

100 Published Research Studies

TruAge Scanner Technology Key Publications

- **Skin autofluorescence provides additional information to the UK Prospective Diabetes Study (UKPDS) risk score for the estimation of cardiovascular prognosis in type 2 diabetes mellitus.** Lutgers H. et al, Diabetologia, 2009; 52(5): 789-797
- **Skin autofluorescence and risk of micro- and macrovascular complications in patients with Type 2 diabetes mellitus-a multi-centre study.** Noordzij M.J. et al. Diabet Med. 2012 Dec;29(12):1556-61.
- **Skin Autofluorescence and the Association with Renal and Cardiovascular Risk Factors in Chronic Kidney Disease Stage 3.** McIntyre N. et al. Clin J Am Soc Nephrol. 2011 Sep 1. Epub
- **Skin-Autofluorescence Is an Independent Predictor of Graft Loss in Renal Transplant Recipients.** Hartog J. et al. Transplantation, Volume 87, Number 7, April 15, 2009
- **Simple non-invasive assessment of advanced glycation endproducts accumulation.** Meerwaldt R et al, Diabetologia, 2004; 47:1324-1330

Diabetes

- 1. Skin autofluorescence is associated with past glycaemic control and complications in type 1 diabetes mellitus.** Genevieve M. et al. Diabetes Metab. 2013 May 2. [Epub ahead of print]
- 2. Advanced Glycation End Products Assessed by Skin Autofluorescence-A New Marker of Diabetic Foot Ulceration.** Vouillarmet J. et al. Diabetes Technol Ther. 2013 Apr 30. [Epub ahead of print]
- 3. Study design of DIACORE (DIAbetes COhoRtE) - a cohort study of patients with diabetes mellitus type 2.** Dörhöfer L, BMC Med Genet. 2013 Feb 14;14:25.
- 4. Verification of Skin Autofluorescence Values by Mass Spectrometry in Adolescents with Type 1 Diabetes: Brief Report.** Mácsai E. et al. Diabetes Technol Ther. 2013 Jan 23.
- 5. Advanced glycation end products in infant formulas do not contribute to insulin resistance associated with their consumption.** Klenovics KS. et al. PLoS One. 2013;8(1):e53056.
- 6. Advanced Glycation End Products, Measured as Skin Autofluorescence, During Normal Pregnancy and Pregnancy Complicated by Diabetes Mellitus.** de Ranitz-Greven WL. et al. Diabetes Technol Ther. 2012 Oct 31. (Epub)
- 7. Skin autofluorescence measurement in diabetological and nephrological clinical practice.** Mácsai E. et al. Orv Hetil. 2012 Oct 21;153(42):1651-7.
- 8. Skin autofluorescence and risk of micro- and macrovascular complications in patients with Type 2 diabetes mellitus-a multi-centre study.** Noordzij M.J. et al. Diabet Med. 2012 Aug 31. doi: 10.1111/dme.12005.
- 9. Advanced glycation end products measured by skin autofluorescence in a population with central obesity.** den Engelsen C. et al. Dermatoendocrinol. 2012 Jan 1;4(1):33-8.
- 10. Elevated skin autofluorescence is strongly associated with foot ulcers in patients with diabetes: a cross-sectional, observational study of Chinese subjects.** Hu H. et al. J Zhejiang Univ Sci B. 2012 May;13(5):372-7.
- 11. Advanced Glycation Endproducts and Diabetic Cardiovascular Disease.** Prasad A. et al. Cardiol Rev. 2012 Feb 6. Epub
- 12. Non-invasive measures of tissue autofluorescence are increased in Type 1 diabetes complications and correlate with a non-invasive measure of vascular dysfunction.** Januszewski A.S. et al. Diabet Med. 2011 Dec 28. doi: 10.1111/j.1464-5491.2011.03562.x.
- 13. Skin autofluorescence is associated with severity of vascular complications in Japanese patients with Type 2 diabetes.** Tanaka K. et al. Diabet Med. 2011 Sep 14. Epub
- 14. Skin autofluorescence is inversely related to HDL anti-oxidative capacity in type 2 diabetes mellitus.** Mulder D. et al. Atherosclerosis. 2011 May. Epub
- 15. Advanced Glycation End Products, Measured as Skin Autofluorescence, at Diagnosis in Gestational Diabetes Mellitus Compared with Normal Pregnancy.** de Ranitz-Greven WL et al. Diabetes Technol Ther. 2011 Aug 29. Epub

- 16. Increased accumulation of skin advanced glycation end products is associated with microvascular complications in type 1 diabetes.** Araszkievicz A. et al. *Diabetes Technol Ther.* 2011 Aug;13(8):837-42.
- 17. Assessment of skin autofluorescence as a marker of advanced glycation end product accumulation in type 1 diabetes.** Samborski P. et al. *Pol Arch Med Wewn.* 2011 Mar;121(3):67-72.
- 18. Advanced glycation end products, measured as skin autofluorescence and diabetes complications: a systematic review.** Bos D.C. et al. *Diabetes Technol Ther.* 2011 Jul;13(7):773-9.
- 19. Tissue advanced glycation end products are associated with diastolic function and aerobic exercise capacity in diabetic heart failure patients.** Willemsen S. et al. *Eur J. Heart Fail* 2010. doi:10.1093/eurjhf/hfq168
- 20. Skin autofluorescence and glycemic variability.** Noordzij M. et al. *Diabetes Technol Ther.* 2010; 12(7): 581-585
- 21. Advanced glycation end products assessed by skin autofluorescence in type 1 diabetics are associated with nephropathy, but not retinopathy.** Chabroux S. et al: *Diabetes Metab*, 2010 Apr;36(2):152-7.
- 22. Skin autofluorescence provides additional information to the UK Prospective Diabetes Study (UKPDS) risk score for the estimation of cardiovascular prognosis in type 2 diabetes mellitus** Lutgers H. et al: *Diabetologia*, 2009; 52(5): 789-797
- 23. Skin Autofluorescence: A tool to identify type 2 diabetic patients at risk for developing microvascular disease.** Gerrits E. et al. *Diabetes Care.* 2008; 31: 517-521
- 24. Skin autofluorescence is a strong predictor of cardiac mortality in diabetes** Meerwaldt R, et al. *Diabetes Care* 2007, 30: 107-112
- 25. Skin autofluorescence in type 2 diabetes: Beyond blood glucose** Monami M. et al. *Diabetes Research & Clinical Practice* July 2007. epub
- 26. Non-invasive AGE-measurements by skin autofluorescence in patients with Type 2 Diabetes Mellitus. Tool for risk-assessment of diabetes complications?** Lutgers H, et al. *Diabetes Care.* 2006 Dec;29(12):2654-9
- 27. Increased accumulation of skin advanced glycation end-products precedes and correlates with clinical manifestation of diabetic neuropathy** Meerwaldt R, et al. *Diabetologia.* 2005;48:1637-44.
- 28. The clinical relevance of advanced glycation endproducts (AGE) and recent developments in pharmaceuticals to reduce AGE accumulation.** Smit AJ, Lutgers HL. *Curr Med Chem.* 2004 Oct;11(20):2767-84.

Cardiovascular disease

- 29. Skin autofluorescence as proxy of tissue AGE accumulation is dissociated from SCORE cardiovascular risk score, and remains so after 3 years.** Tiessen AH. et al. *Clin Chem Lab Med.* 2013 Apr 2:1-7.
- 30. Skin Autofluorescence as a Measure of Advanced Glycation End Product Deposition Is Elevated in Peripheral Artery Disease.** de Vos L.C. et al. *Arterioscler Thromb Vasc Biol.* 2012 Nov 8. (Epub)
- 31. Relationship between tissue glycation measured by autofluorescence and pulse wave velocity in young and elderly non-diabetic populations.** Watfa G. et al. *Diabetes Metab.* 2012 Jun 13.
- 32. Advanced glycation end product associated skin autofluorescence: A mirror of vascular function?** Hofmann B. et al. *Exp Gerontol.* 2012 May 12.
- 33. Effects of alagebrium, an advanced glycation endproduct breaker, on exercise tolerance and cardiac function in patients with chronic heart failure.** Hartog J.W. et al. BENEFICIAL investigators. *Eur J Heart Fail.* 2011 Aug;13(8):899-908.
- 34. Skin autofluorescence is increased in patients with carotid artery stenosis and peripheral artery disease.** Noordzij MJ. *Int J Cardiovasc Imaging.* 2011 Feb. Epub
- 35. Carotid artery intima media thickness associates with skin autofluorescence in non-diabetic subjects without clinically manifest cardiovascular disease.** Lutgers H. et al. *Eur J Clin Invest.* 2010 ;40(9):812-7
- 36. Advanced glycation end-products, anti-hypertensive treatment and diastolic function in patients with hypertension and diastolic dysfunction.** Hartog J. et al; *Eur. Journal of Heart Failure*, 2010 Apr;12(4):397-403
- 37. Advanced glycation end products in patients with cerebral infarction.** Ohnuki Y. *Intern Med.* 2009;48(8):587-91.
- 38. Advanced Glycation End Products and their receptor RAGE in systemic autoimmune diseases - an inflammation propagating factor contributing to accelerated atherosclerosis.** Nienhuis et al. *Autoimmunity*, 2009; 42(4): 302-304
- 39. Skin autofluorescence is elevated in acute myocardial infarction and is associated with the one-year incidence of major adverse cardiac events** Mulder D. et al, *Netherlands Heart Journal*, Volume 17, Number 4, April 2009

- 40. Relation between food and drinking habits, and skin autofluorescence and intima media thickness in subjects at high cardiovascular risk** Jochemsen M. et al: Journal of Food and Nutrition Research Vol. 48, 2009, No. 1, pp. 51–58
- 41. Advanced Glycation Endproducts (AGE) in chronic heart failure** Smit A. et al. Annals of New York Academy of Science 2008; 1126:225-30
- 42. Clinical relevance of Advanced Glycation Endproducts for vascular surgery** Meerwaldt R. et al. Eur J Vasc Endovasc Surg. 2008; 38,125-131
- 43. Skin autofluorescence is elevated in patients with stable coronary artery disease and is associated with serum levels of neopterin and the soluble receptor for advanced glycation end products.** Mulder DJ. et al. Atherosclerosis. 2007;197:217-223
- 44. Clinical and prognostic value of Advanced Glycation End-products (AGEs) in chronic heart failure.** Hartog J. et al Eur J Heart Failure 2007;9:1146-55
- 45. Skin Autofluorescence is an independent marker for Acute Myocardial Infarction** Mulder DJ, et al. Circulation: 2005; 112:II-371.

Renal disease

- 46. Advanced glycation end-products and skin autofluorescence in end-stage renal disease: a review.** Arsov S. et al. Clin Chem Lab Med. 2013 Apr 4:1-10.
- 47. Accumulation of tissue advanced glycation end products correlated with glucose exposure dose and associated with cardiovascular morbidity in patients on peritoneal dialysis.** Jiang J. et al. Atherosclerosis. 2012 Sep;224(1):187-94.
- 48. Skin autofluorescence as a marker of cardiovascular risk in children with chronic kidney disease.** Makulska I. et al. Pediatr Nephrol. 2012 Sep 15. (Epub)
- 49. Factors influencing skin autofluorescence of patients with peritoneal dialysis.** Mácsai E. et al. Acta Physiol Hung. 2012 Jun;99(2):216-22.
- 50. Decreased serum carnitine is independently correlated with increased tissue accumulation levels of advanced glycation end products in hemodialysis patients.** Adachi T. et al. Nephrology (Carlton). 2012 Jul 13. doi: 10.1111/j.1440-1797.2012.01642.x.
- 51. Skin Autofluorescence: A Pronounced Marker of Mortality in Hemodialysis Patients.** Gerrits E. et al. Nephron Extra. 2012 Jan;2(1):184-191.
- 52. Advanced oxidation protein products and advanced glycation end products in children and adolescents with chronic renal insufficiency.** Sebeková K. J Ren Nutr. 2012 Jan;22(1):143-8.
- 53. Evaluation of advanced glycation end products accumulation, using skin autofluorescence, in CKD and dialysis patients.** Oleniuc M. et al. Int Urol Nephrol. 2011 Oct;44(5):1441-9.
- 54. Skin autofluorescence and the association with renal and cardiovascular risk factors in chronic kidney disease stage 3.** McIntyre N.J. et al. Clin J Am Soc Nephrol. 2011 Oct;6(10):2356-63.
- 55. Tissue level of advanced glycation end products is an independent determinant of high-sensitivity C-reactive protein levels in haemodialysis patients.** Nagano M. et al. Nephrology (Carlton). 2011 Mar;16(3):299-303
- 56. Skin autofluorescence as a measure of advanced glycation endproduct deposition: a novel risk marker in chronic kidney disease.** Smit AJ. et al. Curr Opin Nephrol Hypertens, 2010; 19(6):527-33.
- 57. Skin autofluorescence is associated with renal function and cardiovascular diseases in pre-dialysis chronic kidney disease patients.** Tanaka K. et al. Nephrol Dial Transplant. doi: 10.1093/ndt/gfq369
- 58. Advanced glycation end products, carotid atherosclerosis, and circulating endothelial progenitor cells in patients with end-stage renal disease.** Ueno H et al. Metabolism, 2010, doi: 10.1016/j.metabol.2010.04.001
- 59. Tissue-Advanced Glycation End Product Concentration in Dialysis Patients** McIntyre et al; CJASN, 2010; 5(1): 51-55
- 60. Does hepatitis C increase the accumulation of advanced glycation end products in haemodialysis patients?** Arsov S. et al. Nephrol Dial Transplant 2009; 25(3): 885-891
- 61. Skin-Autofluorescence Is an Independent Predictor of Graft Loss in Renal Transplant Recipients** Hartog J. et al, Transplantation • Volume 87, Number 7, April 15, 2009
- 62. Advanced Glycation End Products in Renal Failure: An Overview** Noordzij M. et al, Journal of Renal Care 2008

- 63. AGEs, autofluorescence and renal failure** Gerrits E. et al. Nephrology Dialysis and Transplantation November 25, 2008
- 64. Skin autofluorescence, a marker for advanced glycation end product accumulation, is associated with arterial stiffness in patients with end-stage renal disease** Ueno H. et al: Metabolism Clinical and Experimental 57 (2008) 1452–1457
- 65. Skin Autofluorescence, a measure of tissue advanced glycation endproducts (AGEs), is related to the diastolic function of dialysis patients** Hartog J. et al. Journal of Cardiac Failure. 2008; 14(7): 596-602
- 66. Risk factors for chronic transplant dysfunction and cardiovascular disease are related to accumulation of advanced glycation end-products in renal transplant recipients** Hartog JWL, et al. Nephrol Dial Transpl 2006 Aug;21(8):2263-9
- 67. Skin autofluorescence, a measure of cumulative metabolic stress and advanced glycation endproducts, predicts mortality in hemodialysis patients** Meerwaldt R, et al. J Am Soc Nephrol 2005;16:3687-93.
- 68. Skin autofluorescence, a noninvasive measure of advanced glycation end product accumulation, is a predictor of mortality in hemodialysis patients** Meerwaldt R, et al. Ann N Y Acad Sci 2005;1043:911.
- 69. Accumulation of advanced glycation end products, measured as skin autofluorescence, in renal disease.** Hartog JW. et al. Ann N Y Acad Sci. 2005 Jun;1043:299-307.
- 70. Advanced glycation endproducts in kidney transplant patients: a putative role in the development of chronic renal transplant dysfunction** Hartog J. et al. Am J Kidn Dis 2004; 43:966-975

All other diseases

- 71. Plasma AGEs and skin autofluorescence are increased in COPD.** Gopal P. et al. Eur Respir J. 2013 May 3. [Epub ahead of print]
- 72. Increased advanced glycation end-products (AGEs) assessed by skin autofluorescence in schizophrenia.** Koudrat Y. et al. J Psychiatr Res. 2013 Apr 21.
- 73. Local differences in skin autofluorescence may not reflect similar differences in oxidative stress exposure.** Hettema M. et al. J Rheumatol. 2013 Feb;40(2):206.
- 74. Vascular Aspects of Fabry Disease in Relation to Clinical Manifestations and Elevations in Plasma Globotriaosylsphingosine.** Rombach S.M. et al. Hypertension. 2012 Aug 6. (Epub)
- 75. Advanced Glycation Endproducts are increased in RA patients with controlled disease.** de Groot L. et al. Arthritis Res Ther. 2011 Dec 14;13(6):R205.
- 76. Increased skin autofluorescence after colorectal operation reflects surgical stress and postoperative outcome.** Pol H.W. et al. Am J Surg. 2011 Nov;202(5):583-9.
- 77. Skin autofluorescence, as marker of accumulation of advanced glycation endproducts and of cumulative metabolic stress, is not increased in patients with systemic sclerosis.** Hettema M.E.. et al. Int J Rheumatol. 2011. Epub
- 78. Skin advanced glycation end-product accumulation is negatively associated with calcaneal osteo-sono assessment index among non-diabetic adult Japanese men.** Momma H. Osteoporos Int. 2011 Sep 8. Epub
- 79. Skin autofluorescence is high in patients with cirrhosis - further arguing for the implication of Advanced Glycation End products.** Maury E. et al. J Hepatol. 2011 May;54(5):1079-80.
- 80. Skin advanced glycation end product accumulation and muscle strength among adult men.** Momma H. et al; Eur J Appl Physiol. 2010 (Epub)
- 81. Skin Autofluorescence as Marker of Tissue Advanced Glycation End-Products Accumulation in Formerly Preeclamptic Women.** Coffeng S.M. et al. Hypertens Pregnancy; 2010, Epub
- 82. Accumulation of advanced glycation end (AGEs) products in intensive care patients: an observational, prospective study.** Greven W. et al. BMC Clinical Pathology; 2010: 10 (4)
- 83. Increased accumulation of advanced glycation endproducts in patients with Wegener's granulomatosis.** Leeuw de K et al. Ann Rheum Dis. 2009; 69(3): 625-U191
- 84. Skin autofluorescence is increased in systemic lupus erythematosus but not reflected by plasma levels advanced glycation endproducts** Nienhuis H. et al: Rheumatology. 2008; 47(10): 1554-1558
- 85. Skin autofluorescence is increased in systemic lupus erythematosus but not reflected by plasma levels of advanced glycation endproducts** Nienhuis H. et al. Rheumatology; 2008; 47(10): 1554-1558

- 86. Advanced glycation end products and the absence of premature atherosclerosis in glycogen storage disease Ia** den Hollander NC. et al. *J Inherit Metab Dis.* 2007. epub ahead of print
- 87. Accumulation of advanced glycation endproducts in patients with systemic lupus erythematosus.** de Leeuw K. et al. *Rheumatol* 2007;45:1551-1556.
- 88. Skin autofluorescence, a marker of advanced glycation end products and oxidative stress, is increased in recently prelamptic women** Blaauw J. et al. *Am J Obstet Gynecol.* 2006 Sep;195(3):717-22.
- 89. Enhanced skin autofluorescence as a marker for oxidative stress in sepsis, a pilot study.** Mulder DJ, et al. *Eur Soc Intensive Care Medicine* 2004

(Technical) validation

- 90. Reference values for the Chinese population of skin autofluorescence as a marker of advanced glycation end products accumulated in tissue.** Yue X. et al. *Diabet Med.* 2011 Jul;28(7):818-23.
- 91. Dermal factors influencing measurement of skin autofluorescence.** Noordzij M.J. et al. *Diabetes Technol Ther.* 2011 Feb;13(2):165-70
- 92. Skin color independent assessment of aging using skin autofluorescence** Koetsier M. et al. *Optics Express*, 2010 ;18(14):14416-29
- 93. Reference Values of Skin Autofluorescence.** Koetsier M. et al. *Diabetes Technology & Therapeutics* 2010; 12(5):399-403
- 94. Skin autofluorescence for the risk assessment of chronic complications in diabetes: a broad excitation range is sufficient** Koetsier M. et al: *Optics Express.* 2009; 17(2): 509-519
- 95. Skin autofluorescence increases postprandially in human subjects** Stirban A. et al. *Diabetes Technology & Therapeutics* 2008: 10:200-5
- 96. The Effect of Aggressive Versus Conventional Lipid-lowering Therapy on Markers of Inflammatory and Oxidative Stress.** Mulder DJ. et al. *Cardiovasc Drugs Ther.* 2007 Apr;21(2):91-7.
- 97. Skin Autofluorescence, a Novel Marker for Glycation and Oxidative Stress derived Advanced Glycation Endproducts. An Overview of Current Clinical Studies, Evidence and Limitations** Mulder DJ, et al. *Diabetes Technology and Therapeutics* 2006; 8:523-535.
- 98. Simple noninvasive measurement of skin autofluorescence** Meerwaldt R, et al. *Ann N Y Acad Sci.* 2005;1043:290-298.
- 99. Instrumentation for the measurement of Autofluorescence in the human skin** Graaff R et al. *Proc. of SPIE Vol. 5692* (SPIE, Bellingham, WA, 2005). pp. 111-118.
- 100. Simple non-invasive assessment of advanced glycation endproducts accumulation** Meerwaldt R et al. *Diabetologia* 2004; 47:1324-1330