

多分野にわたる GlycoCheck® 文献リスト

- Bedside analysis of the sublingual microvascular glycocalyx in the emergency room and intensive care unit – the GlycoNurse study
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J Rheumatol. 2017 Nov; 44 (11): 1572-1574
- Automated Measurement of Microvascular Function Reveals Dysfunction in Systemic Sclerosis: A Cross-sectional Study.
J Rheumatol. 2017 Nov; 44 (11): 1603-1611
- Non-invasive assessment of microvascular dysfunction in patients with microvascular angina. *Int J Cardiol.* 2017 Dec 1; 248: 433-439
- Effects of varenicline and nicotine replacement therapy on arterial elasticity, endothelial glycocalyx and oxidative stress during a 3-month smoking cessation program. *Atherosclerosis.* 2017 May 13; 262: 123-130
- Protocol for intraoperative assessment of the human cerebrovascular glycocalyx. *BMJ Open.* 2017 Jan 5; 7 (1)
- Early detection of left ventricular dysfunction in first-degree relatives of diabetic patients by myocardial deformation imaging: The role of endothelial glycocalyx damage. *Int J Cardiol.* 2017 Apr 15; 233: 105-112
- 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
- Improvement of arterial stiffness and myocardial deformation in patients with poorly controlled diabetes mellitus type 2 after optimization of antidiabetic medication. *Eur Heart J Cardiovasc Imaging.* 2016 Dec 1; 17 (suppl_2)
- The impact of periodontal disease treatment on endothelium of sublingual microvessels. *Stomatologia (Mosk).* 2016; 95 (4): 9-12. Russian
- Perturbation of the microvascular glycocalyx and perfusion in infants after cardiopulmonary bypass. *J Thorac Cardiovasc Surg.* 2015 Dec; 150 (6): 1474-81
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- Plasma free hemoglobin and microcirculatory response to fresh or old blood transfusions in sepsis. *PLoS One.* 2015 May 1; 10 (5): e0122655
- Characteristics and determinants of the sublingual microcirculation in populations of different ethnicity. *Hypertension.* 2015 May; 65 (5): 993-1001
- Effects of ultrapure hemodialysis and low molecular weight heparin on the endothelial surface layer. *Blood Purif.* 2014; 38 (3-4): 203-10
- Is the systemic microvascular endothelial glycocalyx in peritoneal dialysis patients related to peritoneal transport?
Nephron ClinPract. 2014; 128 (1-2): 159-65
- Deeper penetration of erythrocytes into the endothelial glycocalyx is associated with impaired microvascular perfusion.
PLoS One. 2014 May 9; 9 (5): e96477
- Skeletal muscle capillary density and microvascular function are compromised with aging and type 2 diabetes.
J Appl Physiol. 2014 Apr 15; 116 (8): 998-1005
- 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
- Association of kidney function with changes in the endothelial surface layer. *Clin J Am SocNephrol.* 2014 Apr; 9 (4): 698-704
- Alteration of the sublingual microvascular glycocalyx in critically ill patients. *Microvasc Res.* 2013 Nov; 90: 86-9
- Non-invasive assessment of microvascular dysfunction in families with premature coronary artery disease. *Int J Cardiol.* 2013 Oct 12; 168 (5): 5026-8
- Sublingual microvascular glycocalyx dimensions in lacunar stroke patients. *Cerebrovasc Dis.* 2013; 35 (5): 451-4
- Damage of the endothelial glycocalyx in dialysis patients. *J Am SocNephrol.* 2012 Nov; 23 (11): 1900-8

製品仕様

商品名	型番
GlycoCheck®	GSP001V1
レンズカバー	GL01V150

- Laptop PC /Desktop PC
- Monochrome video microscope camera
- GlycoCheck® carry case
- GlycoCheck® Software
- Users manual
- Technical support including the remote technical training
- 稼働環境・温度: +10℃ ~ +35℃
- 相対湿度: 30% ~ 75% (非結露)
- 標高 700 ~ 1060 hPa
- メーカー保証 3年

GlycoCheck® Microscope Camera

- High quality monochrome USB camera
- Image size (pixels): 752 x 480
- Field of view (µm): 692 x 442
- Magnification (µm/pixel): 0.92
- Strobed illumination: 4 x 525 nm
- USB uncompressed video output
- Dimension : 100 mm x 42 mm
- Lens cover : 129.5 mm x 10.0 mm (at tip)
- Weight: 270g
- Standards: EN 60601-1:2006 Medical electrical equipment
- CE Medical Devices Directive 93/42 EEC Annex VII (class I)

GlycoCheck® Laptop PC

- Intel Core i7 CPU
- 8GB RAM
- 1 TB SSD
- 15" 1080p full HD LED display
- 6GB graphic RAM
- UL listed and CE Listing

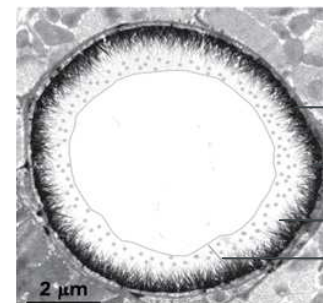

 滅菌済レンズカバー
(レンズ蓋防止特殊加工)

メディカルグレード PC

Non-invasive evaluation of the endothelial glycocalyx change by monitoring the sublingual microcirculation



舌下粘膜の微小循環動態変化により 毛細血管内皮グリコカリックスを評価



血管内皮細胞 Endothelial cell

細胞核 Nucleus

多糖類 Polysaccharides

グリコカリックス In vivo glycocalyx

 顕微鏡で観察した血管内皮の構造
<http://www.glycocalyx.nl/background.php>

特許技術を用いた定量解析アルゴリズム



Laptop 式 GlycoCheck®

製造業者 Microvascular Health Solutions

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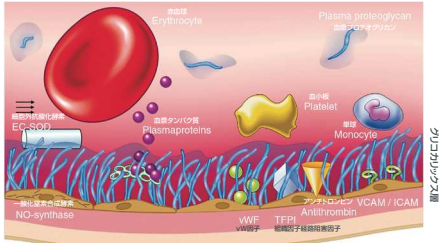
製造販売業者 フィンガルリンク株式会社

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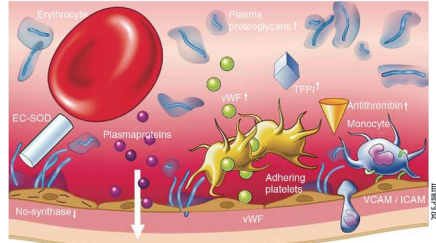
血管内皮グリコカリックス構造

健全な状態 Glycocalyx under physiological condition



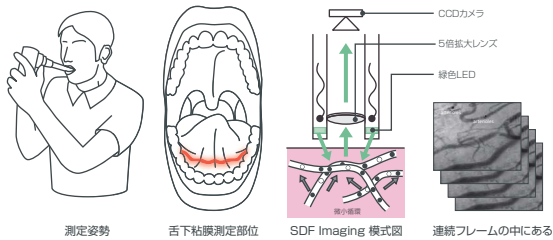
内皮機能	透過性	凝固	炎症
一酸化窒素のNO合成 過酸化物の抑制	肺い分け/リア	血小板粘着の抑制 凝固調整因子の抑制	白血球粘着の防止

異常な状態 Glycocalyx under perturbed condition



内皮機能	透過性	凝固	炎症
NO合成 ↓ 過酸化物 ↑	高分子物質の漏出 ↑	血小板粘着 ↑ トロンビン生成 ↑	白血球粘着 ↑ 血管外遊走 ↑

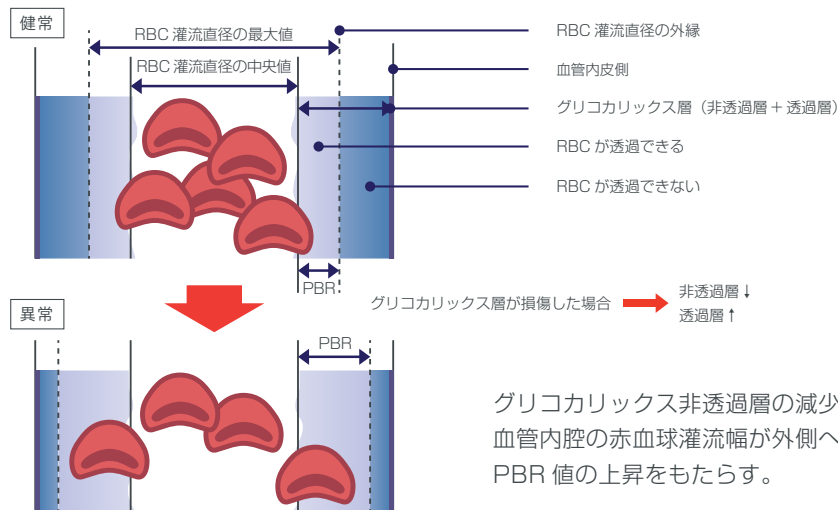
Sidestream Dark Field (SDF) Imaging



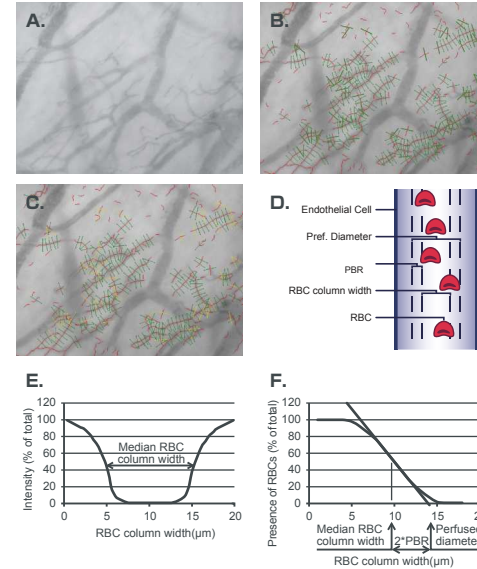
プローブ先端の外側には、発光ダイオード (LED4x525nm) が同心円状に配置され、プローブ先端の中央には、5倍拡大レンズ構成と CCD カメラが搭載されています。

舌下粘膜組織、もしくは臓器表面組織では、緑色 LED 照射光は散乱され、血中のヘモグロビン (Hb) に吸収されます。ソフトウェアは血管径 25µm 以下の毛細血管を自動認識し、撮影した動画を USB3.0 経由で PC へ送り、定量解析を自動的に行います。

Perfused Boundary Region グリコカリックスの変化を PBR(灌流境界領域)で評価する模式図



GlycoCheck® の解析アルゴリズム



- A. 血管内径 30µm 以下の 3000 本毛細血管を自動認識、40 フレームの動画毎で自動取り込む
- B. 毛細血管長さ(赤)を 10µm 単位毎で切り分ける(緑)
- C. 解析アルゴリズム基準による毛細血管の品質判別、基準に満たさない毛細血管を取り除く(黄)
- D. 血管内皮への赤血球の接触による PBR で示す RBC 灌流直径 = PBR* + RBC カラム幅 + PBR*
* PBR: Perfused boundary region (灌流境界領域)
- E. 各血管段の RBC カラム幅の中央値を算出
- F. RBC カラム幅の中央値による線形回帰分析で RBC 最大灌流径を算出
PBR 値は、RBC 灌流中央値と最大灌流値の差と計算される

PLoS One. 2014; 9(5): e96477.

GlycoCheck® 解析画面例

