

## Curriculum Vitae

**Dr. Gijs H. Goossens**

### Contact Information

Name: Gijs H. Goossens  
Address: NUTRIM School for Nutrition, Toxicology and Metabolism  
Maastricht University Medical Centre  
Dept. of Human Biology  
PO Box 616  
6200 MD, Maastricht, The Netherlands  
Date of birth: 23-06-1979  
Telephone: +31 (0)43 3881314  
E-mail: [G.Goossens@hb.unimaas.nl](mailto:G.Goossens@hb.unimaas.nl)

### Education

Jan 2002-Feb 2006 PhD project at the Department of Human Biology, Nutrition and Toxicology Research Institute Maastricht (NUTRIM), Maastricht University. Title thesis: The renin-angiotensin system in obesity: metabolic and hemodynamic effects. Date thesis defense: June 28th 2006.

1997-2001 Health Sciences, specialization Movement Sciences (MSc), Maastricht University. Main orientations: human physiology, biochemistry, nutrition, and statistics.

### Dissertation/Dissertation Abstract

**Title:** 'The renin-angiotensin system in obesity: metabolic and hemodynamic effects'.

This thesis describes a series of human studies designed to investigate the role of the renin-angiotensin system (RAS) in obesity-related disorders. We examined both local (autocrine/paracrine) metabolic and hemodynamic effects of the RAS using state-of-the-art arterio-venous balance measurements across adipose tissue and skeletal muscle in combination with measurements of tissue blood flow *in vivo* in humans, combined with microdialysis and additional *in vitro* experiments in human adipocytes.

**Main findings:**

- Locally produced Ang II in adipose tissue and skeletal muscle exerts no endocrine role in lean and obese subjects. In contrast, angiotensinogen (the precursor of Ang II) is released from adipose tissue and muscle in obese subjects during  $\beta$ -adrenergic stimulation, which may contribute to the increased plasma Ang II concentrations during  $\beta$ -adrenergic stimulation in obese subjects.
- Ang II inhibits lipolysis in adipose tissue and skeletal muscle in lean and obese subjects.
- Short-term treatment with the ACE inhibitor ramipril (2 wks, 5mg/d) adequately reduces ACE activity and blood pressure, but has no significant effects on whole-body insulin sensitivity, forearm blood flow, substrate fluxes across the forearm, whole-body substrate oxidation, and intramuscular triacylglycerol content in obese insulin resistant subjects.

- Ang II is a major regulator of adipose tissue blood flow, and a major proportion of the Ang II-induced decrease in ATBF seems to be nitric oxide-independent.

Based on these findings, it is tempting to postulate that the renin-angiotensin system may impair adipose tissue function, thereby contributing to the development of insulin resistance and type 2 diabetes.

## **Awards, Fellowships, Honours, Grants**

2008	Innovative Pilot Research Grant 2008 from the Dutch Diabetes Research Foundation (DFN). Title research proposal: 'Adipose tissue hypoxia in the pathogenesis of insulin resistance: a novel approach for the continuous monitoring of oxygen tension in human subcutaneous adipose tissue by microdialysis'. Acquired budget: 45.000 euro
2007	Grant from the International Association for the Study of Obesity (IASO) to attend the 6 <sup>th</sup> IASO Stock Conference, March 29-31 <sup>st</sup> 2007, Bangkok, Thailand. (1.000 euro)
2007	Grant from the Netherlands Association for the Study of Obesity (NASO) to attend the 16 <sup>th</sup> European Congress on Obesity, May 14-17 <sup>th</sup> 2008, Geneva, Switzerland. (500 euro)
2006	'Talent for the Future Award' (prestigious scholarship for talented PhD students) from Maastricht University, Maastricht, The Netherlands (March 2006-Jan 2007). Acquired budget: 42.000 euro
2005	Young Investigator Award (4 <sup>th</sup> International Symposium on Obesity and Hypertension, Oct 27-29 <sup>th</sup> 2005, Berlin, Germany).
2005	Grant from the International Association for the Study of Obesity (IASO) to attend the 4 <sup>th</sup> IASO Stock Conference, March 21-23 <sup>rd</sup> 2005, Istanbul, Turkey. (1.000 euro)
2005	Grant from the Netherlands Organisation for Scientific Research (NWO) for a collaborative research project (visiting scientist) at the Oxford Centre for Diabetes, Endocrinology and Metabolism, University of Oxford, Oxford, UK. (5.100 euro)
2002	Unilever Research Award 2002 for best master thesis in 2001. Title thesis: 'Relation between intramuscular lipids and indicators of glucose tolerance, obesity, maximal aerobic capacity and substrate utilization.' (2.500 euro)
2001	Grant from the Dutch Diabetes Research Foundation (DFN) for a research period (visiting scientist) at the Oxford Centre for Diabetes, Endocrinology and Metabolism, University of Oxford, Oxford, UK. (3.200 euro)

## **Research Experience**

### **Research positions**

Jan 2007–now	Post-doctoral fellow at the Department of Human Biology (NUTRIM) of Maastricht University (Maastricht, The Netherlands). Direct supervision of 1 PhD student (co-promotor), 1 technician and several bachelor and master students. <u>Main research focus:</u> The role of the renin-angiotensin
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system and adipose tissue (dys)function in the development of insulin resistance and type 2 diabetes mellitus. (fixed-term, 1.0 fte)

- Mar 2006-Jan 2007 Awarded with the prestigious 'Talent for the Future' scholarship from Maastricht University (Maastricht, The Netherlands) to continue the work on the renin-angiotensin system as a post-doctoral fellow at the Department of Human Biology (NUTRIM). (fixed-term, 1.0 fte)
- Jan 2005-May 2005 Visiting scientist (awarded with a scholarship from the Netherlands Organisation for Scientific Research (NWO)) at the Oxford Centre for Diabetes, Endocrinology and Metabolism (University of Oxford, Oxford, UK), headed by Prof. dr. K. Frayn and Dr. F. Karpe, to investigate the role of the renin-angiotensin system in adipose tissue blood flow regulation. (fixed-term, 1.0 fte)
- Jan 2002-Feb 2006 PhD project at the Department of Human Biology (NUTRIM), Maastricht University, under supervision of Prof. dr. E.E. Blaak, Prof. dr. M.A. van Baak and Prof. dr. W.H.M. Saris. Title thesis: The renin-angiotensin system in obesity: metabolic and hemodynamic effects. (fixed-term, 1.0 fte)
- Oct 2001-May 2002 Visiting scientist (awarded with a scholarship from the Dutch Diabetes Research Foundation (DFN)) at the Oxford Centre for Diabetes, Endocrinology and Metabolism (University of Oxford, Oxford, UK), headed by Prof. dr. K. Frayn and Dr. F. Karpe, to learn techniques to investigate adipose tissue and skeletal muscle metabolism and blood flow in humans (arterio-venous differences, <sup>133</sup>Xe wash-out technique, venous occlusion plethysmography).

## **Publications**

### **International (refereed) journals**

*Average/median impact factor publications: 5.0/5.0*

1. Goossens GH, Petersen L, Blaak EE, Hul G, Arner P, Astrup A, Froguel P, Patel K, Pedersen O, Polak J, Oppert J-M, Martinez A, Sørensen TIA, Saris WHM, and the NUGENOB Consortium. Several gene polymorphisms but not FTO variants modulate resting energy expenditure and fat-induced thermogenesis in obese subjects: The NUGENOB Study Int J Obes Relat Metab Disord 2009; 33: 669-679.
2. Goossens GH. The role of adipose tissue dysfunction in the pathogenesis of obesity-related insulin resistance. Physiol Behav 2008; 94: 206-218.
3. Franssen FME, O'Donnell DE, Goossens GH, Blaak EE, Schols AMWJ. Obesity and COPD. Thorax 2008; 63: 1110-1117.
4. Goossens GH, Jocken JWE, van Baak MA, Jansen EHJM, Saris WHM, Blaak EE. Short-term beta-adrenergic regulation of leptin, adiponectin and interleukin-6 secretion in vivo in lean and obese subjects. Diabetes Obes Metab 2008; 10: 1029-1038.
5. Jocken JWE, Roepstorff C, Goossens GH, van der Baan P, van Baak MA, Saris WHM, Kiens B, Blaak EE. HSL serine phosphorylation and glycerol exchange across skeletal muscle in lean and obese subjects: effect of beta-adrenergic stimulation. Diabetes 2008; 57: 1834-1841.

6. Jocken JWE, Smit E, Goossens GH, Essers Y, Mensink M, Saris WHM, Blaak EE. Adipose TriGlyceride Lipase (ATGL) expression in human skeletal muscle is type I (oxidative) fiber specific. *Histochem Cell Biol* 2008; 129: 535-538.
7. Jocken JW, Goossens GH, van Hees AM, Frayn KN, van Baak M, Stegen J, Pakbiers MT, Saris WH, Blaak EE. Effect of beta-adrenergic stimulation on whole-body and abdominal subcutaneous adipose tissue lipolysis in lean and obese men. *Diabetologia* 2008; 51: 320-327.
8. Wang P, Smit E, Brouwers M, Goossens GH, Van der Kallen C, Van Greevenbroek M, Mariman E. Plasma pigment epithelium-derived factor is positively associated with obesity in Caucasian subjects, in particular with the visceral fat depot. *Eur J Endocrinol* 2008; 159: 713-718.
9. Goossens GH, Jocken JWE, Blaak EE, Schiffrers PM, Saris WHM, van Baak MA. Endocrine role of the renin-angiotensin system in human adipose tissue and muscle in vivo in humans: effect of  $\beta$ -adrenergic stimulation. *Hypertension* 2007; 49: 542-547.
10. Goossens GH, Blaak EE, Arner P, Saris WHM, van Baak MA. Angiotensin II: a hormone that affects lipid metabolism in adipose tissue. *Int J Obes Relat Metab Disord* 2007; 31: 382-384.
11. Boon N, Goossens GH, Blaak EE, Saris WHM. The effects of hydralazine on lipolysis in subcutaneous adipose tissue in humans. *Metabolism* 2007; 56: 1742-1748.
12. Goossens GH, Blaak EE, Schiffrers PM, Saris WHM, van Baak MA. Effect of short-term ACE inhibitor treatment on peripheral insulin sensitivity in obese insulin-resistant subjects. *Diabetologia* 2006; 49: 3009-3016.
13. Goossens GH, McQuaid SE, Dennis AL, van Baak MA, Blaak EE, Frayn KN, Saris WHM, Karpe F. Angiotensin II: a major regulator of subcutaneous adipose tissue blood flow in humans. *J Physiol* 2006; 571:451-60.
14. Goossens GH, Blaak EE, Saris WHM, van Baak MA. Angiotensin II-induced effects on adipose and skeletal muscle tissue blood flow and lipolysis in normal-weight and obese subjects. *J Clin Endocrinol Metab* 2004; 89: 2690-2696.
15. Tan GD, Goossens GH, Humphreys SM, Vidal H, Karpe F. Upper and lower body adipose tissue function: a direct comparison of fat mobilization in humans. *Obes Res* 2004; 12: 114-118.
16. Goossens GH, Blaak EE, van Baak MA. Possible involvement of the adipose tissue renin-angiotensin system in the pathophysiology of obesity and obesity-related disorders. *Obes Rev* 2003; 4: 43-55.

#### **Books / Contributions to books**

1. Goossens GH, Karpe F. Human Adipose Tissue Blood Flow and Micromanipulation of Human Subcutaneous Blood Flow. In: Yang, K, ed. *Methods Mol Biol, Adipose Tissue protocols*, 2nd ed. Totowa, NJ: Humane Press; 456: 97-107.
2. Goossens GH, Saris WHM, Blaak EE. Microdialysis on Adipose Tissue. In: Tsai, T-H, ed. *Applications of Microdialysis in Pharmaceutical Science*. Hoboken, NJ: John Wiley & Sons, Inc., *in press* (will be published in 2010).

#### **Case reports**

1. Goossens GH, de Leeuw PW, van Baak MA. Management of obesity-related hypertension: reducing renin-angiotensin system activity. *Renin Angiotensin System in Cardiovascular Medicine* 2005; 1: 12-13.

#### **Popular publications**

1. Goossens GH, Mensink M, Kooi, ME, Saris WHM, Blaak EE. De rol van vetten in de spier bij type 2 diabetes mellitus. *Chemisch2Weekblad* 2002.

## **Presentations, Abstracts**

### **Invited lectures**

1. Netherlands Association for the Study of Obesity, June 8<sup>th</sup> 2010, Utrecht, The Netherlands. Title presentation: 'Adipose tissue dysfunction in the etiology of insulin resistance'.
2. Cordelier Research Center, University Pierre et Marie Curie-Paris 6 (INSERM U872), Apr 19<sup>th</sup> 2010, Paris, France (invitation by Prof. Karine Clément). 'Adipose tissue dysfunction in the etiology of insulin resistance: role of the renin-angiotensin system'.
3. 8<sup>th</sup> Dutch Endo-Neuro-Psycho meeting, June 3<sup>rd</sup> 2009, Doorwerth, The Netherlands. Title presentation: 'Adipose tissue dysfunction in the pathogenesis of insulin resistance: role of the renin-angiotensin system'.
4. NUTRIM Workshop 'Diabesity', May 23<sup>rd</sup> 2008, Maastricht, The Netherlands. Title presentation: 'Obesity-related insulin resistance: adipose tissue and skeletal muscle dysfunction'.
5. Unilever Corporate Research SPARK workshop 'Maintenance of Metabolic Flexibility in Ageing', Nov 10-11<sup>th</sup> 2006, Amsterdam, The Netherlands. Title presentation: 'Disturbances in adipose tissue and skeletal muscle metabolism: impact on metabolic flexibility'.
6. Masterclass 'Dietary Influences on Blood Pressure', Sept 27-28<sup>th</sup> 2006, Wageningen, The Netherlands. Title presentation: 'Obesity and blood pressure: role for the renin-angiotensin system?'.
7. Oxford Centre for Diabetes, Endocrinology and Metabolism Research Meeting, Apr 1<sup>st</sup> 2005, University of Oxford, Oxford, UK (invitation by Prof. K. Frayn and Dr. F Karpe). Title presentation: 'Possible involvement of the renin-angiotensin system in obesity-related disorders'.

### **Abstracts (presented at international meetings)**

1. Goossens GH, Petersen L, Blaak EE, Hul G, Arner P, Astrup A, Froguel P, Patel K, Pedersen O, Polak J, Oppert J-M, Martinez A, Sørensen TIA, Saris WHM, and the NUGENOB Consortium. Several gene polymorphisms but not FTO variants modulate resting energy expenditure and fat-induced thermogenesis in obese subjects: The NUGENOB Study. *Int J Obes* 2008; 32(1): S26.
2. Goossens GH, Jocken JWE, Blaak EE, Schiffrers PM, Saris WHM, van Baak MA. Endocrine role of the renin-angiotensin system in adipose tissue and skeletal muscle in vivo in humans: effect of beta-adrenergic stimulation. *Int J Obes* 2007; 31(1): S91.
3. Goossens GH, Jocken JWE, van Baak MA, Jansen EHJM, Saris WHM, Blaak EE. Beta-adrenergic regulation of leptin, adiponectin and interleukin-6 secretion in vivo in lean and obese subjects. *Int J Obes* 2007; 31(1): S32.
4. Jocken JWE, Goossens GH, van Hees A, Frayn KN, van Baak MA, Pakbiers M, Saris WHM, Blaak EE. Effect of beta-adrenergic stimulation on whole-body and regional abdominal subcutaneous adipose tissue lipolysis in lean and obese men. *Diabetologia* 2007; 50(1): S86.
5. Jocken JWE, Goossens GH, van Baak MA, Saris WHM, Blaak EE. The effect of beta-adrenergic stimulation on abdominal subcutaneous adipose tissue substrate fluxes in lean and obese men. *Obes Rev* 2005; 6(1): 74.
6. Goossens GH, Blaak EE, Schiffrers PM, Saris WHM, van Baak MA. ACE inhibition and insulin sensitivity in obese insulin resistant subjects: a double-blind placebo-controlled randomized trial to examine underlying mechanisms. *Diabetologia* 2006; 49(11): 455.

7. Goossens GH, McQuaid SE, Dennis AL, van Baak MA, Blaak EE, Frayn KN, Saris WHM, Karpe F. Angiotensin II: a major regulator of subcutaneous adipose tissue blood flow in humans. *Int J Obes* 2005; 29(3): S3.
8. Goossens GH, Jocken JW, Schiffers PM, Blaak EE, Saris WHM, van Baak MA. The effect of  $\beta$ -adrenergic stimulation on circulating angiotensin II concentration and angiotensin II release from adipose tissue and the forearm. *Int J Obes* 2005; 29(3): S6.
9. Goossens GH, Blaak EE, Schiffers PM, Saris WHM, van Baak MA. Does short-term ACE inhibitor treatment improve insulin sensitivity and hemodynamics in obese insulin resistant subjects? *Int J Obes* 2005; 29(3): S12.
10. Goossens GH, Jocken JW, Blaak EE, Saris WHM, Schiffers PM, van Baak MA. Angiotensin II release from adipose tissue and the forearm in lean and obese men: effect of beta-adrenergic stimulation. *Obes Rev* 2005; 6(1): 75.
11. Goossens GH, Blaak EE, Saris WHM, van Baak MA. Metabolic en hemodynamic effects of the ACE inhibitor ramipril in obese insulin resistant subjects. *Obes Rev* 2005; 6(1): 68.
12. Jocken JWE, Goossens GH, van Baak MA, Saris WHM, Blaak EE. The effect of beta-adrenergic stimulation on abdominal subcutaneous adipose tissue substrate fluxes in lean and obese men. *Obes Rev* 2005; 6(1): 74.
13. Goossens GH, van Baak MA, Saris WHM, Blaak EE. The effect of angiotensin II on abdominal subcutaneous adipose tissue lipolysis in normal-weight and obese subjects. *Int J Obes* 2004; 28(1): S83.
14. Goossens GH, Blaak EE, Saris WHM, van Baak MA. Ang II-induced effects on adipose and skeletal muscle tissue blood flow and lipolysis. *Int J Obes* 2003; 27: S26.
15. Goossens GH, Tan GD, Humphreys SM, Vidal H, Karpe F. Upper and lower body adipose tissue function: a direct comparison of fat mobilization. *Int J Obes* 2003; 27(1): S49.

## **Professional Training, Related Work Experience**

### **Educational experience**

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| 2006-now  | Lecturer and tutor of student groups within the problem based learning educational system at the Faculty of Health Sciences (Maastricht University).   |
| 2002-2006 | Tutor of student groups within the problem based learning educational system at the Faculty of Health Sciences (Maastricht University) and Faculty of Biomedical Engineering (Eindhoven University of Technology), guiding students in practical work. |

### **Management**

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| June 2010-now     | Secretary of the Netherlands Association for the Study of Obesity (NASO).                                 |
| Jan 2007-now      | Direct supervision of 1 PhD student (co-promotor), 1 technician and several bachelor and master students. |
| Jan 2002- Dec2006 | Direct supervision of several bachelor and master students.   |

## **Academic Service**

### **International activities**

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| 2002-now | <b>Oral presentations</b> at several international and national scientific meetings on obesity and type 2 diabetes mellitus (e.g. |
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- European Congress on Obesity, NASO, NVDO) (see 'Presentations, Abstracts').
- Apr 2008–May 2009 **Chair** of the satellite symposium 'Lipids and insulin resistance', 17<sup>th</sup> European Congress on Obesity, Amsterdam (6-9 May 2009). Chairs: Dr. G.H. Goossens and Dr. P. Schrauwen.
- Nov 2008–May 2009 **Member of scientific committee** of the 17<sup>th</sup> European Congress on Obesity, Amsterdam (6-9 May 2009).
- 2007 **Collaborative writing of book chapter** with Dr. F. Karpe (University of Oxford, Oxford, UK) on 'Human Adipose Tissue Blood Flow and Micromanipulation of Human Subcutaneous Blood Flow' (see 'Publications').
- Jan-May 2005 **Visit abroad (visiting scientist)** (awarded with a scholarship from the Netherlands Organisation for Scientific Research (NWO)): Collaboration with Prof. dr. K. Frayn and Dr. F. Karpe from the Oxford Centre for Diabetes, Endocrinology and Metabolism (University of Oxford, Oxford, UK) to investigate the role of the renin-angiotensin system in adipose tissue blood flow regulation using the recently-developed microinfusion technique.
- 2003-now **Reviewer** for several international scientific journals, including Diabetes, Diabetologia, International Journal of Obesity, Metabolism, Kidney International, Hormone and Metabolic Research.
- Oct 2001-Apr 2002 **Visit abroad (visiting scientist)** (grant from the Dutch Diabetes Research Foundation (DFN)). Collaboration with Prof. K. Frayn and Dr. F. Karpe from the Oxford Centre for Diabetes, Endocrinology and Metabolism (University of Oxford, Oxford, UK) to investigate fat mobilization from different adipose tissue depots in vivo in humans using arterio-venous difference measurements.
- Nov 2006-Apr 2007 **Chair** of the workshop 'Techniques to study in vivo tissue metabolism in man', 15th European Congress on Obesity, April 24<sup>th</sup>, Budapest, Hungary. Chairs: Dr. G.H. Goossens and Prof. dr. E.E. Blaak.