergic modulation of intestinal permeability and visceral perception **24**.

* Ileal brake **25**: A 200cm long catheter is introduced into the small intestine of healthy volunteers. Nutrients are directly infused through this catheter and are delivered in different parts of the small intestine in order to expose ileum to different amounts of carbohydrates and proteins to see whether carbohydrates or proteins activate the ileal brake.

* Gluten digestion **26**: A triple-lumen feeding catheter is inserted under intermittent fluoroscopic control, with the tube tip located in the duodenum to administer test meals and enzyme directly into the stomach, and for the aspiration of fluid samples from the stomach and the duodenum.

Translational research infrastructure

Ambulatory Monitoring of muscle (dys)function

*The MMAAS **27** is a sophisticated monitoring system. It can capture 3D muscle-skeletal motion and muscle activity for a whole day and has been developed for a more detailed analysis of limitations in movement performance during ADL.

*The CAM **28** is an activity monitor that discriminates between non-weight bearing and weight bearing postures as well as physical activities (e.g. walking, cycling). It is used to monitor time spent on sedentary and physical activities in humans.

Biomarker development

* Diagnosis by exhaled breath **29**:

Exhaled breath contains thousands of so-called volatile organic compounds (VOCs) of which the composition varies depending on health status.

* Protein research

Proteins are the major regulators of life processes and as such they are important for the balance between health and disease. They function as diagnostic and prognostic biomarkers of crucial health sustaining processes in the body and are major drug targets for medication.

Protein separation

30 1st dimension separation

31 2nd dimension separation

32 Protein staining

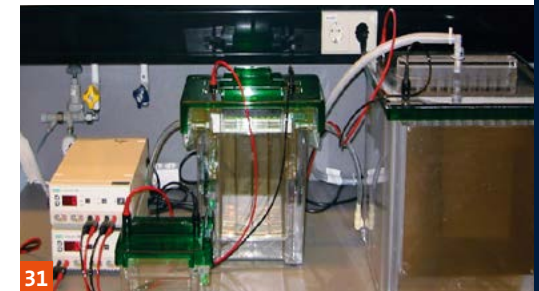
33 Detection and Image analysis

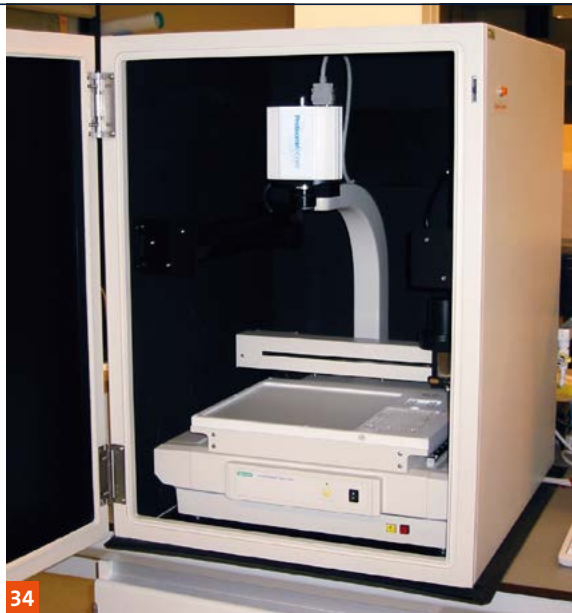
Protein identification

34 Automated spot cutting

35 Digestion and spotting

36 Mass spectrometry





Appendix 1

Large collaborative research projects at the national and international level

Large research projects in the Netherlands

public private organisations

research project

TIPharma

COPD: Transition of systemic inflammation into multi-organ pathology

TIFN

Effect of prebiotic fibres on intestinal health and functioning

Microbiota, energy balance and metabolism

Effects of decontamination

Active aging

Nocturnal protein supply during sleep as a dietary strategy to improve muscle mass in elderly

Muscle mass preservation

The impact of the macronutrient composition and energy content of a nutritional supplement on

post-prandial muscle protein synthesis in the elderly

Muscle Health and Function

Gut nutrient sensing in relation to appetite control

Gastrointestinal health / Barrier and Immune

Cardiovascular Health - Human studies

Cardiovascular health - HDL functionality

Using metabolomic analysis of volatile organic compounds (VOCs) in breath as biomarkers for healthy and disturbed gut

Insulin-related metabolic disorders

Diet, insulin-resistance and chronic inflammation

Ectopic fat

Microbe-mediated gut metabolism / Microbial functionality and safety

Relevance of vascular function markers

Oral perception and metabolic effect of proteins

Sensory satiety, metabolic satiety and food intake regulation

CTMM

Cardiac lipotoxicity

Evaluation and validation of cathepsins as a biomarker for NASH

NGI / NCSB-NBIC

Flux visualization

NGI NCSB

Using pathways and networks to study system states based on multi-omics data, genetic variation, and modeling results

ZonMw

MUMC-MOVE: one of the 4 national Academic centres for Sports, Physical Activity and Health

ZonMW

NUTRIM Graduate Programme: Metabolism and Chronic Disease

NUTRIM PI / coordinator

Prof. A. Schols

Prof. E. Blaak

Prof. E. Blaak / Prof. C. Dejong

Dr. K. Lenaerts

Prof. L. van Loon

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Prof. A. Masclee

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Prof. R. Mensink

Prof. R. Mensink

Prof. F.J. van Schooten

Prof. P. Schrauwen

Prof. P. Schrauwen

Dr. F. Troost

Dr. A. Vreugdenhil

Prof. M. Westerterp-Plantenga

Prof. M. Westerterp-Plantenga

Prof. P. Schrauwen / Prof. M. Hesselink

Dr. R. Sverdlov

Prof. C. Evelo

Prof. C. Evelo

Prof. A. Schols / Prof. M. Hesselink

Large collaborative EU research projects

European Community 7th Framework Programme

research project

Spotlight: Sustainable prevention of obesity through integrated strategies
Flaviola: Targeted delivery of dietary flavenols for optimal human cell function: Effects on cardiovascular health
AnastomoSEAL: Development of a resorbable sealing patch for the prevention of anastomotic leakage after colorectal cancer surgical treatment
An open, integrated and sustainable chemistry, biology and pharmacology knowledge resource for drug discovery
Eurodish, Study on the need for food and health research infrastructures in Europe
Microgennet: Extension, enhancement and strengthening of established collaborations for the purpose of a community-driven knowledge base for micronutrient genomics
Recruitment and activation of brown adipocytes as preventive and curative therapy for type 2 diabetes

Diagnostic and prognostic biomarkers for inflammatory bowel disease
SysmedIBD: Systems medicine of chronic inflammatory bowel disease
Food4Me: Personalised nutrition: An integrated analysis of opportunities and challenges
Sarcopenia and Physical frailty IN older people: multi-component Treatment strategies - SPRINTT
Full4Health: Understanding food-gut-brain mechanisms across the lifespan in the regulation of hunger and satiety for health
PREvention of diabetes through lifestyle intervention and population studies in Europe and around the world
e-NanoMapper - A database and ontology framework for Nanomaterials design and safety assessment
Bladder Cancer Epidemiology

NUTRIM PI / coordinator

Dr. P. van Assema
Prof. A. Bast
Prof. N. Bouvy

Prof. C. Evelo
Prof. C. Evelo
Prof. C. Evelo

Prof. W.D. van Marken
Lichtenbelt
Dr. M. Pierik
Dr. M. Pierik
Prof. W. Saris
Prof. A. Schols
Prof. M. Westerterp-Plantenga
Prof. M. Westerterp-Plantenga
Dr. E. Willighagen
Prof. M. Zeegers

Other EC initiatives / projects

Innovation and standardisation
European Strategic Research Agenda (SRA) of the European Technology Platform ETP Food for life, theme 'Nutrition and Health'

Prof. W. Saris

Appendices 2

International collaborations

University of Vermont, Burlington, USA

Topic: Respiratory Biology and oxidant-antioxidant metabolism

Contact person: Prof. Y. Janssen-Heininger, Department of Pathology

NUTRIM departments: Respiratory Medicine, Medical Microbiology, Toxicology

Collaboration since 1997

- Faculty exchange (Visiting professorships for Prof. Janssen-Heininger (NUTRIM) and Prof. E. Wouters (UvM))
- Joint PhD projects (4 PhD theses since 2003; 3 ongoing PhD projects)
- Joint laboratory facilities (NUTRIM: human tissue; UvM: transgenic animal models)
- Joint symposia, for example the Lecture and Master Class by Prof. B. Suratt 'Obesity and the inflammation paradox'
- Master classes

University of Birmingham, UK

Topic: Genetic epidemiology & evidence based medicine

Contact person: Prof. M. Zeegers

NUTRIM departments: Complex Genetics, Internal Medicine, Paediatrics, Respiratory Medicine, Ophthalmology, Toxicology

Collaboration since 2008

University College London, UK

Topic: Gut-liver homeostasis

Contact person: Prof. R. Jalan, Institute of Liver and Digestive Health.

NUTRIM departments: Surgery, Molecular Genetics

Collaboration since 1997

- Faculty exchange (Part time position for Dr. S. Olde Damink)
- Joint PhD projects (joint NUTRIM thesis of S. Olde Damink and R. Jalan; 3 ongoing PhD projects)

RWTH Aachen, Germany

Topic: Liver inflammation and failure

Contact persons: Prof U. Neumann (Dept of Surgery) and Prof. C. Trautwein (Dept of Hepatology)

NUTRIM departments: Surgery, Hepatology and Molecular Genetics

Collaboration since: 2010

Development of Euregional HPB centre (since 2010 joint weekly HPB multi-disciplinary-team meetings and joint cross border operations)

Faculty exchange (Post-doc position of Dr. Veerle Bieghs)

- Joint PhD projects.

German Diabetes Centre, Germany

Topic: Metabolism and Diabetes, Düsseldorf

Contact: Prof. M. Roden

NUTRIM departments: Human Biology, Movement Sciences, Internal Medicine

Collaboration started in: 2010

- Joint research projects on ectopic fat accumulation, insulin sensitivity, mitochondrial function & BAT
- Organize yearly diabetes day

École Polytechnique Fédérale de Lausanne, Laboratory of Integrative Systems Physiology

Topic: Mitochondrial metabolism

Contact: Prof. J. Auwerx

NUTRIM departments: Human Biology

Collaboration started in 2011

- Faculty exchange

National Institute of Ageing, USA

Topic: Skeletal muscle weakness in chronic disease and aging

Contact person: Dr. R. de Cabo, Lab of Experimental Gerontology

Dr. T. Harris, Laboratory of Epidemiology, Demography, and Biometry

NUTRIM departments: Respiratory Medicine

Collaboration started in 2009

- Exchange at PhD and post-doc level
- Joint research projects
- Master classes

St John's Research Institute and National Academy, Bangalore, India

Topic: Nutrition and metabolism

Contact: Prof. A. Kurpad

NUTRIM departments: Human Biology, Toxicology, Respiratory Medicine, Internal Medicine

Collaboration started in 2009

- Joint PhD projects
- Faculty exchange

European "Biohealth computing" network

Topic: Systems biology and chronic disease

Key partners: Grenoble, Barcelona, Torino

Contact person: Prof. Ph. Sabatier (Grenoble) and Prof. J. Roca (Barcelona)

NUTRIM departments: Bioinformatics, Toxicology, Respiratory Medicine, Molecular Genetics

- Joint MSc education and Summer school
- Faculty exchange

Richardson Centre for Functional foods and Nutraceuticals, Manitoba, Canada

Topic: functional foods and nutraceuticals

Contact: Prof. P.J. Jones

NUTRIM departments: Human Biology, Toxicology

Collaboration started in: 2011

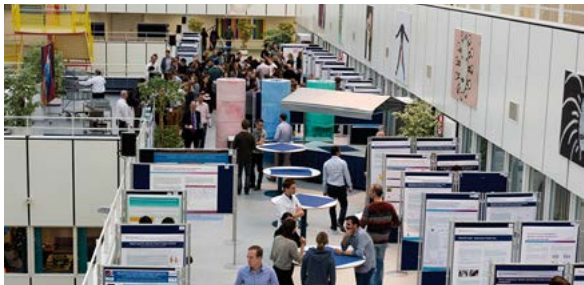
- Joint research projects on plant sterol metabolism
- Organized international symposium on plant sterols and health



Appendices 3

Appendix 3 List of abbreviations

ALD	Alcoholic Liver Disease	NAFLD	Non-alcoholic fatty liver disease
azM	Academic Hospital Maastricht	NASH	Non-alcoholic Steatohepatitis
BAT	Brown Adipose Tissue	NBIC	Netherlands Bioinformatics Centre
BBMRI-NL	Biobanking and Biomolecular Research Infrastructure	NCSB	Netherlands Centre for Systems Biology
CARIM	School for Cardiovascular Disease	NFU	Netherlands Federation of University Medical Centres
CEFIC	The European Chemical Industry Council	NGI	Netherlands Genomics Initiative
CIRO	Centre for Integrated care and Chronic Organ Failure	NRF	Nutricia Research Foundation
COPD	Chronic Obstructive Pulmonary Disease	NuGo	European Nutrigenomics Organisation
CTMM	Centre of Translational Molecular Medicine	NWO	Netherlands Foundation for Scientific Research
DFN	Dutch Heart Foundation	OPZuid	Operational Programme South Netherlands (European Innovation Programme)
DJBL	Duodenal-jejunal Bypass Liner	OTC	Osteosynthesis and trauma care
ECNIS	European Centre of Excellence on Environmental Carcinogenesis, Nutrition and Individual Susceptibility	PET	Position emission tomography
ECO	European Congress on Obesity	PI	Prime Investigator
ECPI	The European Council for Plasticisers and Intermediates	RCO NL	Netherlands Enterprise Agency
ECSS	European College of Sport Science	RIVM	National Institute of Public Health & Environmental Protection
EFSD	European Foundation for the Study of Diabetes	RVO-NL	Netherlands Enterprise Agency
ET	Enabling Technologies	SSIB	Society for the Studies of Ingestive Behaviour
EU	European Union	STW	Technology Foundation
FAEEs	Fatty acid ethyl esters	SWOL / NRF	University Fund Limburg
FDG	Fluoro-deoxy-glucose	TIPharma	Top Institute Pharma
FHML	Faculty of Health, Medicine and Life Sciences	TIFN	Top Institute Food and Nutrition
FIND	Foundation for Innovative New Diagnostics	TNO	Netherlands Organisation for Applied Scientific Research
IBD	Inflammatory Bowel Disease	UCP	UnCoupling Proteins
IBS	Irritable Bowel Syndrome	Veni/Vidi/Vici	Prestigious personal grants from NWO
I-FABP	Intestinal fatty acid binding protein	VLAG	Graduate School of Food Technology, Agro biotechnology, Nutrition and Health Sciences
ILD	Interstitial Lung Diseases	VOC	Volatile organic compounds
IMI	Innovative Medicine Initiative	WAT	White Adipose Tissue
KNAW	Royal Dutch Academy of Arts and Sciences	WCRF	World Cancer Research Fund
KNGF	Royal Dutch Society for Physical Therapy	ZonMw	Netherlands Organisation for Health Research & Development
MLDS	Dutch Digestive Foundation		
MUMC	Maastricht University Medical Centre		



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