Latest PAT Publications

Angiopoietin-2 is increased in sepsis and inversely associated with nitric oxide-dependent microvascular reactivity.

Davis JS, Yeo TW, Piera KA, Woodberry T, Celermajer DS, Stephens DP, Anstey NM.
Crit Care. 2010;14(3):R89.

Tested endothelial NO bioavailability, vascular endothelial growth factor (VEGF), endothelial-active cytokines and EndoPAT index correlations with ang-2 concentrations in sepsis, (n = 83 early sepsis vs. 41 hospital controls).
Results: Plasma Ang-2 increased with sepsis severity (P < 0.0001), and correlated inversely with EndoPAT index (r = -0.38, P < 0.0001), positively with IL-6 (r = 0.57, P < 0.0001) and degree of organ failure (r = 0.58, P < 0.0001). Longitudinal recovery of EndoPAT index was associated with decline in ang-2.
Conclusions: Ang-2 is proportional to sepsis severity, and inversely correlated to EndoPAT index. Impaired NO bioavailability may contribute to increased release of ang-2, endothelial activation and capillary leakage. Agents increasing NO bioavailability may have therapeutic potential in sepsis.

http://www.ncbi.nlm.nih.gov/pubmed/20482750

Postprandial vascular reactivity in obese and normal weight young adults.

Ayer JG, Harmer JA, Steinbeck K, Celermajer DS.
Obesity (Silver Spring). 2010 May;18(5):945-51.

Compared vascular reactivity after a high-fat meal in 11 obese (median BMI 46.4, age 32.1 ±6.3 years, 7 men) and 11 normal weight (median BMI 22.6) age- and sex-matched controls.
Physiological parameters and blood chemistry were measured at baseline and 1 and 3 h postmeal.
Results: At baseline, obese subjects had higher systolic BP, HR, resting FBF, insulin and equivalent FMD, EndoPAT index, hyperemic FBF, AIx75, PWV(b), glucose, total cholesterol, triglycerides, and lower HDL cholesterol.
FMD at baseline and 3 h was not significantly different between groups, nor did the meal produce significant changes in EndoPAT index, hyperemic FBF, and PWV(b) in either group.
Conclusions: Vascular responses to a high-fat meal are similar in obese and normal weight young adults, and thus unlikely to contribute importantly to the increased cardiovascular risk of obesity.

www.ncbi.nlm.nih.gov/pubmed/19834470

Asymmetric dimethylarginine, endothelial nitric oxide bioavailability and mortality in sepsis.

Davis JS, Darcy CJ, Yeo TW, Jones C, McNeil YR, Stephens DP, Celermajer DS, Anstey NM.
PLoS One. 2011 Feb 18;6(2):e17260.

Assessed Plasma concentrations of asymmetric dimethylarginine (ADMA), L-arginine concentrations and Endothelial function (EndoPAT2000) (98 patients, 67 with acute sepsis, and 31 controls).
Results: Baseline plasma L-arginine: ADMA ratio was significantly lower in sepsis (median [IQR] 63 [45-103]) than controls (143 [123-166], p<0.0001) and correlated with EndoPAT index (r = 0.34, p = 0.02). Increase in ADMA correlated with increase in organ failure and decrease in EndoPAT index.
Conclusions: Impaired endothelial and microvascular function due to decreased endothelial NO bioavailability is a potential mechanism linking increased plasma ADMA to organ failure and death in sepsis.

http://www.ncbi.nlm.nih.gov/pubmed/21364995

Comparing EndoPAT and BIOPAC measurement of vascular responses to mental stress.

Martin EA, Nelson RE, Felmlee-Devine MD, Brown TE, Lerman A.
Cell Biochem Funct. 2011 Jun;29(4):272-8.

Compared stress-induced changes in vascular function during acute mental stress tests using the EndoPAT2000, to a standard polygraph device (BIOPAC MP150), in 25 healthy subjects. Reactive hyperemia was compared at baseline and following three acute mental stress tests using both methods.
Results: There was no difference in vascular hyperemic reactivity at baseline and following acute mental stress, as measured by both systems (P > 0.05), however, mental stress ratios measured by EndoPAT were significantly different than those measured by BIOPAC (P < 0.01).
Conclusions: Data suggest that EndoPAT measurements of vascular responses to acute mental stress may be more specific and sensitive than measurements using the BIOPAC system.

http://www.ncbi.nlm.nih.gov/pubmed/21671245

Normal Endothelial Function in Patients with Mild-to-Moderate Psoriasis: A Case-control Study.

Jensen P, Zachariae C, Hansen P, Skov L.
Acta Derm Venereol 2011 May 6.

Measured endothelial function (EndoPAT2000), and other cardiovascular risk factors in patients with mild-to-moderate psoriasis (n = 30) and controls (n = 30).
Results: No difference in endothelial function between groups, but the patient group exhibited higher levels of certain cardiovascular risk factors compared to controls
Conclusions: Even mild-to-moderate psoriasis may be regarded as a systemic inflammatory disease, with an increased cardiovascular risk in the long-term.

http://www.ncbi.nlm.nih.gov/pubmed/21547343

A spontaneous, double-blind, double-dummy cross-over study on the effects of daily vardenafil on arterial stiffness in patients with vasculogenic erectile dysfunction.

Aversa A, Letizia C, Francomano D, Bruzziches R, Natali M, Lenzi A.
Int J Cardiol. 2011 May 3

Measured the effects of vardenafil on endothelial function and arterial stiffness in men with erectile dysfunction (ED, N=20) enrolled in a 4-week, randomized, double-blind, double-dummy, crossover study of either daily vardenafil 10mg or 20mg on-demand with a two-week washout interval. EndoPAT index, AI, endothelial blood markers and ED questionnaire were assessed.
Results: Patients who took daily vardenafil (vs. on-demand) had significant improvements in arterial stiffness as evaluated by the EndoPAT AI ($P<0.01$), and reduction of plasma ADM levels ($p<0.05$). Each treatment resulted in significantly greater IIEF5 scores ($p<0.001$).
Conclusions: Daily vardenafil improves arterial stiffness and erectile function measurements in men with severe vasculogenic ED.

http://www.ncbi.nlm.nih.gov/pubmed/21546099

Remission is the goal for cardiovascular risk management in patients with rheumatoid arthritis: a cross-sectional comparative study.

Provan SA, Semb AG, Hisdal J, Stranden E, Agewall S, Dagfinrud H, Angel K, Atar D, Kvien TK.
Ann Rheum Dis. 2011 May;70(5):812-7.

Compared cardiovascular disease (CVD) risk markers amongst patients with rheumatoid arthritis (RA), either active or in remission (N=113), and controls (N=86).
A panel of biomarkers, EndoPAT index, pressure measurements, arterial stiffness and intima-media thickness were compared.
Results: Active RA had significantly higher levels of NT-proBNP, brachial systolic pressure, augmentation index and central systolic pressure but lower cholesterol than the other 2 groups. Active RA patients also had significantly higher pulse wave velocity and worse EndoPAT index than RA patients in remission.
Conclusions: Only Patients with active RA, had significantly increased levels of CVD risk markers, thus linking inflammatory activity to markers of CVD risk in patients with RA and indirectly supporting the notion that remission in RA confers diminished cardiovascular morbidity.

http://www.ncbi.nlm.nih.gov/pubmed/21288959

Dietary, lifestyle and pharmacogenetic factors associated with arteriole endothelial-dependent vasodilatation in schizophrenia patients treated with atypical antipsychotics (AAPs).

Ellingrod VL, Taylor SF, Brook RD, Evans SJ, Zöllner SK, Grove TB, Gardner KM, Bly MJ, Pop-Busui R, Dalack G.
Schizophr Res. 2011 Apr 18.

Examined endothelial function (EndoPAT Index) in schizophrenic patients (n=83), and determined association with pharmacogenetic, medication, dietary, and lifestyle factors. Subjects were screened for metabolic syndrome, physical activity, smoking, variants related to folate pharmacogenetics, and the influence of N-3 FA dietary intake.
Results: EndoPAT Index was positively related to N-3 FA intake ($F=17.7(1,16)$, $p=0.0007$) in subjects not receiving atypical antipsychotics (AAPs), but not in those treated with AAPs ($F=0.25(1,43)$, $p>0.6$). Regression analysis confirmed the interaction effect of AAP treatment on the relationship between EndoPAT Index and N-3 FAs ($p=0.0105$). Endothelial dysfunction was also related to folate pharmacogenetic variants.
Conclusions: AAPs may counteract some vascular health benefits of a diet high in N-3 FAs. Pharmacogenetic variants related to folate and homocysteine metabolism may also increase endothelial dysfunction risk.

http://www.ncbi.nlm.nih.gov/pubmed/21504842

CLA Does Not Impair Endothelial Function and Decreases Body Weight as Compared with Safflower Oil in Overweight and Obese Male Subjects.

Pfeuffer M, Fielitz K, Laue C, Winkler P, Rubin D, Helwig U, Giller K, Kammann J, Schwedhelm E, Böger RH, Bub A, Bell D, Schrezenmeir J.
J Am Coll Nutr. 2011 Feb;30(1):19-28.

Compared the effect of CLA (Conjugated linoleic acid) with safflower oil on endothelial function (EndoPAT index), and markers of cardiovascular risk in overweight and obese men (N=85). Heated safflower oil and olive oil were given for additional descriptive control. Patients were randomized to receive 4.5 g/d of the CLA isomeric mixture, safflower oil, heated safflower oil, or olive oil in a 4-week double-blind study. Endothelial function was assessed in the fasting and postprandial state.
Results: CLA did not impair fasting or postprandial PAT index but decreased body weight compared to safflower oil. There were no changes in lipid profile or other inflammatory blood markers.
Conclusions: CLA did not impair endothelial function. Other parameters associated with metabolic syndrome and oxidative stress were not changed or were slightly improved. Results suggest that CLA does not increase cardiovascular risk.

http://www.ncbi.nlm.nih.gov/pubmed/21697535

Vascular function in the diagnostic categories of polycystic ovary syndrome.

Moran LJ, Cameron JD, Strauss BJ, Teede HJ.
Hum Reprod. 2011 May 25.

Assessed whether milder phenotypes of PCOS (polycystic ovary syndrome) have elevated CVD risk compared with controls in 54 overweight premenopausal women with either NIH PCOS (n = 29) or milder non-NIH PCOS (n = 25) and 27 controls without PCOS. Primary outcomes were endothelial function [EndoPAT2000, ADMA and plasminogen activator inhibitor-1 (PAI-1)] and arterial stiffness (PWVc). Secondary outcomes were insulin resistance, glucose tolerance and C-reactive protein.
Results: PAI-1 (P = 0.20), PAT (P = 0.95) and PWVc (P = 0.67) were similar for the three groups. ADMA was higher in both groups of PCOS vs. controls.
Conclusions: Women with NIH and non-NIH PCOS have elevated ADMA compared with controls independent of age and adiposity, suggesting that CVD risk, reflected by endothelial dysfunction, is increased in both traditional NIH and new milder non-NIH PCOS phenotypes.

http://www.ncbi.nlm.nih.gov/pubmed/21616917

Sleep staging based on autonomic signals: a multi-center validation study.

Hedner J, White DP, Malhotra A, Herscovici S, Pittman SD, Zou D, Grote L, Pillar G.
J Clin Sleep Med. 2011 Jun 15;7(3):301-6

Assessed a Watch-PAT100 based algorithm for determining wake, light sleep, deep sleep, and REM sleep based on epoch-by-epoch comparisons to polysomnography (PSG), in 38 normal subjects and 189 OSA patients.
Results: The overall agreement in detecting light/deep and REM sleep were 88.6% ± 5.9% and 88.7% ± 5.5%, respectively. There was a good agreement between PSG and Watch-PAT100 in quantifying sleep efficiency (78.4% ± 9.9% vs. 78.8% ± 13.4%), REM latency (237 ± 148 vs. 225 ± 159 epochs), and REM percentage (14.4% ± 6.5% vs. 19.3% ± 8.7%). OSA severity did not affect the sensitivity and specificity of the algorithm.
Conclusions: Watch-PAT 100 can detect sleep stages with moderate agreement to PSG in normal subjects and OSA patients. This novel algorithm may provide insights on sleep and sleep architecture when applying the PAT recorder for OSA diagnosis.

http://www.ncbi.nlm.nih.gov/pubmed/21677901

Impairment of endothelial progenitor cell function and vascularization capacity by aldosterone in mice and humans.

Thum T, Schmitter K, Fleissner F, Wiebking V, Dietrich B, Widder JD, Jazbutyte V, Hahner S, Ertl G, Bauersachs J.
Eur Heart J. 2011 May;32(10):1275-86.

Assessed the impact of hyperaldosteronism on EPC (endothelial progenitor cells) function and vascularization capacity in mice and humans.
Results: Treatment of human EPC with aldosterone induced impaired multiple cellular functions of EPCs. Aldosterone infusion in mice impaired EPC function, EPC homing to vascular structures and vascularization capacity. Endothelial progenitor cells from patients with primary hyperaldosteronism compared with controls of similar age displayed reduced migratory potential. Impaired EPC function was associated with endothelial dysfunction assessed by the EndoPAT2000. MR (mineralocorticoid receptor) blockade in patients with hyperaldosteronism improved EPC function and arterial stiffness assessed by EndoPAT2000.
Conclusions: Normalization of EPC function may represent a novel mechanism contributing to the beneficial effects of MR blockade in cardiovascular disease prevention and treatment.

http://www.ncbi.nlm.nih.gov/pubmed/20926363

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December 8 – 10, 2011
Las Vegas, NV, USA

Spotlight on
Prof. David Celermajer

David Celermajer, MB BS, PhD, DSc, is the Scandrett Professor of Cardiology, University of Sydney, and the Director of Echocardiography and Cardiologist, Royal Prince Alfred Hospital, Clinical Director of the Heart Research Institute, Sydney, and Chairman of the Research Committee, National Heart Foundation of Australia.

His principle research interest is in early detection of vascular disease and specifically in endothelial function assessment, cellular/molecular biology, animal models of heart disease, public health research, and developing world research. In 1992, when in John Deanfield's lab he published the first description of the Flow Mediated Dilatation technique for non-invasive endothelial function assessment.

Prof. Celermajer and colleagues, are making significant contributions to the scientific base and clinical acceptance of the EndoPAT, as evidenced by the following publications:

Tsin W. Yeo, Daniel A. Lampah, Retno Gitawati, Emiliana Tjitra, Enny Kenangalem, Yvette R. McNeil, Christabelle J. Darcy, Donald L. Granger, J. Brice Weinberg, Bert K. Lopansri, Ric N. Price, Stephen B. Duffull, David S. Celermajer, Nicholas M. Anstey. **Impaired nitric oxide bioavailability and L -arginine–reversible endothelial dysfunction in adults with falciparum malaria.** JEM 2007; 204(11): 2693-2704

Celermajer, David S. **Reliable Endothelial Function Testing: At Our Fingertips?** Circulation 2008; 117(19): 2428-2430.

Yeo TW, Lampah DA, Gitawati R, Tjitra E, Kenangalem E, McNeil YR, Darcy CJ, Granger DL, Weinberg JB, Lopansri BK, Price RN, Duffull SB, Celermajer DS, Anstey NM. **Recovery of Endothelial Function in Severe Falciparum Malaria: Relationship with Improvement in Plasma l-Arginine and Blood Lactate Concentrations.** J Infect Dis. 2008; 198(4):602-608.

Yeo TW, Lampah DA, Gitawati R, Tjitra E, Kenangalem E, Piera K, Price RN, Duffull SB, Celermajer DS, Anstey NM. **Angiopoietin-2 is associated with decreased endothelial nitric oxide and poor clinical outcome in severe falciparum malaria.** PNAS 2008 Nov 4;105(44):17097-102

Davis JS, Yeo TW, Thomas JH, McMillan M, Darcy CJ, McNeil YR, Cheng AC, Celermajer DS, Stephens DP, Anstey NM. **Sepsis-associated microvascular dysfunction measured by peripheral arterial tonometry: an observational study.** Crit Care 2009 25;13(5):R155

Yeo TW, Lampah DA, Tjitra E, Gitawati R, Kenangalem E, Piera K, Granger DL, Lopansri BK, Weinberg JB, Price RN, Duffull SB, Celermajer DS, Anstey NM. **Relationship of cell-free hemoglobin to impaired endothelial nitric oxide bioavailability and perfusion in severe falciparum malaria.** J Infect Dis. 2009 15; 200(10):1522-9.

Davis JS, Darcy CJ, Yeo TW, Jones C, McNeil YR, Stephens DP, Celermajer DS, Anstey NM. **Asymmetric dimethylarginine, endothelial nitric oxide bioavailability and mortality in sepsis.** PLoS One. 2011;6(2):e17260.

Davis JS, Yeo TW, Piera KA, Woodberry T, Celermajer DS, Stephens DP, Anstey NM. **Angiopoietin-2 is increased in sepsis and inversely associated with nitric oxide-dependent microvascular reactivity.** Crit Care. 2010;14(3):R89.

Julian G. Ayer, Jason A. Harmer, Katherine Steinbeck and David S. Celermajer. **Postprandial Vascular Reactivity in Obese and Normal Weight Young Adults.** Obesity (2010) 18, 945–951

Davis JS, Thomas JH, McMillan M, Yeo TS, Celermajer DS, Stephens DP, Anstey NM. **Finger reactive hyperaemia to measure endothelial function in sepsis and health (The FRESH study).** ISICEM (International Symposium on Intensive Care and Emergency Medicine) conference 2008.