

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
Cardiovascular Research Institute Maastricht,
Maastricht University, PO Box 616
Maastricht, The Netherlands
Email: h.vink@maastrichtuniversity.nl

Founder and Chief Science Officer (Dec 2010 – present)
GlycoCheck BV
The Netherlands
Email: hans.vink@glycocheck.com

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:

Programme Grant: ‘GLYCOTREAT - The GLYCOcalyx and heparanase as biomarkers and therapeutic targets in TREATment of glomerular diseases’ (Dutch Kidney Foundation, 2017 - 2020, 1.050.000 euros, in collaboration with LUMC and RUNMC)

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.-)

PUBLICATIONS:

Rovas A, Seidel LM, **Vink H**, Pohlkötter T, Pavenstädt H, Ertmer C, Hessler M, Kümpers P. Association of sublingual microcirculation parameters and endothelial glycocalyx dimensions in resuscitated sepsis. Crit Care. 2019 Jul 24;23(1):260. doi: 10.1186/s13054-019-2542-2.

van den Berg BM, Wang G, Boels MGS, Avramut MC, Jansen E, Sol WMPJ, Lebrin F, van Zonneveld AJ, de Koning EJP, **Vink H**, Gröne HJ, Carmeliet P, van der Vlag J, Rabelink TJ. Glomerular Function and Structural Integrity Depend on Hyaluronan Synthesis by Glomerular Endothelium. J Am Soc Nephrol. 2019 Jul 15. pii: ASN.2019020192. doi: 10.1681/ASN.2019020192. [Epub ahead of print]

Astapenko D, Pouska J, Benes J, Skulec R, Lehmann C, **Vink H**, Cerny V. Neuraxial anesthesia is less harmful to the endothelial glycocalyx during elective joint surgery compared to general anesthesia. Clin Hemorheol Microcirc. 2019;72(1):11-21. doi: 10.3233/CH-180428.

Haeren RHL, Rijkers K, Schijns OEMG, Dings J, Hoogland G, van Zandvoort MAMJ, **Vink H**, van Overbeeke JJ. In vivo assessment of the human cerebral microcirculation and its glycocalyx: A technical report. J Neurosci Methods. 2018 Jun 1;303:114-125. doi: 10.1016/j.jneumeth.2018.03.009. Epub 2018 Mar 22.

Rovas A, Lukasz AH, **Vink H**, Urban M, Sackarnd J, Pavenstädt H, Kümpers P. Bedside analysis of the sublingual microvascular glycocalyx in the emergency room and intensive care unit - the GlycoNurse study. Scand J Trauma Resusc Emerg Med. 2018 Feb 14;26(1):16. doi: 10.1186/s13049-018-0483-4.

Machin DR, Gates PE, **Vink H**, Frech TM, Donato AJ. Automated Measurement of Microvascular Function Reveals Dysfunction in Systemic Sclerosis: A Cross-sectional Study. J Rheumatol. 2017 Nov;44(11):1603-1611. doi: 10.3899/jrheum.170120. Epub 2017 Sep 15.

Jaarsma C, **Vink H**, van Haare J, Bekkers SCAM, van Rooijen BD, Backes WH, Wildberger JE, Crijns HJ, van Teeffelen J, Schalla S. Non-invasive assessment of microvascular dysfunction in patients with microvascular angina. Int J Cardiol. 2017 Dec 1;248:433-439. doi: 10.1016/j.ijcard.2017.05.010. Epub 2017 Jul 18.

van Haare J, Kooi ME, van Teeffelen JW, **Vink H**, Slenter J, Cobelens H, Strijkers GJ, Koehn D, Post MJ, van Bilsen M. Metformin and sulodexide restore cardiac microvascular perfusion capacity in diet-induced obese rats. Cardiovasc Diabetol. 2017 Apr 11;16(1):47. doi: 10.1186/s12933-017-0525-7. PMID: 28399917 Free PMC Article

Haeren RH, **Vink H**, Staals J, van Zandvoort MA, Dings J, van Overbeeke JJ, Hoogland G, Rijkers K, Schijns OE. Protocol for intraoperative assessment of the human cerebrovascular glycocalyx. BMJ Open. 2017 Jan 5;7(1):e013954. doi: 10.1136/bmjopen-2016-013954.

Haeren RH, van de Ven SE, van Zandvoort MA, **Vink H**, van Overbeeke JJ, Hoogland G, Rijkers K. Assessment and Imaging of the Cerebrovascular Glycocalyx. Curr Neurovasc Res. 2016;13(3):249-60.

Koning NJ, Vonk AB, **Vink H**, Boer C. Side-by-Side Alterations in Glycocalyx Thickness and Perfused Microvascular Density During Acute Microcirculatory Alterations in Cardiac Surgery. Microcirculation. 2016 Jan;23(1):69-74.

van Haare J, Kooi ME, **Vink H**, Post MJ, van Teeffelen JW, Slenter J, Munts C, Cobelens H, Strijkers GJ, Koehn D, van Bilsen M.

Early impairment of coronary microvascular perfusion capacity in rats on a high fat diet. *Cardiovasc Diabetol*. 2015 Nov 17;14:150.

Potter DR, van Teeffelen J, **Vink H**, van den Berg BM.

Perturbed mechanotransduction by endothelial surface glycocalyx modification greatly impairs the arteriogenic process.

Am J Physiol Heart Circ Physiol. 2015 Aug 15;309(4):H711-7.

Dane MJ, van den Berg BM, Lee DH, Boels MG, Tiemeier GL, Avramut MC, van Zonneveld AJ, van der Vlag J, **Vink H**, Rabelink TJ.

A microscopic view on the renal endothelial glycocalyx.

Am J Physiol Renal Physiol. 2015 May 1;308(9):F956-66.

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.

Eskens BJ, Leurgans TM, **Vink H**, Vanteeffelen JW.

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]

Dane MJ, Khairoun M, Lee DH, van den Berg BM, Eskens BJ, Boels MG, van Teeffelen JW, Rops AL, van der Vlag J, van Zonneveld AJ, Reinders ME, **Vink H**, Rabelink TJ.

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. *Cardiovasc Diabetol*. 2013 Dec 5;12:175. doi: 10.1186/1475-2840-12-175.

Brands J, van Haare J, **Vink H**, Vanteeffelen JW.

Whole-body recruitment of glycocalyx volume during intravenous adenosine infusion.

Physiol Rep. 2013 Oct;1(5):e00102. doi: 10.1002/phy2.102. Epub 2013 Oct 11.

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.

- Martens RJ, **Vink H**, van Oostenbrugge RJ, Staals J.
Sublingual microvascular glycocalyx dimensions in lacunar stroke patients.
Cerebrovasc Dis. 2013;35(5):451-4. doi: 10.1159/000348854. Epub 2013 May 31.
- Dane MJ, van den Berg BM, Avramut MC, Faas FG, van der Vlag J, Rops AL, Ravelli RB, Koster BJ, van Zonneveld AJ, **Vink H**, Rabelink TJ.
Glomerular endothelial surface layer acts as a barrier against albumin filtration.
Am J Pathol. 2013 May;182(5):1532-40. doi: 10.1016/j.ajpath.2013.01.049. Epub 2013 Mar 19.
- VanTeeffelen JW, Brands J, Janssen BJ, **Vink H**.
Effect of acute hyaluronidase treatment of the glycocalyx on tracer-based whole body vascular volume estimates in mice. *J Appl Physiol* (1985). 2013 May;114(9):1132-40. doi: 10.1152/jappphysiol.00842.2012. Epub 2013 Feb 28.
- Eskens BJ, Mooij HL, Cleutjens JP, Roos JM, Cobelens JE, **Vink H**, Vanteeffelen JW.
Rapid insulin-mediated increase in microvascular glycocalyx accessibility in skeletal muscle may contribute to insulin-mediated glucose disposal in rats.
PLoS One. 2013;8(1):e55399. doi: 10.1371/journal.pone.0055399. Epub 2013 Jan 31.
- Vlahu CA, Lemkes BA, Struijk DG, Koopman MG, Krediet RT, **Vink H**.
Damage of the endothelial glycocalyx in dialysis patients.
J Am Soc Nephrol. 2012 Nov;23(11):1900-8. doi: 10.1681/ASN.2011121181. Epub 2012 Oct 18.
- Wijnands KA, **Vink H**, Briedé JJ, van Faassen EE, Lamers WH, Buurman WA, Poeze M.
Citrulline a more suitable substrate than arginine to restore NO production and the microcirculation during endotoxemia.
PLoS One. 2012;7(5):e37439. doi: 10.1371/journal.pone.0037439. Epub 2012 May 29.
- Pacella JJ, Kameneva MV, Brands J, Lipowsky HH, **Vink H**, Lavery LL, Villanueva FS.
Modulation of pre-capillary arteriolar pressure with drag-reducing polymers: a novel method for enhancing microvascular perfusion.
Microcirculation. 2012 Oct;19(7):580-5. doi: 10.1111/j.1549-8719.2012.00190.x.
- Brands J, **Vink H**, Van Teeffelen JW.
Comparison of four mathematical models to analyze indicator-dilution curves in the coronary circulation. *Med Biol Eng Comput.* 2011 Dec;49(12):1471-9. doi: 10.1007/s11517-011-0845-9. Epub 2011 Nov 18.
- Reitsma S, Oude Egbrink MG, Heijnen VV, Megens RT, Engels W, **Vink H**, Slaaf DW, van Zandvoort MA.
Endothelial glycocalyx thickness and platelet-vessel wall interactions during atherogenesis.
Thromb Haemost. 2011 Nov;106(5):939-46. doi: 10.1160/TH11-02-0133. Epub 2011 Sep 8.
- Broekhuizen LN, van Wijk DF, **Vink H**, Stalmach A, Crozier A, Hutten BA, Kastelein JJ, Hugenholtz PG, Koenig W, Stroes ES.
Reduction of monocyte chemoattractant protein 1 and macrophage migration inhibitory factor by a polyphenol-rich extract in subjects with clustered cardiometabolic risk factors.
Br J Nutr. 2011 Nov;106(9):1416-22. doi: 10.1017/S0007114511002431. Epub 2011 Jun 28.
- Lekakis J, Abraham P, Balbarini A, Blann A, Boulanger CM, Cockcroft J, Cosentino F, Deanfield J, Gallino A, Ikonomidis I, Kremastinos D, Landmesser U, Protogerou A, Stefanadis C, Tousoulis D, Vassalli G, **Vink H**, Werner N, Wilkinson I, Vlachopoulos C.
Methods for evaluating endothelial function: a position statement from the European Society of Cardiology Working Group on Peripheral Circulation.
Eur J Cardiovasc Prev Rehabil. 2011 Dec;18(6):775-89. doi: 10.1177/1741826711398179. Review.
- 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.
J Vasc Res. 2011;48(4):297-306. doi: 10.1159/000322176. Epub 2011 Jan 27.

- Constantinescu A, Spaan JA, Arkenbout EK, **Vink H**, Vanteeffelen JW.
Degradation of the endothelial glycocalyx is associated with chylomicron leakage in mouse cremaster muscle microcirculation.
Thromb Haemost. 2011 May;105(5):790-801. doi: 10.1160/TH10-08-0560. Epub 2010 Dec 21.
- Meuwese MC, Broekhuizen LN, Kuikhoven M, Heeneman S, Lutgens E, Gijbels MJ, Nieuwdorp M, Peutz CJ, Stroes ES, **Vink H**, van den Berg BM.
Endothelial surface layer degradation by chronic hyaluronidase infusion induces proteinuria in apolipoprotein E-deficient mice.
PLoS One. 2010 Dec 8;5(12):e14262. doi: 10.1371/journal.pone.0014262.
- Broekhuizen LN, Lemkes BA, Mooij HL, Meuwese MC, Verberne H, Holleman F, Schlingemann RO, Nieuwdorp M, Stroes ES, **Vink H**.
Effect of sulodexide on endothelial glycocalyx and vascular permeability in patients with type 2 diabetes mellitus.
Diabetologia. 2010 Dec;53(12):2646-55. doi: 10.1007/s00125-010-1910-x. Epub 2010 Sep 25.
- Snoeijis MG, **Vink H**, Voesten N, Christiaans MH, Daemen JW, Peppelenbosch AG, Tordoir JH, Peutz-Kootstra CJ, Buurman WA, Schurink GW, van Heurn LW.
Acute ischemic injury to the renal microvasculature in human kidney transplantation.
Am J Physiol Renal Physiol. 2010 Nov;299(5):F1134-40. doi: 10.1152/ajprenal.00158.2010. Epub 2010 Sep 1.
- VanTeeffelen JW, Brands J, **Vink H**.
Agonist-induced impairment of glycocalyx exclusion properties: contribution to coronary effects of adenosine.
Cardiovasc Res. 2010 Jul 15;87(2):311-9. Epub 2010 Apr 23.
- Brands J, Spaan JA, Van den Berg BM, **Vink H**, VanTeeffelen JW.
Acute attenuation of glycocalyx barrier properties increases coronary blood volume independently of coronary flow reserve.
Am J Physiol Heart Circ Physiol. 2010 Feb;298(2):H515-23. Epub 2009 Nov 25.
- Grundmann S, Schirmer SH, Hekking LH, Post JA, Ionita MG, de Groot D, van Royen N, van den Berg B, **Vink H**, Moser M, Bode C, de Kleijn D, Pasterkamp G, Piek JJ, Hofer IE.
Endothelial glycocalyx dimensions are reduced in growing collateral arteries and modulate leucocyte adhesion in arteriogenesis
J Cell Mol Med. 2009 Sep;13(9B):3463-74. Epub 2009 Mar 6.
- Broekhuizen LN, Mooij HL, Kastelein JJ, Stroes ES, **Vink H**, Nieuwdorp M.
Endothelial glycocalyx as potential diagnostic and therapeutic target in cardiovascular disease.
Curr Opin Lipidol. 2009 Feb;20(1):57-62. Review.
- van den Berg BM, Spaan JA, **Vink H**.
Impaired glycocalyx barrier properties contribute to enhanced intimal low-density lipoprotein accumulation at the carotid artery bifurcation in mice.
Pflugers Arch. 2009 Apr;457(6):1199-206.
- Meuwese MC, Mooij HL, Nieuwdorp M, van Lith B, Marck R, **Vink H**, Kastelein JJ, Stroes ES.
Partial recovery of the endothelial glycocalyx upon rosuvastatin therapy in patients with heterozygous familial hypercholesterolemia.
J Lipid Res. 2009 Jan;50(1):148-53. Epub 2008 Aug 11.
- Nieuwdorp M, Meuwese MC, Mooij HL, van Lieshout MH, Hayden A, Levi M, Meijers JC, Ince C, Kastelein JJ, **Vink H**, Stroes ES.
Tumor necrosis factor-alpha inhibition protects against endotoxin-induced endothelial glycocalyx perturbation.
Atherosclerosis. 2009 Jan;202(1):296-303. Epub 2008 Apr 12

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

Bradykinin- and sodium nitroprusside-induced increases in capillary tube haematocrit in mouse cremaster muscle are associated with impaired glycocalyx barrier properties.

J Physiol. 2008 Jul 1;586(13):3207-18. Epub 2008 May 1.

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

Microrheology of Hyaluronan Solutions: Implications for the Endothelial Glycocalyx.

Biomacromolecules. 2008 Aug 14. [Epub ahead of print]

Noble MI, Drake-Holland AJ, **Vink H**.

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

QJM. 2008 Mar 4.

Van Teeffelen J, **Vink H**, Ameredes BT, Jones AM, Egginton S, Ferreira LF, Schmid-Schoenbein

GW, Murfee WL, Segal SS, Tymk 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."

J Appl Physiol. 2008 Mar;104(3):895-9.

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.

J Appl Physiol. 2008 Mar;104(3):845-52.

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

Heparin impairs glycocalyx barrier properties and attenuates shear dependent vasodilation in mice. Hypertension. 2007 Jul;50(1):261-7. Epub 2007 Apr 23.

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

Endothelial glycocalyx: sweet shield of blood vessels. Trends Cardiovasc Med. 2007 Apr;17(3):101-5. Review.

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.

Perturbation of hyaluronan metabolism predisposes patients with type 1 diabetes mellitus to atherosclerosis. Diabetologia. 2007 Jun;50(6):1288-93. Epub 2007 Apr 6.

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

Glycocalyx and endothelial (dys) function: from mice to men. Pharmacol Rep. 2006;58 Suppl:75-80.

Reitsma S, Slaaf DW, **Vink H**, van Zandvoort MA, oude Egbrink MG.

The endothelial glycocalyx: composition, functions, and visualization.

Pflugers Arch. 2007 Jun;454(3):345-59. Epub 2007 Jan 26.

Bernard van den Berg and **Hans Vink**

Glycocalyx perturbation: Cause or consequence of damage to the vasculature?

American Journal of Physiology, Editorial Focus, 2006 Jun;290(6):H2174-5. PMID: 16687608

[PubMed - in process]

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 Haefen 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

Han Y, Weinbaum S, Spaan J, **Vink H**.

Large Deformation Analysis of the Elastic Recoil of Fiber Layers in a Brinkman Medium with Application to the Endothelial Glycocalyx. Journal of Fluid Mechanics, May 2006, 254: 217-235.

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]

Nieuwdorp M, Meuwese MC, **Vink H**, Hoekstra JB, Kastelein JJ, Stroes ES.

The endothelial glycocalyx: a potential barrier between health and vascular disease. Curr Opin Lipidol. 2005 Oct;16(5):507-11. PMID: 16148534 [PubMed - in process]

- Gouverneur M, Spaan JA, Pannekoek H, Fontijn RD, **Vink H**. Fluid shear stress stimulates incorporation of hyaluronan into the endothelial cell glycocalyx. *Am J Physiol Heart Circ Physiol*. 2006 Jan;290(1):H458-2. Epub 2005 Aug 26; PMID: 16126814 [PubMed - as supplied by publisher]
- Van Haaren PM, Vanbavel E, **Vink H**, Spaan JA. Charge modification of the endothelial surface layer modulates the permeability barrier of isolated rat mesenteric small arteries. *Am J Physiol Heart Circ Physiol*. 2005 Dec;289(6):H2503-7. Epub 2005 Aug 12; PMID: 16100247 [PubMed - as supplied by publisher]
- Vanteffelen JW, Dekker S, Fokkema DS, Siebes M, **Vink H**, Spaan JA. Hyaluronidase treatment of coronary glycocalyx increases reactive hyperemia but not adenosine hyperemia in dog hearts. *Am J Physiol Heart Circ Physiol*. 2005 Dec;289(6):H2508-13. Epub 2005 Jul 22; PMID: 16040715 [PubMed - as supplied by publisher]
- Zuurbier CJ, Demirci C, Koeman A, **Vink H**, Ince C. Short-term hyperglycemia increases endothelial glycocalyx permeability and acutely decreases lineal density of capillaries with flowing red blood cells. *J Appl Physiol*. 2005 Oct;99(4):1471-6. Epub 2005 Jul 14. PMID: 16024521 [PubMed - in process]
- VanTeeffelen JW, Constantinescu AA, **Vink H**, Spaan JA. Hypercholesterolemia impairs reactive hyperemic vasodilation of 2A but not 3A arterioles in mouse cremaster muscle. *Am J Physiol Heart Circ Physiol*. 2005 Jul;289(1):H447-54. Epub 2005 Feb 25. PMID: 15734874 [PubMed - indexed for MEDLINE]
- Bastiaanse J, Slaaf DW, oude Egbrink MG, Anderson GL, **Vink H**, v. der Heijden BE, Kon M. Effect of hypothermia and HTK on the microcirculation in the rat cremaster muscle after ischaemia. *Clin Sci (Lond)*. 2005 Jul;109(1):117-23. PMID: 15610071 [PubMed]
- Van Haaren PM, VanBavel E, **Vink H**, Spaan JA. Localization of the permeability barrier to solutes in isolated arteries by confocal microscopy. *Am J Physiol Heart Circ Physiol*. 2003 Dec;285(6):H2848-56. Epub 2003 Aug 7. PMID: 12907418
- Constantinescu AA, **Vink H**, Spaan JA. Endothelial cell glycocalyx modulates immobilization of leukocytes at the endothelial surface. *Arterioscler Thromb Vasc Biol*. 2003 Sep 1;23(9):1541-7. Epub 2003 Jul 10. PMID: 12855481
- Weinbaum S, Zhang X, Han Y, **Vink H**, Cowin SC. Mechanotransduction and flow across the endothelial glycocalyx. *Proc Natl Acad Sci U S A*. 2003 Jun 24;100(13):7988-95. Epub 2003 Jun 16. PMID: 12810946 [PubMed - indexed for MEDLINE]
- Mochizuki S, **Vink H**, Hiramatsu O, Kajita T, Shigeto F, Spaan JA, Kajiya F. Role of hyaluronic acid glycosaminoglycans in shear-induced endothelium-derived nitric oxide release. *Am J Physiol Heart Circ Physiol*. 2003 Aug;285(2):H722-6. Epub 2003 May 1. PMID: 12730059 [PubMed - indexed for MEDLINE]
- Van den Berg BM, **Vink H**, Spaan JA. The endothelial glycocalyx protects against myocardial edema. *Circ Res*. 2003 Apr 4;92(6):592-4. Epub 2003 Mar 13. PMID: 12637366 [PubMed - indexed for MEDLINE]
- Constantinescu AA, **Vink H**, Spaan JA. Elevated capillary tube hematocrit reflects degradation of endothelial cell glycocalyx by oxidized LDL. *Am J Physiol Heart Circ Physiol*. 2001 Mar;280(3):H1051-7. PMID: 11179046 [PubMed]
- Vink H**, Constantinescu AA, Spaan JA. Oxidized lipoproteins degrade the endothelial surface layer : implications for platelet-endothelial cell adhesion. *Circulation*. 2000 Apr 4;101(13):1500-2. PMID: 10747340 [PubMed]
- Vink H**, Duling BR.

Capillary endothelial surface layer selectively reduces plasma solute distribution volume. Am J Physiol Heart Circ Physiol. 2000 Jan;278(1):H285-9. PMID: 10644610 [PubMed]

Merkus D, Kajiya F, **Vink H**, Vergroesen I, Dankelman J, Goto M, Spaan JA. Prolonged diastolic time fraction protects myocardial perfusion when coronary blood flow is reduced. Circulation. 1999 Jul 6;100(1):75-81. PMID: 10393684 [PubMed - indexed for MEDLINE]

Vink H, Duling BR.

Identification of distinct luminal domains for macromolecules, erythrocytes, and leukocytes within mammalian capillaries. Circ Res. 1996 Sep;79(3):581-9. PMID: 8781491 [PubMed - MEDLINE]

Vink H, Wieringa PA, Spaan JA.

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]