



## CURRICULUM VITAE

**NAME:** Hans Vink  
**DATE OF BIRTH:** January 31, 1967  
**PLACE OF BIRTH:** Waalwijk, The Netherlands  
**GENDER:** Male  
**CITIZENSHIP:** The Netherlands

### PRESENT POSITION:

Associate Professor of Vascular Physiology (May 2006 - present)  
Department of Physiology  
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GlycoCheck BV  
Oxfordlaan 70  
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### DISSERTATION TITLE:

The endothelial cell glycocalyx as determinant of capillary hematocrit (1994)

### RESEARCH INTERESTS:

Clinical assessment of endothelial glycocalyx to identify early vascular risk  
Glycocalyx biophysics and biochemistry in relation to vascular (dys)function.

The endothelial glycocalyx forms a complex, hydrated mesh of cell surface proteoglycans, glycosaminoglycans, and plasma proteins that is situated between the vascular wall and flowing blood. Strategically situated between flowing blood and the vascular surface, an intact glycocalyx forms the first line of defence of blood vessels against atherogenic challenges by limiting leakage of atherogenic lipoproteins into the vessel wall and preventing adhesion of circulating coagulatory and inflammatory cells to the vascular endothelial lining. Recent clinical studies have demonstrated that monitoring glycocalyx damage identifies early vascular vulnerability in patients with e.g. early cognitive impairment (neurology), premature atherosclerosis and coronary microvascular disease (cardiology), impaired renal function (nephrology), insulin resistance (diabetes) and acute vascular vulnerability in critically ill patients (ICU).

As a spin-off of MUMC, GlycoCheck BV is developing a non-invasive test for early detection of personal vascular vulnerability in the context of increased cardiovascular risk by e.g. diabetes. The test is based on automated analysis of clinical videomicroscopic recordings of microvascular hemodynamics to check the quality of the endothelial glycocalyx, a protective coating on the luminal surface of blood vessels.

## RESEARCH EXPERIENCE:

Associate Professor of Vascular Physiology  
Department of Physiology, Cardiovascular Research Institute Maastricht,  
Maastricht University (2006 – present)

Full Professor of Circulatory Physics (Bijzonder Hoogleraar) by the Genootschap ter Bevordering van de Natuur-, Genees- en Heelkunde  
Department of Vascular Medicine, Academic Medical Center of Amsterdam,  
University of Amsterdam (2008 – 2013)

Established Investigator of the Netherlands Heart Foundation (NHF)  
Department of Physiology, Cardiovascular Research Institute Maastricht,  
Maastricht University (2006 – present)

Research fellow of the Royal Netherlands Academy of Arts and Sciences (KNAW),  
Department of Medical Physics / Academic Medical Center, UvA (2001 – 2005)

Assistant Professor of Medical Physics  
Department of Medical Physics, Academic Medical Center, UvA (June 1999 - 2001)

Postdoctoral Fellowship: "Capillary blood flow rheology and the role of plasma proteins", Netherlands Organization for Scientific Research (NWO, # 902-16-205, 1996)  
Department of Medical Physics, Academic Medical Center, UvA (Sept 1996 – May 1999)

Postdoctoral Fellow,  
Department of Molecular Physiology and Biological Physics,  
University of Virginia, Health Sciences Center (1995-sept 1996)

Research Associate,  
Department of Molecular Physiology and Biological Physics,  
University of Virginia, Health Sciences Center (1994-1995)

## GRANTS AND FELLOWSHIPS:

Fellow of the European Society of Cardiology (2010)

Founding of GlycoCheck BV (2010) – a MUMC spin-off for non-invasive assessment of glycocalyx dimension and permeability for early detection of personal vascular vulnerability in the context of increased cardiovascular risk.

**\*(Patent Application PCT/EP2008/066524, "Diagnostic and therapeutic tools for diseases altering vascular function", filled 01-12-2008 and published 04-06-2009 onder WO2009/068685)**

Programme Grant CTMM: Glycocalyx as early marker for vascular risk in diabetes (PREDICCT consortium, 2010 – 2013, extension of ongoing programme with 82.000 euros for clinical cohort study of 6000 patients and 200.000 euros for further product development).

Programme Grant: 'GLYCOREN - The structure and function of the glycocalyx in glomerular physiology and pathology' (Dutch Kidney Foundation, 2010 - 2015, 1.500.000 euros, in collaboration with LUMC and RUNMC)

Pre-Seed grant: 'GlycoCheck – Check Your Health' (Netherlands Genomics Initiative and ZonMW, 2010 – 2012, 250.000 euros for the start-up of MUMC spin-off for clinical measurement of glycocalyx)

Kenniswerkersregeling 'Glycocalyx Measurement Tool': 380.000 euros (Economische Zaken; 2010 - 2011, ism TOPIC)

Project Grant: Magnetic resonance imaging (MRI) of microvascular blood volume recruitment capacity in the heart: indicator of coronary endothelial glycocalyx loss and associated microvascular dysfunction? (Netherlands Heart Found, 2009, 233.000 euros)

Project Grant: "Role of the endothelial glycocalyx in renal glomerular and tubular function " (Kidney Foundation, 2009 – 2012; \$ 375,000.-)

Program Grant: "The endothelial glycocalyx: early marker and therapeutic target of vascular complications in diabetes" (CTMM Diabetes, PREDICCT Consortium, 2008 – 2013; \$ 1,300,000.-)

Project Grant: "An intact endothelial glycocalyx is required for adequate shear stress induced arteriogenesis" (Netherlands Heart Foundation, 2007 – 2011; \$ 300,000.-)

Project Grant: "Role of insulin-mediated glycocalyx modulation in insulin sensitivity" (Dutch Diabetes Research Foundation, 2007 – 2011; \$ 365,000.-)

Established Investigatorship "The endothelial glycocalyx: first line defense against cardiovascular disease" (Netherlands Heart Foundation, 2005 - 2011; \$ 675,000.-)

Research Fellowship for project "the endothelial cell glycocalyx and vascular function". (Royal Netherlands Academy of Arts and Sciences, 2001 – 2005; \$ 500,000.-)

Project Grant: "Contribution of capillary glycocalyx volume modulation to local control of coronary flow" (Netherlands Heart Foundation, 2004; \$ 200,000.-)

Project Grant: "Modulation of vascular function by binding of lipoprotein lipase to the endothelial cell glycocalyx" (Cardiovascular Research Institute Amsterdam, Acad. Medical Center, 2001; \$ 200,000.-)

Van Leeuwenhoek distinctive Travel Award donated by The European Society for Microcirculation "for Dr. Vink's contributions to the advancement of microcirculatory research." Stockholm, June 2000

Program Grant: "The role of the glycocalyx in myocardial perfusion and coronary endothelial function in health and disease" (NWO, 1999, co-investigator with prof Jos Spaan; \$ 500,000.-)

Project Grant: "The role of the capillary glycocalyx in microvascular permeability, rheology, and exchange" (The Whitaker Foundation, 1999, co-investigator with dr Ed Damiano; \$ 210,000.-)

Project Grant: "The role of the endothelial cell glycocalyx in development of atherosclerosis" (Cardiovascular Research Institute Amsterdam, Acad. Medical Center, 1997; \$ 150,000.-)

Postdoctoral Fellowship: Netherlands Organization for Scientific Research (NWO, 1996; \$ 150,000.-)  
Postdoctoral Fellowship, American Heart Association, Virginia Affiliate (1995; \$ 50,000.-)

## **P U B L I C A T I O N S :**

Cornelis T, Broers NJ, Titulaer DC, Henskens YM, van Oerle R, van der Sande FM, Spronk HM, Vink H, Leunissen KM, Ten Cate H, Kooman JP.  
Effects of Ultrapure Hemodialysis and Low Molecular Weight Heparin on the Endothelial Surface Layer. *Blood Purif.* 2014 Dec 16;38(3-4):203-210. [Epub ahead of print]

Vlahu CA, Lopes Barreto D, Struijk DG, Vink H, Krediet RT.  
Is the systemic microvascular endothelial glycocalyx in peritoneal dialysis patients related to peritoneal transport? *Nephron Clin Pract.* 2014;128(1-2):159-65. Epub 2014 Nov 6.

Lee DH, Dane MJ, van den Berg BM, Boels MG, van Teeffelen JW, de Mutsert R, den Heijer M, Rosendaal FR, van der Vlag J, van Zonneveld AJ, Vink H, Rabelink TJ; NEO study group.  
Deeper penetration of erythrocytes into the endothelial glycocalyx is associated with impaired microvascular perfusion. *PLoS One.* 2014 May 9;9(5):e96477.

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Early impairment of skeletal muscle endothelial glycocalyx barrier properties in diet-induced obesity in mice. *Physiol Rep.* 2014 Jan 6;2(1):e00194.

Donati A, Damiani E, Luchetti M, Domizi R, Scorcella C, Carsetti A, Gabbanelli V, Carletti P, Bencivenga R, Vink H, Adrario E, Piagnerelli M, Gabrielli A, Pelaia P, Ince C.  
Microcirculatory effects of the transfusion of leukodepleted or non-leukodepleted red blood cells in patients with sepsis: a pilot study. *Crit Care.* 2014 Feb 17;18(1):R33.

Groen BB, Hamer HM, Snijders T, van Kranenburg J, Frijns D, Vink H, van Loon LJ.  
Skeletal muscle capillary density and microvascular function are compromised with aging and type 2 diabetes. *J Appl Physiol (1985).* 2014 Feb 27. [Epub ahead of print].

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Association of Kidney Function with Changes in the Endothelial Surface Layer.  
*Clin J Am Soc Nephrol*. 2014 Jan 23. [Epub ahead of print].
- Eskens BJ, Zuurbier CJ, van Haare J, Vink H, van Teeffelen JW.  
Effects of two weeks of metformin treatment on whole-body glycocalyx barrier properties in db/db mice.  
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- Mulders TA, Nieuwdorp M, Stroes ES, Vink H, Pinto-Sietsma SJ.  
Non-invasive assessment of microvascular dysfunction in families with premature coronary artery disease. *Int J Cardiol*. 2013 Oct 12;168(5):5026-8. doi: 10.1016/j.ijcard.2013.07.166. Epub 2013 Jul 25.
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Sublingual microvascular glycocalyx dimensions in lacunar stroke patients.  
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Reitsma S, oude Egbrink MG, Vink H, van den Berg BM, Passos VL, Engels W, Slaaf DW, van Zandvoort MA. Endothelial glycocalyx structure in the intact carotid artery: a two-photon laser scanning microscopy study.

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van den Berg BM, Spaan JA, Vink H.

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Nieuwdorp M, Meuwese MC, Mooij HL, van Lieshout MH, Hayden A, Levi M, Meijers JC, Ince C, Kastelein JJ, Vink H, Stroes ES.

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VanTeeffelen JW, Constantinescu AA, Brands J, Spaan JA, Vink H.

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Nijenhuis N, Mizuno D, Schmidt CF, Vink H, Spaan JA.

Microrheology of Hyaluronan Solutions: Implications for the Endothelial Glycocalyx.

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Hypothesis: arterial glycocalyx dysfunction is the first step in the atherothrombotic process.

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Van Teeffelen J, Vink H, Ameredes BT, Jones AM, Egginton S, Ferreira LF, Schmid-Schoenbein GW, Murfee WL, Segal SS, Tyml K, McDonough P, Keller D, Buckwalter J, Duling B, Rowell LB. Commentary on Point:

Counterpoint debate: "There is / is not capillary recruitment in active skeletal muscle during exercise."

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Nieuwdorp M, Meuwese MC, Mooij HL, Ince C, Broekhuizen LN, Kastelein JJ, Stroes ES, Vink H.

Measuring endothelial glycocalyx dimensions in humans: a potential novel tool to monitor vascular vulnerability.

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VanTeeffelen JW, Brands J, Jansen C, Spaan JA, Vink H.

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Van Teeffelen JW, Brands J, Stroes ES, Vink H.

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Nieuwdorp M, Holleman F, de Groot E, Vink H, Gort J, Kontush A, Chapman MJ, Hutten BA, Brouwer CB, Hoekstra JB, Kastelein JJ, Stroes ES.

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van den Berg BM, Nieuwdorp M, Stroes ES, Vink H.

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Bernard van den Berg and Hans Vink

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Mirella Gouverneur, Bernard van den Berg, Max Nieuwdorp, Erik Stroes, Hans Vink

Vasculoprotective Properties of the Endothelial Glycocalyx: Effects of Fluid Shear Stress

Journal of Internal Medicine, April 2006, 259: 393-400

Max Nieuwdorp; Hans L Mooij; Jojanneke Kroon; Bektas Atasever; Jos AE Spaan; Can Ince; Frits Holleman; Michaela Diamant; Robert J Heine; Joost BL Hoekstra; John JP Kastelein; Erik SG Stroes, and Hans Vink. Progressive glycocalyx perturbation coincides with microvascular complications in patients with longstanding type 1 diabetes mellitus. *Diabetes*. 2006 Apr;55(4):1127-32. PMID: 16567538 [PubMed - in process]

Nieuwdorp M, van Haeften TW, Gouverneur MCLG, Mooij HL, van Lieshout MHP, Levi M, Meijers JCM, Holleman F, Hoekstra JBL, Vink H, Kastelein JJP and Stroes ESG. Loss of Endothelial Glycocalyx during Acute Hyperglycemia Coincides with Endothelial Dysfunction and Coagulation Activation in vivo. *Diabetes*, Feb 2006, 55(2): 480-486

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Van den Berg BM, Spaan JA, Rolf TM, Vink H.

Atherogenic region and diet diminish glycocalyx dimension and increase intima media ratios at the murine carotid artery bifurcation. *Am J Physiol Heart Circ Physiol*. 2006 Feb;290(2):H915-20. Epub 2005 Sep 9; PMID: 16155109 [PubMed - as supplied by publisher]

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Van Haaren PM, Vanbavel E, Vink H, Spaan JA.

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Evidence that cell surface charge reduction modifies capillary red cell velocity-flux relationships in hamster cremaster muscle. *J Physiol*. 1995 Nov 15;489 ( Pt 1):193-201. PMID: 8583403 [PubMed - indexed for MEDLINE]