

ARTERY

14



THURSDAY 9 – SATURDAY 11 OCTOBER 2014
MECC, MAASTRICHT, THE NETHERLANDS

FINAL PROGRAMME



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Supported by an unrestricted educational grant from Servier



ARTERY 14 SCIENTIFIC ORGANISERS

ARTERY EXECUTIVE COMMITTEE

President:	Professor Luc Van Bortel	Ghent	Belgium
Vice-President:	Associate Professor Charalambos Vlachopoulos	Athens	Greece
Secretary:	Professor J Kennedy Cruickshank	London	UK
Treasurer:	Professor Pierre Boutouyrie	Paris	France
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	Dr Isabel Ferreira	Maastricht	The Netherlands
	Professor Lorenzo Ghiadoni	Pisa	Italy
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Ex-officio Member	Professor John Cockcroft	Cardiff	UK
Editor	Professor Stéphane Laurent	Paris	France

ARTERY COUNCIL MEMBERS

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C Stehouwer, Maastricht, The Netherlands

C Thuillez, Rouen, France

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N Wiinberg, Frederiksberg, Denmark

F Zannad, Toul, France

ARTERY 14 LOCAL ORGANISING COMMITTEE

Harry Struijker-Boudier, Maastricht, The Netherlands

Coen Stehouwer, Maastricht, The Netherlands

Koen Reesink, Maastricht, The Netherlands

Isabel Ferreira, Maastricht, The Netherlands

Luc Van Bortel, Ghent, Belgium

Rob Van der Zander, Maastricht, The Netherlands

SECRETARIAT

Hampton Medical Conferences Ltd.

Rapier House, 4-6 Crane Mead, Ware, Hertfordshire, SG12 9PW, UK

Tel: +44 (0) 1920 885162

Fax: +44 (0) 870 900 7783

Email: artery@hamptonmedical.com

ARTERY Society: www.arterysociety.org

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WELCOME

Dear Colleague,

It is our pleasure to welcome you to the MECC, Maastricht, The Netherlands for ARTERY 14. Maastricht is a unique, lively city - charming, compact and international. Located in the Maas-Rijn Euregion; an area that transcends its borders with the Netherlands, Belgium and Germany. It is home of the Cardiovascular Research Institute Maastricht (CARIM) which has a long standing tradition of artery research.

The 2014 meeting follows on from the previous series of highly successful ARTERY meetings, which have established a tradition in the field. ARTERY 14 will cover an expanded list of topics related to large artery structure and function through keynote lectures, abstract presentations and practical demonstrations. This year, special emphasis will be given to large-small artery interactions and to modelling of the arterial tree.

We are keen to support young researchers, who represent nearly half of the presenters of free communications, and invited lectures. Building on the success of previous meetings, we are delighted to announce that we have again received a high number of abstracts this year. We welcome abstracts for both oral and poster presentations dealing with clinical research, experimental studies, epidemiology, biomechanical, methodological and imaging research related to large artery structure and function.

As in previous years we strongly encourage all attendees to engage in scientific debate and critique with presenters and colleagues during the sessions. Furthermore the presentation of data at this meeting will provide the opportunity for scientific interaction and discussion with a highly informed audience.

The Society will provide prestigious prizes for the best oral presentation by a young investigator and best poster, together with Career Development Awards for more established researchers. All presented abstracts will be published in the official journal of the Society – ARTERY Research, later in the year.

On behalf of the Society we would like to thank Servier who has made this event possible through an unrestricted educational grant, and also our sponsor Omron and our exhibitors: Alam Medical, Atcor Medical, Axelife, BPLab, IEM GmbH, ESAOTE and Fukuda Denshi UK.

We hope you enjoy the meeting and scientific discussions.



Harry Struijker-Boudier
Chair of Local Organising Committee



Professor Luc Van Bortel
President of ARTERY

PROGRAMME OVERVIEW

	Thursday 9th October 2014	Friday 10th October 2014	Saturday 11th October 2014	
07.00		Registration, Refreshments & Exhibition 07:30 – 08:30		
08.00		Oral Session III: Young Investigator Presentations 08:30 – 10:00		
09.00				
10.00		Special Guest Lecture: P Lacolley 10:00 – 10:25	Oral Session V: Free Communications & Invited Lecture T Unger 09:00 – 10:30	
		Refreshments, Exhibition & Posters 10:25 – 10:55		
11.00	Satellite Symposium: Organised in Collaboration with Servier 10:55 – 11:55	McDonald Lecture: S Laurent 10:30 – 11:00		
		Refreshments, Exhibition & Posters 11:00 – 11:30		
12.00	Registration, Poster Viewing, Light Lunch & Welcome Address 11:30 – 12:35	DEBATE: J Sharman & G Mitchell 11:30 – 12:30		
			Manufacturer Practical Demonstration 11:55 – 13:00	Lifetime Achievement Awards & Concluding Remarks 12:30 – 12:50
				Opening Lecture: E Agabiti-Rosei 12:35 – 13:05
13.00	Oral Session 1: Free Communications 13:05 – 14:15	Lunch, Exhibition and Posters 13:00 – 14:00		
14.00	Career Development Lectures 14:15 – 15:15	Oral Session IV: Young Investigator Presentations 14:00 – 15:30		
15.00	Refreshments & Exhibition 15:15 – 15:45	FOCUS: Modelling the Arterial System: J Humphrey & A Hughes 15:30 – 16:20		
	Special Guest Lecture: G Biessels 15:45 – 16:10			
16.00	Oral Session II: Free Communications 16:10 – 17:10	Refreshments, Exhibition & Posters 16:20 – 16:50		
17.00	Manufacturers Presentation: 17:10 – 17:30	Parallel Poster Sessions: VI, VII, VIII, IX, X, XI 16:50 – 18:20		
	Parallel Poster Sessions: I, II, III, IV, V & Welcome Reception 17:30 – 19:00			
18.00				
19.00	Young Investigator Network Evening MECC 19:00 – 21:00	Conference Dinner and Award Presentations Le Caverne de Geulhelm 19:30		
20.00				
21.00				

A-Z GENERAL INFORMATION

ABSTRACTS

Abstracts for ARTERY 14 have been loaded onto a memory stick which you will find in your delegate pack. The submitted abstracts are also available to download from the homepage of the conference website www.arteryconference.org

We are pleased to provide laptops located in the Trajectum area next to the Registration Desk to facilitate the viewing of abstracts as well as offering internet access.

Accepted oral and poster abstracts will also be published in the December 2014 issue of the Society's Journal, ARTERY Research.

CONFERENCE APP

The ARTERY 14 Conference App is available to download free from the App Store for Apple users or from the Google Play Store for Android users. Search Artery 2014.

Quick Download Links:



Web link:
<http://bit.ly/ArteryApp>

Key features are all accessible from the Home screen, which you can get to at any time:

- Conference programme
- Exhibition guide
- Venue information
- Invited speakers and paper presenters
- A personal agenda, with built-in notebook
- All conference abstracts

ACCREDITATION

Accreditation from The European Board for Accreditation in Cardiology (EBAC) is in progress and details will be available on the ARTERY 14 website and on site in Maastricht.

Delegates wishing to claim CPD Accreditation should sign the Attendance Register on each day they attend.

AWARDS AND PRIZES

The Awards Ceremony will take place during the Conference Dinner on Friday 10th October. Prizes will be awarded for Best Young Investigator Presentation, Career Development Lecture, Best Poster and Best Paper submitted to ARTERY Research over the past year.

The ARTERY Society has also supported 5 full and partial travel grants to young investigators to facilitate their attendance at ARTERY 14.

BADGES

Name badges must be worn at all times throughout the meeting. For reasons of security delegates not wearing a name badge will be denied access to Scientific Sessions.

CLOAKROOM

A staffed cloakroom is available, in the main Trajectum of the venue, free of charge to delegates. Delegates may also store luggage in the cloakroom on Thursday and Saturday.

CONFERENCE VENUE – FULL ADDRESS

MECC Maastricht

Forum 100 6229, GV MAASTRICHT, The Netherlands

A-Z GENERAL INFORMATION

EXHIBITION

The exhibition is located in the Trajectum area. Please ensure you take time to visit and support the companies exhibiting at ARTERY 14. Further information about the sponsors and exhibitors are available via the conference App.

INSURANCE

The organisers are unable to accept any responsibility for damage or loss of personal property during the conference and participants are advised to ensure that such items are adequately insured.

INTERNET ACCESS

Wi-Fi is provided free of charge for all participants.

Network: **MECC_Congrescentre**
Password: **meccmaastricht**

LUNCH AND REFRESHMENTS

Catering stations are located in the exhibition area. Lunch will be provided for all participants on Thursday, Friday and Saturday.

MOBILE TELEPHONES AND ELECTRONIC DEVICES

As a courtesy to speakers and other delegates, please ensure that mobile telephones, tablets and other electronic devices are switched to silent during sessions. Photography and filming during sessions is not permitted.

BUS DETAILS

Delegates can make free use of the city buses in Maastricht when showing their congress badge on boarding.

Buses to the city center leave regularly from the main entry of the MECC, immediately opposite the NH Hotel.

POSTERS

Posters are displayed in the Lobby of the MECC and will be displayed on the following days:

Thursday 9th October (Guided Poster Tour and Discussion 17.30 – 19.00 hrs)

- Parallel Poster Session I: Therapeutics & Interventions I
- Parallel Poster Session II: Technology & Basic Science I
- Parallel Poster Session III: Clinical Science I
- Parallel Poster Session IV: Epidemiology I
- Parallel Poster Session V: Clinical Science II

Friday 10th October (Guided Poster Tour and Discussion 16.50 – 18.20 hrs)

- Parallel Poster Session VI: Therapeutics & Interventions II
- Parallel Poster Session VII: Clinical Science III
- Parallel Poster Session VIII: Technology & Basic Science II
- Parallel Poster Session IX: Clinical Science IV
- Parallel Poster Session X: Epidemiology II
- Parallel Poster Session XI: Modelling

All Poster presenters are asked to attend their poster during the allocated sessions to talk to fellow delegates.

A-Z GENERAL INFORMATION

GUIDED POSTERS

During the dedicated poster sessions, two session chairs will view and discuss with authors the posters. Delegates are encouraged to join the tour.

MOUNTING AND REMOVAL OF POSTERS

All posters should be mounted by 12.30hrs on Thursday 9th October. Access will be available to the Lobby poster area from 10.00hrs on the morning of Thursday 9th October.

All posters must be removed by 13.50hrs on Saturday 11th October.

QUESTIONS TO SPEAKERS

During discussion periods delegates who wish to pose a question should raise their hand clearly and wait to be acknowledged by the Chairperson. Please do not ask a question until you have been given a microphone.

REGISTRATION DESK

The conference organisers will be located at the Registration Desk and will be pleased to assist you with queries throughout the conference.

The Registration Desk will be open at the following times:

Thursday 9th October: 11.30 – 19.15 hrs

Friday 10th October: 07.30 – 18.15 hrs

Saturday 11th October: 08.15 – 13.30 hrs

Registration Desk Telephone Number: +44 (0) 07432 731911

SPEAKER PREVIEW

All oral presenters should meet with the audio-visual technician in room 1.2 next to auditorium 2 at the earliest opportunity and at the very latest two hours before the start of the session in which the presentation will take place. This is in order to hand over and check their presentations and ensure they are happy with the equipment available for their talk.

SOCIAL PROGRAMME

Welcome Reception

Thursday 9 October

17.30-19.00hrs

MECC: Lobby and Trajectum

A Welcome Reception will be held at the MECC in the Lobby and Trajectum. The reception will take place during the Poster Discussion Session and is open to all delegates.

Young Investigator Network Evening

Thursday 9 October

19.00-21.00hrs

MECC: Suite

Students, PhD students and Post-docs at ARTERY14, the Young Investigators Meeting is especially for you! This event is a great opportunity to enjoy new company and share ideas, with drinks and buffet included. It is going to be stimulating, engaging and fun – don't miss it!

Conference Dinner

Friday 10 October from

19.30hrs

Le Caverne de Geulhelm

A pre-dinner drinks reception followed by the Conference Dinner will take place at Le Caverne de Geulhelm; an ancient underground limestone quarry in the South Limburg Hills. Situated 30 feet underground, the three caves of Le Caverne de Geulhelm offer a spectacular backdrop for the Conference Dinner. Over 400 shimmering candles create a unique and very intimate atmosphere, which you will not easily forget. And you do not have to worry about cold feet as the entire venue is equipped with under-floor heating.

Tickets are available at €80 per ticket, which includes pre-dinner drinks, a three course dinner and wine. We are pleased to offer a reduced rate for students at a cost of €40 per ticket. A short awards ceremony will take place during the dinner.

TRAVELLING TO AND FROM THE CONFERENCE DINNER

Bus transport: Pick up at 18:00hrs From MECC Main Entrance

MANUFACTURER SESSIONS

MANUFACTURER PRESENTATIONS AND DEMONSTRATIONS

Manufacturer Presentation	Thursday 9 October	17.10-17.30 hrs
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OMRON

Establishing Normal and Reference Values for Brachial-Ankle Pulse Wave Velocity in Healthy People and in the Presence of Cardiovascular Risk Factors: The Steno-Stiffness Collaborative Group
C Vlachopoulos, MD, Athens Medical School, Greece

Manufacturer Demonstration	Friday 10 October	11.55-13.00 hrs
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Live demonstration of VP-1000 and HEM-9000AI measuring ABI/PWV/AI and Central BP presented by Omron Healthcare

SPONSORS AND EXHIBITORS

Servier

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Servier is involved in research and development, manufacture and marketing of ethical pharmaceuticals. It is a private, independent pharmaceutical company.

Cardiovascular diseases represent the most important therapeutic area for Servier. In this area, the Company has developed different drugs for the treatment of hypertension, heart failure, and cardiac ischemia, such as Procoralan (ivabradine), Coversyl (perindopril), Natrilix SR (indapamide), and Vastarel MR (trimetazidine) and fixed-combination antihypertensives such as Preterax (perindopril/indapamide) and Coveram (perindopril/amlodipine).

EXHIBITORS

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E: magid.hallab@popmetre.com

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E: impex@bplab.com

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W: www.fukuda.com
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E: office@fukuda.co.uk

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Via di Caciolle, 15, 50127 Florence, Italy

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T: +39-05542291
E: international.sales@esaote.com

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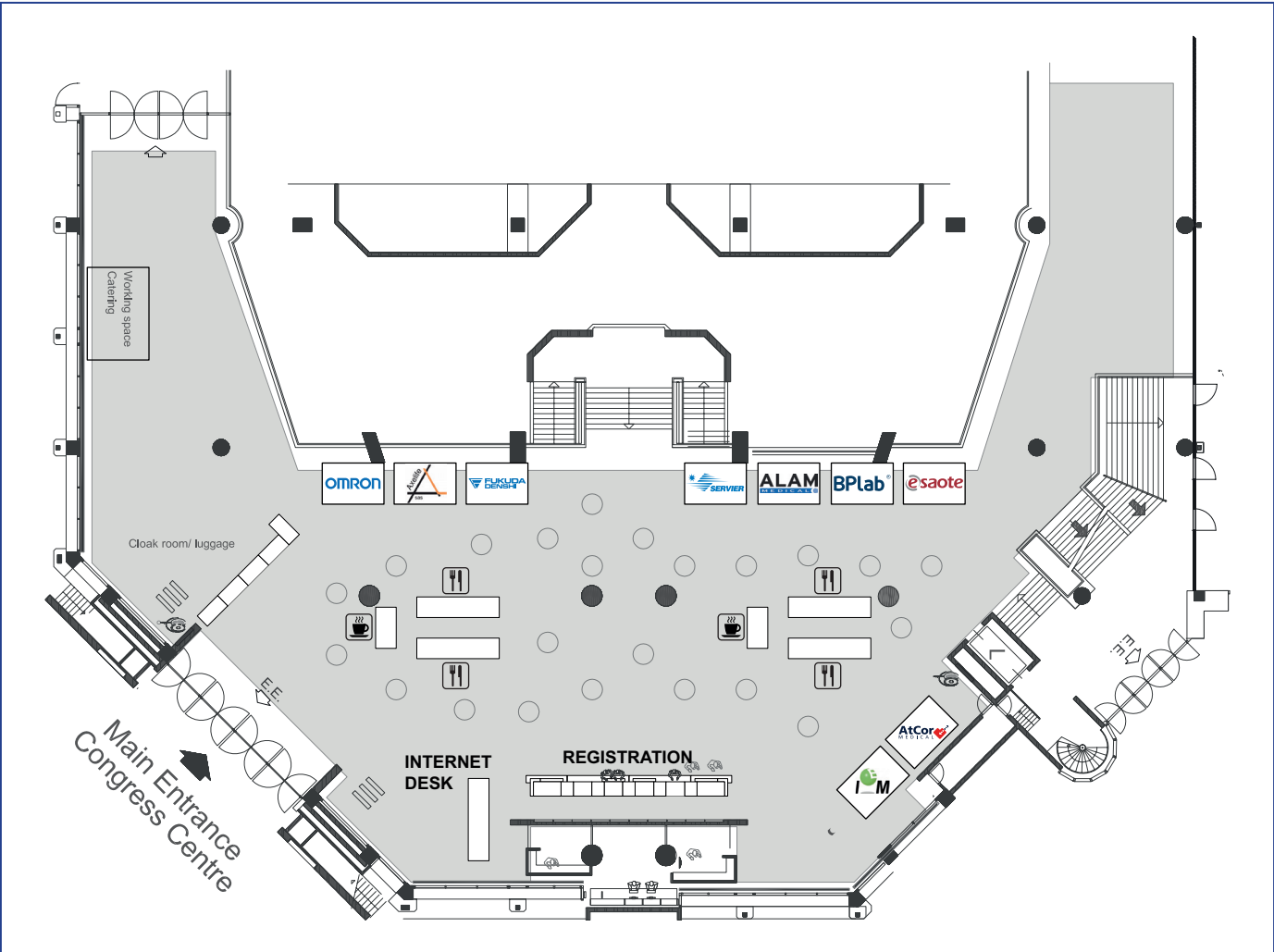
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E: service@iem.de

Omron Healthcare Europe B.V.

53 Kunotsubo, Terado-CHD, MUKO, KYOTO, 617-0002, Japan

W: www.omron-healthcare.com
T: + 81 759252043
E: info.omronhealthcare@eu.omron.com

EXHIBITION FLOORPLAN



SCIENTIFIC PROGRAMME

THURSDAY 9 OCTOBER 2014

- 11.30 Registration, Poster Viewing & Light Lunch**
Location: Trajectum & Lobby
- 12.30 Welcome Address:**
H Struijker-Boudier, *Maastricht, The Netherlands and Chair of Local Organising Committee*
L Van Bortel, *Ghent, Belgium and President of ARTERY*
Location: Auditorium 2
- 12.35 Opening Lecture:**
Pulsatile Hemodynamics and the Microcirculation (in Association with the European Society of Hypertension Working Group on Vascular Structure and Function)
E Agabiti-Rosei, *Università degli Studi di Brescia, Brescia, Italy*
Chair: P Chowienczyk & S Laurent
Location: Auditorium 2
- 13.05 Oral Session I:**
Free Communications in association with ESC Working Group on Peripheral Circulation
Chair: C Vlachopoulos & T Weber
Location: Auditorium 2
- 13.05 1.1 Genome Wide Association Scan Identifies Loci for Arterial Stiffness in Young Healthy Adults**
Yasmin¹, C McEniery¹, S Cleary¹, B Lam¹, H Kuper², Y Endo¹, S Kinra², D Chen¹, G Chandak³, J Deanfield⁴, D Lawlor⁵, J Cockcroft⁶, I Wilkinson¹, K O'Shaughnessy¹
¹University of Cambridge, Cambridge, UK, ²London School of Hygiene & Tropical Medicine, London, UK, ³Centre for Cellular & Molecular Biology, Hyderabad, India, ⁴University College London, London, UK, ⁵Bristol University, Bristol, UK, ⁶Cardiff University, Cardiff, UK
- 13.15 1.2 Marinobufagenin (MBG), an Endogenous Steroidal Na Pump Inhibitor, is Implicated in Cardiovascular Tissue Remodeling and in Pro-Fibrotic Signaling in Old Dahl Salt-Sensitive (Dahl-S) Rats**
O Fedorova, Y Grigorova, W Wei, V Zernetkina, O Juhasz, E Lakatta, A Bagrov
National Institutes of Health, Baltimore, USA
- 13.25 1.3 The Association between Circulating Undecarboxylated Matrix Gla Protein and Arterial Stiffness in General Population**
O Mayer¹, J Seidlerová¹, J Filipovský¹, C Vermeer²
¹Medical Faculty of Charles University and University Hospital, Pilsen, Czech Republic, ²Maastricht University, Maastricht, The Netherlands
- 13.35 1.4 The Aortic Reservoir-Wave as a Paradigm for Arterial Hemodynamics: Insights from 3D Fluid-Structure Interaction Simulations in a Model of Aortic Coarctation**
P Segers, L Taelman, J Degroote, J Bols, J Vierendeels
Ghent University, Ghent, Belgium
- 13.45 1.5 The effect of Ivabradine on Plaque Size, Biomechanics, and Microvasculature in Atherosclerotic Rabbits**
E Hermeling^{1,3}, R H M van Hoof^{1,3}, J Salzmann², J C Sluimer^{1,3}, S Heeneman^{1,3}, A Hoeks^{1,3}, J Roussel², H Struijker-Boudier^{1,3}, J E Wildberger^{1,3}, M Eline Kooij^{1,3}
¹Maastricht University Medical Center, Maastricht, The Netherlands, ²Institute de Recherches Internationales Servier, Suresnes, France, ³Cardiovascular Research Institute Maastricht, Maastricht, The Netherlands
- 13.55 1.6 Augmentation Pressure Independently Associates with Time to Peak Systolic Myocardial Wall Stress**
H Gu¹, M Sinha^{1,2}, J Simpson^{1,2}, P Chowienczyk¹
¹King's College London, London, UK, ²Evelina London Children's Hospital, London, UK
- 14.05 1.7 TLR4 Signaling Mediates SBP Increase with Age - a Translational Investigation**
M Baumann¹, S Schneider¹, S Kemmner¹, S Chmielewski¹, C Aoqui¹, P Hoppmann¹, K Stock¹, K-L Laugwitz^{1,2}, U Heemann¹, A Kastrati^{1,2}
¹Technische Universität München, Munich, Germany, ²German Centre for Cardiovascular Research (DZHK), Munich, Germany

SCIENTIFIC PROGRAMME

THURSDAY 9 OCTOBER 2014

- 14.15 Career Development Lectures**
Chair: I Ferreira & K Maki-Petaja
Location: Auditorium 2
- 14.15 CDL1 Arterial Hemodynamics in Ageing Populations**
G Verwoert, *Erasmus MC, Rotterdam, The Netherlands.*
- 14.35 CDL2 A Multiphysics Computer Modeling Framework in Support of the Quest for Reliable and Robust Local Arterial Stiffness Assessment**
A Swillens¹, L Taelman¹, A Caenen¹, D Shcherbakova¹, M Pernot², B Verheghe¹, J Degroote¹, J Vierendeels¹
¹*Ghent University, Ghent, Belgium,* ²*Institut Langevin, Paris, France*
- 14.55 CDL3 Diabetes Confers a Greater Excess Risk Cardiovascular Disease in Women than in Men: Current Evidence, Potential Mechanisms, Clinical Implications, and Future Directions**
S Peters^{1,2}, ¹*University of Oxford, Oxford, UK,* ²*Utrecht University, Utrecht, The Netherlands*
- 15.15 Refreshments & Exhibition**
Location: Trajectum & Lobby
- 15.45 Special Guest Lecture: Cerebral Circulation & Cognition in the Elderly**
G Biessels, *University Medical Centre Utrecht, Utrecht, The Netherlands*
Chair: C Stehouwer & T De Backer
Location: Auditorium 2
- 16:10 Oral Session II: Free Communications in Association with Pulse of Asia**
Chair: H Tomiyama & J K Cruickshank
Location: Auditorium 2
- 16:10 2.1 24 Hour Central Ambulatory Blood Pressure: Usual Values and Relationship with Markers of Cardiovascular Risk**
C McEniery¹, J Smith¹, G Pestelli², J Woodcock-Smith¹, K Miles¹, J Cockcroft³, I Wilkinson¹
¹*University of Cambridge, Cambridge, UK,* ²*University of Genova, Genova, Italy,* ³*Cardiff University, Cardiff, UK*
- 16:20 2.2 Determination of the Restenosis Degree Inside the Implanted Stent with Integrated Wireless Pulse Wave Velocity (PWV) Sensor**
A Domnich, J Schaechtele
Fraunhofer IPA, Stuttgart, Germany
- 16:30 2.3 Local Stiffness of the Carotid Artery is Associated with Incident Cardiovascular Events and All-Cause Mortality - a Systematic Review and Meta-Analysis**
T van Sloten¹, S Laurent², L Engelen¹, P Boutouyrie², C Stehouwer¹
¹*Maastricht University Medical Centre, Maastricht, The Netherlands,* ²*Université Rene Descartes, Paris, France*
- 16:40 2.4 Relationship between Adult Transfer Function Derived Central Aortic Systolic Pressure and Measured Systolic Pressure in the Healthy Children Population**
Y Cai¹, A Qasem^{2,3}, M Skilton¹, J Ayer^{1,4}, M Butlin², A Avolio², D Celemajor^{1,5}, G Marks⁶
¹*University of Sydney, Sydney, Australia,* ²*Macquarie University, Sydney, Australia,* ³*AtCor Medical, Sydney, Australia,* ⁴*The Children's Hospital at Westmead, Sydney, Australia,* ⁵*Royal Prince Alfred Hospital, Sydney, Australia,* ⁶*Woolcock Institute of Medical Research, Sydney, Australia*
- 16:50 2.5 Comparison of Non-Invasive and Invasive Measurements of Central Blood Pressure in Patients with Chronic Kidney Disease**
R Carlsen, C Peters, D Khatir, E Laugesen, S Winther, N Buus
Aarhus University Hospital, Aarhus, Denmark
- 17:00 2.6 Non-Invasive Estimation of Exercise Central Blood Pressure by Radial Tonometry may be Underestimated due to Brachial-To-Radial-Systolic-Blood-Pressure-Amplification and is related to Upper Limb Blood Flow Velocity**
D Picone, R Climie, M Keske, J Sharman
University of Tasmania, Hobart, Australia

SCIENTIFIC PROGRAMME

THURSDAY 9 OCTOBER 2014

- 17.10 **Manufacturers Presentation**
OMRON
Establishing Normal and Reference Values for Brachial-Ankle Pulse Wave Velocity in Healthy People and in the Presence of Cardiovascular Risk Factors: The Steno-Stiffness Collaborative Group
C Vlachopoulos, MD, *Athens Medical School, Athens, Greece*
Chair: H Struijker-Boudier & L Van Bortel
Location: Auditorium 2
- 17.30 **Parallel Poster Sessions & Welcome Reception**
- 17.30 **Parallel Poster Session I: Therapeutics & Interventions I**
Chair: M Baumann & I Wilkinson
Location: Lobby
- P1.1 Anti-Angiogenic Treatment in Cancer Patients Causes Arterial Dilation and Stiffening Beyond the Blood Pressure Effect**
B Spronck¹, A de Lepper¹, M Alivon², P Boutouyrie², K Reesink¹
¹Maastricht University Medical Centre, Maastricht, The Netherlands, ²European Georges Pompidou Hospital, Paris, France
- P1.2 Atheromatosis, Arteriosclerosis and Deterioration of Cardiac Structure and Performance; the Pivotal Contribution of Mediterranean Diet in Cardiovascular Health**
A Angelis¹, N Ioakimidis¹, D Terentes¹, M Abdelrasoul¹, K Aznaouridis¹, C Vlachopoulos¹
¹Hippokraton Hospital, 1st Department of Cardiology, University of Athens, Athens, Greece
- P1.3 Can Arterial Stiffness and Aortic Pulse Pressure be Reduced Better if Antihypertensive Treatment is Performed according to Laragh and Alderman Idea?**
T Pizon¹, M Rajzer², D Czarnecka²
¹University Hospital, Kraków, Poland, ²Jagiellonian University Medical College, Kraków, Poland
- P1.4 The Influence of regular Interval Training on Blood Pressure, Arterial Stiffness and Endothelial Function among Hypertensive Subjects**
T Kameczura, M Rajzer, D Czarnecka
1st Department of Cardiology and Interventional Electrophysiology with Hypertension, Kraków, Poland
- P1.5 Age-Based Comparison of the Acute Effect of Maximal Aerobic Running Exercise on Arterial Stiffness in Children and Adults**
X Melo¹, B Fernhall², D Santos¹, R Pinto¹, N Pimenta^{1,3}, L Sardinha¹, H Santa-Clara¹
¹University of Lisbon, Lisbon, Portugal, ²University of Illinois, Chicago, USA, ³Sport Sciences School of Rio Major - Polytechnic Institute of Santarem, Rio Major, Portugal
- P1.6 Carotid-Radial Pulse Transit Time Compared to the Pulse Arrival Time to the Capillary Bed of the Finger Tip During and After Aerobic Exercise in Young Healthy Subjects**
N Potocnik, H Lenasi
University of Ljubljana, Ljubljana, Slovenia
- P1.7 Parameters of Arterial Stiffness Differ between Atrial, Ventricular, and Atrial-Ventricular Cardiac Pacing Modes**
I Tan¹, H Kiat^{1,2}, E Barin^{1,3}, M Butlin¹, A Avolio¹
¹Macquarie University, Sydney, Australia, ²Cardiac Health Institute Macquarie, Sydney, Australia, ³Macquarie Heart, Sydney, Australia
- P1.8 Antihypertensive Medicines of up to 4-Drug Combinations in a Large, Community-Based Study: Differential Relationships with Brachial Blood Pressure and Aortic Waveform Parameters**
J Sluyster¹, A Hughes², A Lowe³, K Parker⁴, B Hametner⁵, S Wassertheurer⁵, R Scragg¹
¹University of Auckland, Auckland, New Zealand, ²University College London, London, UK, ³Auckland University of Technology, Auckland, New Zealand, ⁴Imperial College London, London, UK, ⁵Austrian Institute of Technology, Vienna, Austria
- P1.9 Evaluation of Affective Temperaments and Arterial Stiffness in Treated Hypertensive Patients**
J Nemcsik^{1,2}, A László¹, L Babos¹, Z Kis-Igari¹, A Pálfi¹, P Torzsa¹, A Eöry¹, L Kalabay¹, O Cseprekál¹, A Tislér¹, X Gonda¹, Z Rihmer¹
¹Semmelweis University, Budapest, Hungary, ²Health Service of Zugló (ZESZ), Budapest, Hungary

SCIENTIFIC PROGRAMME

THURSDAY 9 OCTOBER 2014

P1.10 Longitudinal changes in Geometric and Functional Arterial Properties in Vascular Ehlers-Danlos Syndrome with Celiprolol

P Hoang¹, S Laurent^{1,2}, M Franck¹, X Jeunemaitre^{1,3}, P Boutouyrie^{2,3}

¹Hopital Europeen Georges-Pompidou, Paris, France, ²INSERM U970, Paris, France,

³Université Paris Descartes, Paris, France

P1.11 Arterial Stiffness and left Ventricular Diastolic Function in Treated and Untreated Hypertensives

W Wojciechowska, K Stolarz-Skrzypek, A Olszanecka, L Klima, J Gasowski, T Grodzicki, D Czarnecka
Jagiellonian University, Kraków, Poland,

P1.12 Tetrahydrobiopterin (BH4) Improves Endothelial Function, but not Aortic Stiffness in Patients with Rheumatoid Arthritis

K Maki-Petaja, L Day, F Hall, A Ostor, I Wilkinson
University of Cambridge, Cambridge, UK

P1.13 Intracoronary and Intravenous Administration of Adenosine Achieve Comparable Maximal Hyperemia and Stenosis Pressure Gradient-Flow Velocity Relations

L Casadonte¹, K Marques², J Spaan¹, M Siebes¹

¹Academic Medical Center, Amsterdam, The Netherlands, ²VU Medical Center, Amsterdam, The Netherlands

P1.14 PWV improvement in Previously Untreated Mild Hypertensive Patients after 1 Year of Monotherapy

E Rodilla^{1,3}, S Millasseau⁴, M Escrivá¹, J García¹, J Costa¹, J Pascual^{1,2}

¹Hospital de Sagunto, Sagunto, Spain, ²Universidad de Valencia, Valencia, Spain, ³Cardenal Herrera, Castellon, Spain, ⁴Pulse Wave Consulting, Saint Leu la Foret, France

P1.15 Modulating effect of Target Pressure Achievement on Pulse Wave Velocity in Hypertensive Patients

E Troitskaya, Y Kotovskaya, Z Kobalava

Peoples' Friendship University of Russia, Moscow, Russia

17.30

Parallel Poster Session II:

Technology & Basic Science I

Chair: P Segers & A Hughes

Location: Lobby

P2.1 Carotid Plaque Microvasculature assessed using Dynamic Contrast-Enhanced MRI: Comparing Different Regions of the Vascular Wall

R van Hoof^{1,3}, E Hermelin^{1,3}, N Wijnen¹, F Schreuder¹, M Truijman¹, S Voo^{1,3}, J Cleutjens^{1,3}, J Sluimer^{1,3}, S Heeneman^{1,3}, R Oostenbrugge^{1,3}, J-W Daemen^{1,3}, M Daemen¹, J Wildberger^{1,3}, M Kooij^{1,3}

¹Maastricht University Medical Center, Maastricht, The Netherlands, ²Academic Medical Center, Amsterdam, The Netherlands, ³Maastricht University, Maastricht, The Netherlands

P2.2 Ultrasound Speckle Tracking Helps Identify Vulnerable Carotid Plaques

A Kaloshina¹, O Kerbikov², E Borskaya³, S Voynov², T Krutova², A Averyanov²

¹I.M.Sechenov First Moscow State Medical University, Moscow, Russia, ²Federal Research Clinical Center FMBA of Russia, Moscow, Russia, ³Federal State Clinical Hospital#86, Moscow, Russia

P2.3 Subclinical Atherosclerosis and Cardiovascular Risk Factors: Ten Years of Experience with IMT Plus® in the Netherlands.

J Barth^{1,2,3}

¹USC, Santa Monica, USA, ²Vitide Medical Research, Santpoort Zuid, The Netherlands,

³Vodemol Research, Muiderberg, The Netherlands

P2.4 Feasibility of Aortic Arch Mechanics - a Study in Normal Subjects

R Teixeira^{1,2}, T Pereira³, R Monteiro⁴, A Xarepe¹, M Graca¹, J Garcia¹, M Ribeiro¹, N Cardim⁴, L Gonçalves^{2,5}

¹Hospital Beatriz Ângelo, Loures, Portugal, ²Faculdade de Medicina Universidade de Coimbra, Coimbra, Portugal, ³Escola Superior Tecnologias da Saúde, Coimbra, Portugal, ⁴Hospital da Luz, Lisboa, Portugal, ⁵Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal, ⁶Lister Hospital, Stevenage, UK

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- P2.5 Aortic Arch Mechanics in Hypertensive Patients versus controls, a Two Dimensional Speckle Tracking Study**
R Teixeira^{1,2}, R Monteiro⁶, T Pereira³, J Garcia¹, A Xarepe¹, M Graca¹, M Ribeiro¹, N Cardim⁵, L Gonçalves^{2,4}
ABSTRACT WITHDRAWN
¹Hospital Beatriz Ângelo, Loures, Portugal, ²Faculdade de Medicina Universidade de Coimbra, Coimbra, Portugal, ³Escola Superior Tecnologias da Saúde, Coimbra, Portugal, ⁴Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal, ⁵Hospital da Luz, Lisboa, Portugal, ⁶Lister Hospital, Stevenage, UK
- P2.6 Artery Distension Measured with Standard B-Mode Image Echo-Tracking has Similar Absolute Values and Precision as Measured with Radio-Frequency Phase-Tracking**
J Steinbuch¹, E Hermeling^{1,2}, F Schreuder², M Truijman², A Hoeks¹, W Mess²
¹Maastricht University, Maastricht, The Netherlands, ²Maastricht University Medical Centre, Maastricht, The Netherlands
- P2.7 Validation of the Complior® Analyse in the Assessment of Central Artery Pressure Curves and Aortic Pulse Wave Velocity**
T Pereira¹, J Maldonado¹
¹Instituto Politécnico de Coimbra, ESTESC, Coimbra, Portugal, ²Instituto de Investigação e Formação Cardiovascular, Coimbra, Portugal
- P2.8 Is the Gold-Standard Foot-To-Foot Pulse Wave Velocity a Good Estimate for Aortic Stiffness? A Numerical Assessment**
M Willemet, N Gaddum, P Chowienczyk, T Schaeffter, J Alastruey
 King's College London, London, UK
- P2.9 Assessment of Central Aortic Pressure and its Association to All Cause Mortality Critically Depends on Wave Form Calibration**
S Wassertheuer¹, M Baumann²
¹AIT Austrian Institute of Technology, Vienna, Austria, ²TU München, Klinikum rechts der Isar, Munich, Germany
- P2.10 Assessment of Carotid Pulse Wave Velocity by Ultrasound: a Wave Intensity Analysis-Based Approach**
N Lascio¹, R Bruno¹, F Stea^{1,2}, V Gemignani¹, E Bianchini¹, L Ghiadoni², F Faïta¹
¹National Council of Research, Pisa, Italy, ²University of Pisa, Pisa, Italy
- P2.11 Assessment of Carotid Distention Waveform and Local Pulse Wave Velocity Determination by a Novel Optical System**
T Pereira¹, T Pereira², H Santos², H Pereira¹, C Correia¹, J Cardoso¹
¹University of Coimbra, Coimbra, Portugal, ²Coimbra College of Health Technology, Coimbra, Portugal
- P2.12 Arterial Stiffness Measured with pOpmètre® in Primary Anti-Phospholipids Syndrome**
M Hallab¹, G Leftheriotis², C Belizna²
¹University Hospital of Nantes, Nantes, France, ²University Hospital of Angers, Angers, France
- P2.13 Foot to Toe Pulse Wave Velocity with pOpmetre® Independently Correlates with Glomerular Filtration Rate in Renal Transplant Patients**
M Hallab¹, S Bertin², J Halimi²
¹University Hospital of Nantes, Nantes, France, ²University Hospital of Tours, Tours, France
- P2.14 Estimation of Aortic Arch Pulse Wave Velocity in MRI using Complex Wavelet Cross-Spectrum**
I Bargiotas¹, A Redheuil^{1,3}, E Bollache¹, G Soulat², A Cesare¹, E Mousseaux², N Kachenoura¹
¹Sorbonne Universités, Paris, France, ²Hôpital Européen Georges Pompidou, Paris, France, ³Imaging Core Lab, Paris, France
- P2.15 Identification of Framework Conditions in Cuff Based Blood Measurement Systems**
R Lurf¹, M Michael¹, C Mayer¹, B Hametner^{1,2}, T Weber³, S Wassertheuer^{1,2}
¹AIT Austrian Institute of Technology GmbH, Vienna, Austria, ²Vienna University of Technology, Vienna, Austria, ³Klinikum Wels-Grieskirchen, Wels, Austria
- 17:30 Parallel Poster Session III: Clinical Science I**
Chair: E Agabiti-Rosei & M Cecelja
Location: Lobby

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- P3.1 Beneficial effects of Hypertriglyceridemia Treatment on Microvascular Endothelial Function in Treated Hypertensive Patients**
M Casanova¹, V Menezes¹, A Cunha¹, M Burlá², F Medeiros³, W Oigman¹, M Neves¹
¹Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Brazil, ²Universidade Federal Fluminense, Rio de Janeiro, Brazil, ³Universidade Federal do Estado do Rio de Janeiro, Rio de Janeiro, Brazil
- P3.2 Impaired Systolic Function is associated with Altered Forward Wave Intensity**
B Hametner^{1,2}, T Weber³, S Parragh^{1,2}, B Eber³, S Wassertheurer¹
¹AIT Austrian Institute of Technology, Vienna, Austria, ²Vienna University of Technology, Vienna, Austria, ³Klinikum Wels-Grieskirchen, Wels, Austria
- P3.3 Cardiac 82Rb-PET/CT Reveals Microvascular Dysfunction in Asymptomatic Patients with Type 2 Diabetes**
T Hansen¹, B von Scholten¹, P Hasbak², T Christensen², A Ghotbi², A Kjaer², P Rossing¹
¹Steno Diabetes Center, Gentofte, Denmark, ²Nuclear Medicine & PET and Cluster for Molecular Imaging, Copenhagen, Denmark, ³University of Copenhagen, Copenhagen, Denmark, ⁴Aarhus University, Aarhus, Denmark
- P3.4 Functional Changes in the Carotid Artery Associated with an Acute Bout of Resistance Exercise**
J Black¹, K Stone², M Stembridge¹, D Newcombe³, E Assasie⁴, E Stöhr¹, J Esformes¹
¹Cardiff Metropolitan University, Cardiff, UK, ²University of Gloucestershire, Gloucester, UK, ³Oxford Brookes University, Oxford, UK, ⁴Loughborough University, Loughborough, UK
- P3.5 Urinary Proteomics and Vascular Phenotyping in a Cohort of Type 2 Diabetic Patients at High Cardiovascular Risk**
G Currie, M Friar, C Brown, J Flynn, W Mullen, H Mischak, C Delles
University of Glasgow, Glasgow, UK
- P3.6 Age-Dependent Differences in Carotid Artery Circumferential Strain Measurements, Independent of Blood Pressure, Aerobic Fitness Capacity, Gender and Conventional Non-Invasive Parameters of Vascular Stiffness**
A Rosenberg, A Lane, R Kappus, T Wee, T Baynard, B Fernhall
University of Illinois at Chicago, Chicago, USA
- P3.7 Impedance Mismatching Between Central and Peripheral Arteries Fails to Explain Central Pressure Augmentation: Aortic Reservoir Characteristics May Be the Prevailing Factor**
M Schultz¹, J Davies², A Hughes³, J Sharman¹
¹University of Tasmania, Hobart, Australia, ²Imperial College London, London, UK, ³University College London, London, UK
- P3.8 Acute Effects of Contrast Media on Central Hemodynamics, Arterial Stiffness, Inflammatory and Kidney Injury Biomarkers**
K Paapstel¹, M Zilmer¹, J Eha¹, J Kals^{1,2}
¹University of Tartu, Tartu, Estonia, ²Tartu University Hospital, Tartu, Estonia
- P3.9 Metabolomic Signature of Arterial Stiffness in Patients with Peripheral Arterial Disease**
M Zagura¹, J Kals^{1,2}, K Paapstel¹, K Kilk¹, M Serg¹, P Kampus¹, J Eha¹, U Soomets¹, M Zilmer¹
¹University of Tartu, Tartu, Estonia, ²Tartu University Hospital, Tartu, Estonia
- P3.10 Reactivity to Low-Flow in the Brachial Artery: A Potential Determinant for Flow-Mediated Dilatory Response**
K Aizawa^{1,2}, S Elyas¹, D Adingpu¹, A Shore¹, D Strain¹, P Gates¹
¹University of Exeter Medical School, Exeter, UK, ²NIHR Exeter Clinical Research Facility, Exeter, UK
- P3.11 Carotid Intima-Media Thickness is Positively Associated with Subchronic Personal Exposure to Black Carbon: a Study in a Panel of Healthy Adults**
E Provost^{1,2}, T Louwies^{1,2}, J Roodt¹, E Dons², J Penders³, L Panis^{2,4}, P De Boever^{1,2}, T Nawrot^{1,5}
¹Hasselt University, Diepenbeek, Belgium, ²Flemish Institute for Technological Research (VITO), Mol, Belgium, ³Ziekenhuis Oost-Limburg (ZOL), Genk, Belgium, ⁴Hasselt University, Diepenbeek, Belgium, ⁵Leuven University (KU Leuven), Leuven, Belgium

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P3.12 Blood Pressure Changes In Association with Personal Black Carbon Exposure are Not Mediated through Microcirculatory Responses

T Louwies^{1,2}, P De Boever^{1,2}, B Cox², J Penders³, L Panis^{1,2}, T Nawrot²

¹Flemish Institute for Technological Research (VITO), Mol, Belgium, ²Hasselt University, Diepenbeek, Belgium, ³Ziekenhuis Oost-Limburg, Genk, Belgium, ⁴Leuven University (KU Leuven), Leuven, Belgium

17:30

Parallel Poster Session IV:

Epidemiology I

Chair: F Mattace Raso & T Hansen

Location: Lobby

P4.1 Impact of Age and Gender on the Determinants of Pulse Pressure and Isolated Systolic Hypertension

C McEnery¹, A Cocks¹, B McDonnell³, Y Yasmin¹, J Cockcroft², I Wilkinson¹

¹University of Cambridge, Cambridge, UK, ²Cardiff University, Cardiff, UK, ³Cardiff Metropolitan University, Cardiff, UK

P4.2 The Cardiovascular Risks Profiles and Central Hemodynamics in Survivors of Adulthood Cancer Who Have Annual Health Check-Up in Japan

H Tomiyama, A Yamashina

Tokyo Medical University, Tokyo, Japan

P4.3 Influence of Gender on Aortic Stiffness in COPD

A Albarrati, N Gale, I Munnery, M Munnery, S Saikia, S Enright, D Shale, J Cockcroft

Cardiff University, Cardiff, UK

P4.4 Doppler Indexes of Left Ventricular Systolic and Diastolic Flows and Central Pulse Pressure in Relation to Renal Resistive Index in a General Population

N Cauwenberghs¹, J Knez¹, L Thijs¹, Y-P Liu¹, Y-M Gu¹, J Staessen^{1,2}, T Kuznetsova¹

¹KU Leuven, Leuven, Belgium, ²University of Maastricht, Maastricht, The Netherlands

P4.5 Characteristics and Determinants of the Sublingual Microcirculation in a Flemish Population

Y-M Gu¹, L Thijs¹, Y-P Liu¹, T Petit¹, Z Zhang¹, H Vink², T Kuznetsova¹, P Verhamme¹, J Staessen^{1,2}

¹University of Leuven, Leuven, Belgium, ²Maastricht University, Maastricht, The Netherlands

P4.6 Pulsatile and Steady Blood Pressure Components in Relation to Environmental Lead Exposure in the National Health and Nutrition Examination Survey 2003-2010

A Hara¹, L Thijs¹, K Asayama², Y-M Gu¹, L Jacobs¹, Z-Y Zhang¹, Y-P Liu¹, T Nawrot³, J Staessen^{1,4}

¹University of Leuven, Leuven, Belgium, ²Teikyo University School of Medicine, Tokyo, Japan, ³University of Hasselt, Hasselt, Belgium, ⁴Maastricht University, Maastricht, The Netherlands

P4.7 Relationship of Different Cardiovascular Tissue Biomarkers with Established Risk Factors and Framingham Risk Score in Middle-Age Subjects Without Cardiovascular Events

C Palombo¹, C Morizzo¹, D Guarino¹, M Kozakova²

¹Department of Surgical, Medical, Molecular & Critical Area Pathology, University of Pisa, Pisa, Italy,

²Department of Clinical and Experimental Medicine, University of Pisa, Pisa, Italy

P4.8 Arterial Stiffness is Associated with Depressive Symptoms and this Association is Partly Mediated by Cerebral Small Vessel Disease: The AGES-Reykjavik Study

T van Sloten¹, G Mitchell², S Sigurdsson³, M van Buchem⁴, P Jonsson^{5,6}, M Garcia⁷, T Harris⁷, R Henry¹, A Levey⁸, C Stehouwer¹, V Gudnason^{2,6}, L Launer⁷

¹Maastricht University Medical Centre, Maastricht, The Netherlands, ²Cardiovascular Engineering Inc, Norwood, USA, ³Icelandic Heart Association, Kopavogur, Iceland, ⁴Leiden University Medical Center, Leiden, The Netherlands, ⁵Landspítali University Hospital, Reykjavik, Iceland, ⁶University of Iceland, Reykjavik, Iceland, ⁷National Institute on Aging, Bethesda, MD, USA, ⁸Tufts Medical Center, Boston, MA, USA

P4.9 Association Between Arterial Stiffness and Skin Microvascular Function in Individuals Without and With Type 2 Diabetes: Combined Report of The SUVIMAX2 Study and The Maastricht Study

T van Sloten¹, S Czernichow^{2,3}, A Houben¹, A Protogerou¹, R Henry¹, D Muris¹, M Schram¹, S Sep¹, P Dagnelie¹, C van der Kallen¹, N Schaper¹, J Blacher⁴, S Herberg⁵, B Levy², C Stehouwer¹

¹Maastricht University Medical Centre, Maastricht, The Netherlands, ²INSERM, Villejuif, France, ³University of Versailles Saint Quentin, Versailles, France, ⁴Hôtel-Dieu Hospital, Paris Descartes University, Paris, France, ⁵INSERM U557, Bobigny, France

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- P4.10 Pulse Wave Velocity Under the Cut-Off Value of 10 m/s and Aortic Augmentation Index Corrected to Heart Rate May Signal Higher Early CVD Risk in Middle-Aged Men**
I Ceponiene, E Tamuleviciute-Prasciene, R Slapikas, J Petkeviciene, J Klumbiene
Lithuanian University of Health Sciences, Kaunas, Lithuania
- P4.11 Type 2 Diabetes is Associated with Greater Carotid Stiffness and Greater Pressure-Dependency of Carotid Stiffness - The Maastricht Study**
M Veugen¹, T van Sloten¹, R Henry¹, E Hermeling¹, H-P Rocca¹, M Schram¹, P Dagnelie¹, C Stehouwer¹, K Reesink²
¹MUMC+, Maastricht, The Netherlands, ²MUMC+, Cardiovascular Research Institute Maastricht (CARIM), Maastricht, The Netherlands
- P4.12 Age, Waist Circumference and Blood Pressure are Associated with Skin Microvascular Flowmotion: The Maastricht Study**
A Houben, D Muris, A Kroon, R Henry, C van der Kallen, N Schaper, S Sep, A Koster, P Castermans, M Schram, C Stehouwer
MUMC / CARIM, Maastricht, The Netherlands
- P4.13 Type 2 Diabetes is Associated with Altered Carotid Artery Mechanics Independently of Ageing and Mean Arterial Pressure - The Maastricht Study**
B Spronck, E Hermeling, R Henry, C Stehouwer, T Delhaas, C Schalkwijk, K Reesink
Maastricht University Medical Centre, Cardiovascular Research Institute Maastricht (CARIM), Maastricht, The Netherlands
- P4.14 The Effect of Gender and Body Size on Arterial Haemodynamics at Rest and during Exercise**
J Middlemiss^{1,2}
¹University of Cambridge, Cambridge, UK, ²Wales Heart Institute, Cardiff, UK
- 17:30 Parallel Poster Session V: Clinical Science II**
Chair: A Paini & A Protogerou
Location: Lobby
- P5.1 Proteomic Analysis on Human Arterial Tissue: Relations to Arterial Stiffness**
M Hansen, H Beck, A Imukhamedov, P Jensen, L Rasmussen
Odense University Hospital, Odense, Denmark
- P5.2 Quantitative Proteomics Reveal Increased Content of Basement Membrane Proteins in Arteries from Patients with Type 2 Diabetes, but Reduced Amounts Among Metformin Users**
S Preil¹, L Kristensen¹, H Beck¹, P Jensen¹, T Steiniche², M Bjørling-Poulsen¹, M Larsen³, M Hansen¹, L Rasmussen¹
¹Odense University Hospital, Odense, Denmark, ²University Hospital of Aarhus, Aarhus, Denmark, ³University of Southern Denmark, Odense, Denmark
- P5.3 Influence of Diabetes Mellitus on Arterial Stiffness Parameters, Respectively on Central Systolic Blood Pressure - a Matter of Sex?**
A Sitar-Taut, A Cozma, M Cebanu, D Zdrengea, D Pop
"Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania
- P5.4 Identification of Factors that Influence Aortic and Brachial Stiffness**
A Cozma, A Sitar-Taut, O Orasan, A Fodor, D Zdrengea, D Pop
"Iuliu Hatieganu" University of Medicine and Pharmacy, Cluj-Napoca, Romania
- P5.5 In Vivo Assessment of Regulatory Mechanism of the Systemic Arterial and Venous System for the Prevention of Orthostatic Intolerance**
C Leguy^{1,2}, A Blaber², J Rittweger¹, L Beck¹
¹German Aerospace Center, Cologne, Germany, ²Simon Fraser University, Vancouver/BC, Canada
- P5.6 Arterial Remodeling and Its Relationship with Blood Pressure Control in Children with Non-Dialysis Chronic Kidney Disease**
M Sinha^{1,2}, L Keehn², L Milne², P Chowienczyk²
¹Evelina London Children's Hospital, Guy's and St. Thomas NHS Trust, London, UK, ²St Thomas' Hospital, Kings College London, London, UK

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- P5.7 Mobility of Carotid Artery Wall Depends on Level of Atherosclerotic Lesion in Bifurcation**
A Kaloshina¹, O Kerbikov², E Borskaya³, T Krutova², A Averyanov²
¹*I.M.Sechenov First Moscow State Medical University, Moscow, Russia*, ²*Federal Research Clinical Center FMBA of Russia, Moscow, Russia*, ³*Federal State Clinical Hospital#86, Moscow, Russia*
- P5.8 Mismatch Between Office Blood Pressure Response and Hemodynamic Parameters in Routine Treatment of Hypertensive Patients**
P Forcada², C Castellaro², S Gonzalez², S Obregon^{1,2}, J Chiabaut², C Kotliar^{1,2}
¹*Hospital Universitario Austral, Buenos Aires, Argentina*, ²*Santa Maria De La Salud, Buenos Aires, Argentina*
- P5.9 Lack of Recovery in Nocturnal Decline of Heart Rate and Blood Pressure After Heart Transplantation**
P Meani^{1,2}, M Varrenti^{1,2}, L Giupponi^{1,2}, L Bonacchini^{1,2}, V Riva^{1,2}, A Maloberti², F Turazza¹, M Frigerio¹, G Parati², S Wassertheurer³, C Giannattasio^{1,2}
¹*Hospital Cà Granda Niguarda, Milan, Italy*, ²*Milano Bicocca University, Milan, Italy*, ³*AIT Austrian Institute of Technology GmbH, Wein, Austria*
- P5.10 Influence of Obesity in the Relationship Between Carotid Artery Function and Central Blood Pressure**
A Casanova, G Pichler, O Juan, E Solaz, J Mas, F Martinez
Hospital Clinico Universitario, Valencia, Spain
- P5.11 Proximal Aortic Remodeling is Associated with Left Ventricular Mass and Pulse Wave Velocity in Essential Hypertension**
F Tosello, D Leone, G Bruno, A Ravera, L Sabia, F Veglio, A Milan
University of Turin, Turin, Italy
- P5.12 Carotid-Femoral and Brachial Pulse Wave Velocity in Peripheral Arterial Disease**
M Frick¹, V Jacomella¹, S Roth¹, I Wilkinson^{2,1}, B Amann-Vesti¹, M Husmann¹
¹*University Hospital Zurich, Zurich, Switzerland*, ²*University of Cambridge, Cambridge, UK*
- P5.13 The Relationship Between Apolipoprotein B/Apolipoprotein A1 Ratio, High Sensitivity C - Reactive Protein and some Components of Metabolic Syndrome in the Bulgarian Population**
G Atanasova¹, M Marinov², M Atanasov²
¹*Medical University, Pleven, Bulgaria*, ²*National Military University, Dolna Mitropolia, Bulgaria*
- P5.14 Impact of Kidney Donation on Aortic Stiffness: a Feasibility Study**
J Smith, C McEniery, A Bradley, I Wilkinson, L Tomlinson
University of Cambridge, Cambridge, UK
- 19.00 - 21.00 Young Investigator Network Evening**
Location: MeccaTable

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FRIDAY 10 OCTOBER 2014

- 07.30** **Registration, Refreshments & Exhibition**
Location: Trajectum & Lobby
- 08.30** **Oral Session III: Young Investigator Presentations**
Chair: P Boutouyrie & S Wassertheuer
Location: Auditorium 2
- 08.30** **3.1** **Quantification of Three-Dimensional Vascular Smooth Muscle Orientation and Its Dispersion in Murine Carotid Arteries**
B Spronck¹, R Megens^{2,1}, K Reesink¹, T Delhaas¹
¹Maastricht University Medical Centre, Maastricht, The Netherlands, ²Ludwig-Maximilians-Universität, Munich, Germany
- 08.45** **3.2** **Inactive Matrix Gla Protein is Causally Related to Health Outcomes: a Mendelian Randomization Study in a Flemish Population.**
Y-P Liu¹, Y-M Gu¹, L Thijs¹, M Knapen², E Salvi³, L Citterio⁴, T Petit¹, S Carpi⁴, Z-Y Zhang¹, L Jacobs¹, Y Jin¹, C Barlassina³, P Manunta⁵, T Kuznetsova¹, P Verhamme¹, H Struijker-Boudier², D Cusi³, C Vermeer², J Staessen¹
¹University of Leuven, Leuven, Belgium, ²Maastricht University, Maastricht, The Netherlands, ³University of Milan, Milan, Italy, ⁴San Raffaele Scientific Institute, Milan, Italy, ⁵University Vita-Salute San Raffaele, Milan, Italy
- 09.00** **3.3** **Associations Between Plasma Incretin Hormone Release and Aortic Stiffness and Blood Pressure in Individuals Without Known Diabetes: The ADDITION-PRO Study**
N Johansen^{1,2}, K Færch¹, S Torekov³, D Witte⁴, A Jonnson³, O Pedersen³, T Hansen³, T Lauritzen⁵, A Sandbæk⁵, J Holst³, D Vistisen¹, M Jørgensen¹
¹Steno Diabetes Center, Gentofte, Denmark, ²Danish Diabetes Academy, Odense, Denmark, ³University of Copenhagen, Copenhagen, Denmark, ⁴Centre de Recherche Public de la Santé, Strassen, Luxembourg, ⁵University of Aarhus, Aarhus, Denmark
- 09.15** **3.4** **Effect Of Vitamin D Supplementation on Aortic Stiffness and Central Haemodynamics in Older Individuals with Vitamin D Deficiency: Promising Observational Data is Not Supported When Tested by Double-Blind, Placebo-Controlled, Randomised Trial Design**
P Veloudi¹, C Ding¹, L Blizzard¹, G Jones¹, F Cicuttini², A Wluka², T Winzenberg¹, J Sharman¹
¹University of Tasmania, Hobart, Australia, ²Monash University, Melbourne, Australia
- 09.30** **3.5** **Effects of Beta-Blockers With or Without Vasodilating Properties on Central Blood Pressure: a Meta-Analysis of Randomized Trials in Hypertension**
G Pucci¹, M Ranalli², F Battista¹, F Anastasio¹, M Crapa¹, G Schillaci¹
¹University of Perugia and Internal Medicine, Terni, Italy, ²University of Perugia, Perugia, Italy
- 09.45** **3.6** **Gene Expression Analysis Identify Genes Associated with Arterial Stiffness and Carotid Diameter In The Twins UK Cohort**
M Cecelja, B Jiang, K McNeill, T Spector, P Chowieniczky
King's College London, London, UK
- 10.00** **Special Guest Lecture:**
Molecular Mechanisms of Arterial Stiffening: Role of Vascular Smooth Muscle Cells
P Lacolley, INSERM Unit 1116, Vandoeuvre les Nancy, France
Chair: I Wilkinson & F Mattace-Raso
Location: Auditorium 2
- 10.25** **Refreshments, Exhibition & Poster Viewing**
Location: Trajectum & Lobby
- 10.55** **Satellite Symposium: Organised in Collaboration with Servier:**
Arterial stiffness: A Translational Approach
Chair: H Struijker-Boudier and C Vlachopoulos
Location: Auditorium 2
- 10.55** **Introduction**
C Vlachopoulos, Greece
- 11.00** **Arterial Stiffness: from Surrogate Marker to Therapeutic Target**
L Van Bortel, Belgium

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- 11:15** **Effects of Antihypertensive Drugs on Arterial Stiffness**
L Ghiadoni, *Italy*
- 11:30** **Combination Therapy in Hypertension: From Effect on Arterial Stiffness to Cardiovascular Benefits**
Charalambos Vlachopoulos, *Greece*
- 11:45** **Conclusion:**
H Struijker-Boudier, *The Netherlands*
- 11:55** **Manufacturer Practical Demonstration:**
Live demonstration of VP-1000 and HEM-9000AI measuring ABI/PWV/AI and Central BP presented by Omron Healthcare
Location: BERLIN 0.2
- 13:00** **Lunch, Exhibition and Posters**
Location: Trajectum & Lobby
- 14:00** **Oral Session IV: Young Investigator Presentations**
Chair: L Ghiadoni & J Baulmann
Location: Auditorium 2
- 14:00** **4.1** **Normal Values and Determinants of Femoral Artery Stiffness**
J Bossuyt¹, L Engelen^{1,2}, I Ferreira², C Stehouwer^{1,2}, P Boutouyrie⁴, S Laurent⁴, P Segers¹, K Reesink², L Van Bortel¹
¹Ghent University, Ghent, Belgium, ²Maastricht University Medical Centre, Maastricht, The Netherlands, ³Top Institute Food and Nutrition, Wageningen, The Netherlands, ⁴Hôpital Européen Georges Pompidou, Paris, France
- 14:15** **4.2** **Genetic Variations on Chromosome 14 Influence BCL11B Gene Expression Levels and Aortic Stiffness**
R Al Maskari¹, S Cleary¹, Y Li², A Khir², G Mitchell³, I Wilkinson¹, K O'Shaughnessy¹, Yasmin¹
¹University of Cambridge, Cambridge, UK, ²Brunel University, Middlesex, UK, ³Cardiovascular Engineering, Massachusetts, USA
- 14:30** **4.3** **Impact of Age and Gender on the Haemodynamic Determinants of Blood Pressure Across the Adult Age-Span**
A Cocks¹, J Smith¹, J Woodcock-Smith¹, K Miles¹, K Maki-Petaja¹, B McDonnell², J Cockcroft³, I Wilkinson¹, C McEniery¹
¹University of Cambridge, Cambridge, UK, ²Cardiff Metropolitan University, Cardiff, UK, ³Cardiff University, Cardiff, UK
- 14:45** **4.4** **The Effect of B-Vitamin Supplementation on Arterial Stiffness in the Elderly**
S van Dijk¹, Y Smulders², A Enneman¹, K Swart², J van Wijngaarden³, A Ham¹, N van Schoor², R Dhonukshe-Rutten³, L de Groot³, P Lips², A Uitterlinden¹, H Blom², J Geleijnse³, E Feskens³, T van den Meiracker¹, F Mattace-Raso¹, N van der Velde¹
¹Erasmus MC, Rotterdam, The Netherlands, ²VU University Medical Center, Amsterdam, The Netherlands, ³Wageningen University, Wageningen, The Netherlands
- 15:00** **4.5** **Do Backward Pressure Waves Arise From "Reflections" or From a "Reservoir"?**
Y Li, H Fok, B Jiang, S Epstein, J Alastruey, P Chowieńczyk
King's College London, London, UK
- 15:15** **4.6** **Wave Intensity Analysis in the Pulmonary Artery**
J Su^{1,2}, C Manisty³, K Parker², A Hughes^{2,3}
¹Aarhus University, Aarhus, Denmark, ²Imperial College London, London, UK, ³University College London, London, UK
- 15:30** **FOCUS: Modelling the Arterial System**
Chair: P Segers & K Reesink
Location: Auditorium 2
- 15:30** **Models of Arterial Wall Mechanics**
J Humphrey, *Yale University, New Haven, USA*
- 15:55** **The Design of an Optimal Arterial Network**
A Hughes, *University College London, London, UK*

SCIENTIFIC PROGRAMME

FRIDAY 10 OCTOBER 2014

16:20 Refreshments, Exhibition & Posters

Location: Trajectum & Lobby

16.50 Parallel Poster Session VI: Therapeutics & Interventions II

Chair: B Pannier & C Vlachopoulos

Location: Lobby

P6.1 Evaluation of Arterial Stiffness Indices and Central Hemodynamics in Healthy Normotensive Volunteers and in Treated or Untreated Hypertensive Patients in Ambulatory Conditions

S Omboni¹, I Posokhov², A Rogoza³

¹Italian Institute of Telemedicine, Varese, Italy, ²Hemodynamic Laboratory Ltd, Nizhny Novgorod, Russia,

³Cardiology Research Center, Moscow, Russia

P6.2 Systematic Review of Results of Kissing Stents in the Treatment of Aortoiliac Occlusive Disease

E Groot-Jebbink^{1,2}, J-W Lardenoije¹, S Holewijn¹, M Reijnen¹

¹Rijnstate Hospital, Arnhem, The Netherlands, ²University of Twente, Enschede, The Netherlands

P6.3 Moderate Intensity Exercise Aortic Reservoir Pressure Independently Predicts Left-Ventricular Mass Index: One-Year Prospective Study in Patients with Treated Hypertension

M Schultz¹, J Davies², J Sharman¹

¹University of Tasmania, Hobart, Australia, ²Imperial College London, London, UK

P6.4 The Differential Effects of Resistance Training and Endurance Training on Augmentation Index: A Pilot Study

I Softley¹, E Kier², S Cooke², M Bowes², L Watkeys², N Gale¹, J Cockcroft¹, B McDonnell¹

¹Cardiff University, Cardiff, UK, ²Cardiff Metropolitan University, Cardiff, UK

P6.5 Anti-Infective Periodontal Therapy is Associated with Improvement of Arterial Stiffness and Pulse Wave Reflection

Y Jockel-Schneider¹, U Schlagenhaut¹, M Bechtold¹, S Fickl¹, I Harks³, J Baulmann²

¹University Wuerzburg, Wuerzburg, Germany, ²University Luebeck, Luebeck, Germany,

³University Muenster, Muenster, Germany

P6.6 A Double Blind, Randomised Trial Investigating if Arterial Stiffness can be Reduced Independently of Blood Pressure in Participants with or at Risk of Type 2 Diabetes

C Mills, F Iqbal, H Crickmore, V Govoni, A Webb, J K Cruickshank

King's College London, London, UK

P6.7 Sublingual Nitroglycerin in Patients with Heart Failure and Preserved Ejection Fraction: Impact on Central and Regional Carotid and Radial Input Impedance and Hemodynamics

F Londoño¹, P Segers¹, P Shiva-Kumar², S Peddireddy², J Chirinos^{2,3}

¹Ghent University, Ghent, Belgium, ²UPenn, Philadelphia, USA, ³VA Medical Center, Philadelphia, USA

P6.8 Effect of Organic Nitrates on Intraventricular Pressure Gradients in Heart Failure Patients with Preserved Ejection Fraction

F Londoño¹, B Meyers², P Vlachos², P Segers¹, J Chirinos³

¹IBitech-bioMMeda (Ghent University), Ghent, Belgium, ²Faculty School of Biomedical Engineering and Sciences (Virginia Tech), Blacksburg, USA, ³Department of Cardiology & Radiology (University of Pennsylvania), Pennsylvania, USA

P6.9 Dietary Nitrate by Beetroot Juice can Lower Renal Resistive Index in Patients with Chronic Kidney Disease

S Kemmner¹, K Burkhardt², U Heemann¹, M Baumann¹

¹Technical University, Munich, Germany, ²Nephrological Clinic Weissenburg, Weissenburg, Germany

P6.10 Propionyl-L-carnitine for intermittent claudication: A Cochrane Review

T de Backer^{1,2}, V Kamoen², R Vander Stichele¹, L Campens², D De Bacquer³, L Van Bortel¹

¹Heymans Institute of Pharmacology, Ghent, Belgium, ²Cardiovascular Center, Ghent, Belgium,

³Dept of Epidemiology and Public Health, Ghent, Belgium

P6.11 Phosphodiesterase Type-5 Inhibitor Use in Type 2 Diabetes is Associated with a Reduction in All Cause Mortality

S Anderson¹, D Hutchings¹, C Kwok¹, A Trafford¹, A Heald^{1,2}

¹University of Manchester, Manchester, UK, ²Leighton Hospital, Crewe, UK

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16:50

Parallel Poster Session VII: Clinical Science III

Chair: A Avolio & S Wassertheuer

Location: Lobby

- P7.1 Acute Effects of Smoking Over the Endothelial Function and Central Arterial Hemodynamics in Young Healthy People**
T Pereira¹, J Maldonado², R Brandão¹, J Conde¹
¹Instituto Politécnico de Coimbra, Coimbra, Portugal, ²Instituto de Investigação e Formação Cardiovascular, Coimbra, Portugal
- P7.2 Identification of Vascular and Circulating Biomarkers to Predict Outcome in Patients Affected by Septic Shock**
P Vallerio², O Belli², F Musca², G Monti³, L Bonacchini¹, M Cazzaniga¹, M Stucchi¹, P Meani¹, L Frigerio¹, M Molteni¹, F Panzeri¹, M Alloni², R Fumagalli^{3,1}, A De Gasperi⁴, C Giannattasio^{1,2}
¹Milano-Bicocca University, Milan, Italy, ²Cardiologia IV, Ospedale Niguarda Ca' Granda, Milan, Italy, ³Intensive Care Unit 2, Ospedale Niguarda Ca' Granda, Milan, Italy, ⁴Intensive Care Unit 3, Ospedale Niguarda Ca' Granda, Milan, Italy
- P7.3 Impact of Kidney Transplantation on Aortic Stiffness: Results from 2-Year Follow-Up**
D Turgeon^{1,2}, C Fortier^{1,2}, S Ignace³, S De Serres^{1,2}, I Côté^{1,2}, I Houde^{1,2}, M Agharazii¹
¹Université Laval, Québec, Canada, ²Chu de Québec Research Centre, Québec, Canada, ³Chu de Nancy, Nancy, France
- P7.4 Aortic Stiffness is Associated with Functional Limitation (or Six Minute Walk Distance) in Chronic Obstructive Pulmonary Disease: The ERICA Study**
M Fisk¹, D Mohan², C Bolton³, J Cockcroft⁴, W MacNee⁵, C McEniery¹, R Tal-Singer⁶, M Polkey², I Wilkinson¹
¹University of Cambridge, Cambridge, UK, ²Royal Brompton & Harefield Foundation NHS Trust, London, UK, ³University of Nottingham, Nottingham, UK, ⁴Wales Heart Research Institute, Cardiff University, Cardiff, UK, ⁵University of Edinburgh, Edinburgh, UK, ⁶GlaxoSmithKline, Pennsylvania, USA
- P7.5 Phenotyping of Arterial Hypertension by Pulse Wave Velocity and Plasma Renin Activity Measurement**
E Pavlova, Y Kotovskaya, Z Kobalava
Peoples' Friendship University of Russia, Moscow, Russia
- P7.6 Age-Related Trends in 24-Patterns of Aortic Pulse Wave Parameters**
I Semagina, Y Kotovskaya, Z Kobalava
Peoples' Friendship University of Russia, Moscow, Russia
- P7.7 Gender-Related Trends in 24-Hour Ambulatory Brachial Blood Pressure and Central Pulse Wave Monitoring**
I Semagina, Y Kotovskaya, Z Kobalava
Peoples' Friendship University of Russia, Moscow, Russia
- P7.8 Systolic Pressure Amplification in Children**
L Milne¹, L Keehn¹, M Sinha^{1,2}, P Chowienczyk¹
¹St Thomas' Hospital, King's College London, London, UK, ²Evelina London Children's Hospital, Guy's and St. Thomas' NHS Trust, London, UK
- P7.9 Elevated Arterial Stiffness Precedes Development of Hypertension in Never Treated Prehypertensive Patients**
E Rodilla^{1,3}, S Millasseau⁴, M Escrivá¹, J García¹, J Costa¹, J Pascual^{1,2}
¹Hospital de Sagunto, Sagunto, Spain, ²Universidad de Valencia, Valencia, Spain, ³Universidad Cardenal Herrera, Castellon, Spain, ⁴Pulse Wave Consulting, Saint Leu la foret, Spain
- P7.10 Pre-treatment Aortic Pulse Pressure as a Possible Predictor of Future Visit-To-Visit Systolic Blood Pressure Variability**
E Troitskaya, Y Kotovskaya, Z Kobalava
Peoples' Friendship University of Russia, Moscow, Russia
- P7.11 Testosterone and Cardiovascular Performance; the Impact of the Androgen Deficiency in Arterial-Ventricular Coupling and Vascular Stiffness Documented by 3D Echocardiography**
A Angelis, N Ioakimidis, C Vlachopoulos, K Aznaouridis, M Abdelrasoul, K Aggeli
University of Athens, Athens, Greece

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- P7.12 Circulating Vascular Growth Factors and Aortic Indices in Ghanaians with Diabetes and Hypertension**
K Yeboah¹, D Antwi¹, B Gyan², V Govoni³, J K Cruickshank³, A Amoah^{1,4}

¹University of Ghana Medical School, Accra, Ghana, ²University of Ghana, Accra, Ghana, ³King's College, London, London, UK, ⁴National Diabetes Management and Research Centre, Accra, Ghana

- P7.13 Does Carotid Artery Applanation Tonometry Cause Baroreflex Activation?**

B Spronck, T Delhaas, K Reesink

University Medical Centre, Maastricht, The Netherlands

16:50

Parallel Poster Session VIII: Technology & Basic Science II

Chair: P Lacolley & N Westerhof

Location: Lobby

- P8.1 Feasibility of 24-Hour Central Blood Pressure Measurements - the ISAR Hemodialysis Study**
M Baumann¹, M Bauhofer¹, S Wassertheurer², S Tholen¹, C Hauser¹, Y Suttman¹, A-L Hasenau¹,
U Heemann¹, C Schmaderer¹

¹Universität München, Munich, Germany, ²AIT Austrian Institute of Technology, Vienna, Austria

- P8.2 Progression of Carotid Artery Remodeling and Stiffness in Hypertensive Patients With or Without Diabetes Mellitus: a Cohort Prospective Study**

R Bruno¹, M Barzacchi², G Cartoni², G Penno², S Taddei², S Del Prato², L Ghiadoni²

¹Institute of Clinical Physiology - CNR, Pisa, Italy, ²University of Pisa, Pisa, Italy

- P8.3 Aortic Flow Alterations in Dilated and Hypertrophic Cardiomyopathy: New Insight from Quantitative Flow MRI**

I Bargiotas¹, E Bollache¹, A De Cesare¹, L Besson-Hajji², S Tavoraro², A Redheuil^{1,3}, E Mousseaux²,
N Kachenoura¹

¹UPMC University Paris 06, Paris, France, ²Hôpital Européen Georges Pompidou, Paris, France,

³Imaging Core Lab, Paris, France

- P8.4 Non-Invasive Assessment of Local Pulse Wave Velocity using Electromechanical Sensors: Feasibility Study in a Healthy Population**

H Pereira^{1,2}, T Pereira³, J Maldonado⁴, T Pereira¹, V Almeida¹, J Simões^{2,1}, J Cardoso¹, C Correia¹

¹University of Coimbra, Coimbra, Portugal, ²ISA-Intelligent Sensing Anywhere, Coimbra, Portugal,

³Escola Superior de Tecnologia da Saúde de Coimbra, Coimbra, Portugal, ⁴Instituto de Investigação e Formação Cardiovascular, Coimbra, Portugal

- P8.5 Evaluation of Valvuloarterial Impedance in Aortic Valve Stenosis by using Cardiac Magnetic Resonance and Carotid Artery Tonometry**

G Soulat^{1,2}, E Bollache³, F Pontnau¹, L Perdrix¹, V Zhygalina¹, P Achouh¹, N Kachenoura³, P Boutouyrie^{1,2},
S Laurent^{1,2}, E Mousseaux^{1,2}

¹European Hospital Georges Pompidou, Paris, France, ²Paris Descartes University, Paris, France,

³Pierre and Marie Curie University, Paris, France

- P8.6 Comparison of Transit Time Estimation Methods for the Determination of Pulse Wave Velocity**

M Bachler^{1,2}, B Hametner^{1,2}, C Mayer¹, T Weber³, B Eber³, S Wassertheurer¹

¹AIT Austrian Institute of Technology, Vienna, Austria, ²Vienna University of Technology, Vienna, Austria,

³Klinikum Wels-Grieskirchen, Vienna, Austria

- P8.7 Preservation of Biomechanical Properties of Arteries in Embalmed Bodies**

V Cunha^{3,1}, V Vassilenko^{3,1}, D Casal², J O'Neill^{2,1}

¹CEFITEC, New University of Lisbon, Caparica, Lisbon, Portugal, ²New University of Lisbon, Lisbon,

Lisbon, Portugal, ³NMT, S.A., Caparica, Lisbon, Portugal

- P8.8 Apelin/APJ Receptor System Involvement in Obesity-Related Vascular Reactivity Changes**

I Gurzu¹, F Zugun-Eloaie¹, B Gurzu^{1,2}

¹Grigore T Popa University of Medicine and Pharmacy, Iasi, Romania, ²St Spiridon Clinical Emergency Hospital, Iasi, Romania

- P8.9 Mechanical Behavior of the Abdominal Aortic Aneurysm Obtained from the Rat Xenograft Model and Treated by Mesenchymal Stem Cells**

L Marais, J Dai, E Allaire, M Zidi

CNRS EAC 4396 - Université Paris Est Créteil, Créteil, France

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P8.10 Vascular Characterization by means of Wave Intensity Analysis: a Preliminary Study in Mice

N Di Lascio, F Stea, C Kusmic, R Sicari, F Faita
National Research Council, Pisa, Italy

P8.11 Adipokine Dysregulation is Associated with Arterial Stiffness in a Model of Diet-Induced Obesity in Mice

M Gil-Ortega¹, M Martín-Ramos¹, S Arribas², M González², I Aránguez³, MRuiz-Gayo¹,
M Fernández-Alfonso³, B Somoza¹
¹Universidad CEU-San Pablo, Madrid, Spain, ²Universidad Autónoma, Madrid, Spain,
³Universidad Complutense, Madrid, Spain

P8.12 Arterial Distension-Pressure Loop Analysis in Hypertensive Rats: Advantages, Pitfalls and Possibilities

C Vayssettes-Courchay, C Ragonnet, G Lindesay, S Chimenti, M Isabelle, J-P Vilaine
Servier Research Institute, Suresnes, France

P8.13 A 1-D Model of the Systemic Arterial Tree in Mice

L Aslanidou¹, B Trachet^{1,2}, P Reymond¹, P Segers², N Stergiopoulos¹
¹EPFL, Lausanne, Switzerland, ²Ghent University, Ghent, Belgium

16:50 Parallel Poster Session IX: Clinical Science IV

Chair: R Joannides & J Baulmann
Location: Lobby

P9.1 Influence of Insulin Sensitivity and Related Metabolic Features on Carotid and Aortic Stiffness in Normal Subjects

C Palombo¹, E Muscelli¹, C Morizzo¹, A Casolaro¹, M Paterni², M Kozakova¹
¹University of Pisa, Pisa, Italy, ²CNR Institute of Clinical Physiology, Pisa, Italy

P9.2 Vascular Adaptations to Body Size and Composition in Adolescents

C Palombo, C Morizzo, V Bianchi, B Marchi, E Randazzo, G Federico, M Kozakova
University of Pisa, Pisa, Italy

P9.3 Lower SubEndocardial Viability Ratio in Diabetic Women - Contributing to the Abrogated Cardioprotective effect of Female Gender in Diabetes?

E Laugesen^{1,2}, P Højem¹, S Knudsen¹, K Hansen³, J Christiansen¹, T Hansen¹, P Løgstrup¹
¹Aarhus University Hospital, Aarhus, Denmark, ²The Danish Diabetes Academy, Odense, Denmark,
³Regional Hospital Silkeborg, Silkeborg, Denmark

P9.4 Comparison of Different Methods of Vascular Phenotyping in Patients at Cardiovascular Risk

C Brown, A Ghaus, F Moreton, J Flynn, G Currie, C Delles
University of Glasgow, Glasgow, UK

P9.5 Vascular Structure and Function and Hemodynamics are not Altered in Normal-Tension Glaucoma at Rest

J Bossuyt¹, G Vandekerckhove², S Van de Velde¹, T De Backer¹, M Azermai¹, A-M Stevens², P Kesteleyn²,
T Raemdonck², P Segers⁴, F Vanmolkot³, L Van Bortel¹
¹Ghent University, Ghent, Belgium, ²Ghent University Hospital, Ghent, Belgium, ³Maastricht University
Medical Centre, Maastricht, The Netherlands, ⁴iMinds Medical IT, Ghent, Belgium

P9.6 Blood Pressure Variability and Target Organ Damage in Patients with Uncomplicated Hypertension: Average 24 Hour Ambulatory Blood Pressure is More Relevant to Changes in Left Ventricular Mass Index

P Veloudi, L Blizzard, J Sharman
University of Tasmania, Hobart, Australia

P9.7 C-Reactive Protein, Cystatin C and Arterial Stiffness in Renal Transplant Recipients

M Harangi, R Szentimrei, L Lőcsey, I Seres, D Kovács, L Asztalos, G Paragh
University of Debrecen, Debrecen, Hungary

P9.8 Arterial Stiffness and Paraoxonase Activity in Renal Transplant Recipients

R Szentimrei, L Lőcsey, I Seres, M Harangi, D Kovács, L Asztalos, G Paragh
University of Debrecen, Debrecen, Hungary

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- P9.9 Altered Dependence of Aortic Pulse Wave Velocity on Transmural Pressure in Hypertension Revealing Structural Change in the Aortic Wall**
N Gaddum¹, L Keehn², A Guilcher², A Gomez¹, S Brett², P Beerbaum³, T Schaeffter¹, P Chowienczyk²
¹King's College London, Division of Imaging Sciences and Biomedical Engineering, London, UK, ²King's College London British Heart Foundation Centre, London, UK, ³Department of Pediatric Cardiology & Pediatric Intensive Care Medicine, Hannover Medical School, Hannover, Germany
- P9.10 Excess Pressure is Independently Related to Lv Mass and Concentric Geometry in Essential Hypertension**
G Pucci¹, B Hametner², F Battista¹, F Anastasio¹, S Wassertheurer², G Schillaci¹
¹Terni University Hospital, Terni, Italy, ²AIT Austrian Institute of Technology, Wien, Austria
- P9.11 Angiotensin-Converting Enzyme Activity in Normotensive White and African Men**
J van Rooyen¹, M Poglitsch², R Schutte¹, H Huisman¹, L Malan¹, C Fourie¹, C Mels¹, W Smith¹, R Kruger¹, N Malan¹, A Schutte¹
¹North-West University and HART, Potchefstroom, South Africa, ²Attoquant Diagnostics, Vienna, Austria
- P9.12 The Relationship Between Retinal Vessel Calibre and Nocturnal Dipping Status: The SABPA Study**
W Smith¹, N Malan¹, W Vilser², A Schutte¹, R Schutte¹, C Mels¹, L Uys¹, L Malan¹
¹North-West University, Potchefstroom, South Africa, ²IMEDOS Systems UG, Jena, Germany
- P9.13 A Study on Ambulatory Measurement of Central Hemodynamics on Healthy Individuals with No Cardiovascular Risk Factors**
A Lazaridis, E Papadopoulou, A Varouktsi, K Imprialos, M Doumas, E Gkaliagkousi, V Athiros, A Karagiannis
Hippokrateio Hospital, Thessaloniki, Greece
- P9.14 Increased Carotid Artery Stiffness Decreases Measured Carotid-Femoral Pulse Wave Velocity and Effects the Estimation of Age Dependency of Aortic Stiffness**
M Butlin, A Avolio
Macquarie University, Sydney, Australia
- P9.15 The Role of Lung Function on Adolescents' Blood Pressure Trajectories in a Multi-Ethnic Cohort: The Determinants of Adolescents Social Wellbeing and Health (DASH) Study**
S Katikireddi¹, OMolaodi¹, J Kennedy Cruickshank², SLum³, S Harding¹
¹MRC/CSO Social and Public, Edinburgh, UK, ²King's College, London, UK, ³UCL Institute of Child Health, London, UK
- 16:50 Parallel Poster Session X: Epidemiology II**
Chair: I Ferreira & C McEniery
Location: Lobby
- P10.1 Arterial Stiffness and the "Phenotype" Metabolic Syndrome: a Cross-Country Study. The MARE Consortium**
A Scuteri¹, P Cunha², J Cockcroft³, F Cucca⁴, S Laurent⁵, F Raso⁶, M Muiesan⁷, E Rietzschel⁸, L Ryliskyte⁹, C Vlachopoulos¹⁰, P Nilsson¹¹, E Lakatta¹²
¹HSR Pisana IRCCS, Rome, Italy, ²University of Minho, Braga, Portugal, ³Dept of Cardiology, Cardiff, UK, ⁴IRGB CNR, Cagliari, Italy, ⁵Hopital Georges Pompidou, Paris, France, ⁶Erasmus University, Rotterdam, The Netherlands, ⁷University of Brescia, Brescia, Italy, ⁸University of Ghent, Ghent, Belgium, ⁹University Of Vilnius, Vilnius, Lithuania, ¹⁰University of Athens, Athens, Greece, ¹¹Lund University, Malmoe, Sweden, ¹²Lab Cardiovascular Sciences - NIA -NIH, USA
- P10.2 Are Intermediate Ankle-Brachial Index Values Important in Hypertension? Insights from a Large Cohort of Never-Treated Hypertensives**
P Xaplanteris, C Vlachopoulos, D Terentes-Printzios, M Abdelrasoul, N Ioakeimidis, I Dima, G Vyssoulis, C Stefanadis
Hippokration Hospital, Athens, Greece
- P10.3 Arterial stiffness is a better predictor of left ventricular hypertrophy than the Framingham Risk Score and central hemodynamics: insights from 1,141 never-treated hypertensives**
P Xaplanteris, C Vlachopoulos, D Terentes, N Ioakeimidis, I Dima, P Pietri, G Vyssoulis, C Stefanadis
Hippokration Hospital, Athens, Greece

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- P10.4 Early Life Predictors of Blood Pressure in Afro-Caribbean Young Adults: The Jamaica 1986 Birth Cohort Study**
T Ferguson¹, N Younger-Coleman¹, M Tulloch-Reid¹, J Knight-Madden¹, N Bennett¹, M Samms-Vaughan¹, D Ashley¹, A McCaw-Binns¹, O Molaodi³, J K Cruickshank², S Harding³, R Wilks¹
¹The University of the West Indies (UWI), Kingston, Jamaica, ²Kings College, London, UK, ³University of Glasgow, Glasgow, Scotland, UK
- P10.5 Reference Values of Central Blood Pressure in Adults Using a Validated Non-Invasive Oscillometric Method** **ABSTRACT WITHDRAWN**
B Benczur¹, R Bocskei², M Illyes³
¹"Hetenyi Geza" County Hospital, Szolnok, Hungary, ²Semmelweis University, Budapest, Hungary, ³University of Pecs, Pecs, Hungary
- P10.6 Arterial Waveform Measures in the Vitamin D Assessment (ViDA) Study: Relationships with Lifestyle and Cardiovascular Factors**
J Sluyster¹, A Hughes², A Lowe³, K Parker⁴, B Hametner⁵, S Wassertheurer⁵, R Scragg¹
¹University of Auckland, Auckland, New Zealand, ²University College London, London, UK, ³Auckland University of Technology, Auckland, New Zealand, ⁴Imperial College London, London, UK, ⁵Austrian Institute of Technology, Vienna, Austria
- P10.7 Characteristics of Central Haemodynamics among Nigerians: Result of a Pilot Study**
A Odili^{1,3}, B Abdullahi², V Ameh², J Staessen³
¹University of Abuja, Abuja, Nigeria, ²University of Abuja Teaching Hospital, Abuja, Nigeria, ³University of Leuven, Leuven, Belgium
- P10.8 Central but not Brachial Pressure Linked to RBCs in Young Normotensive Individuals**
A Schutte, J Van Rooyen, H Huisman, C Mels, N Malan, W Smith, R Kruger, C Fourie, L Ware, S Botha, R Schutte
North-West University, Potchefstroom, South Africa
- P10.9 Interaction Between Stroke Volume and Peripheral Vascular Resistance in defining Systolic Blood Pressure in Young Adults**
A Cocks¹, J Middlemiss¹, K Miles¹, J Cockcroft¹, I Wilkinson¹, C McEniery¹
¹University of Cambridge, Cambridge, UK, ²Cardiff University, Cardiff, UK
- P10.10 Risk Factors Accelerate Vascular Aging: Results from The Cardiovascular Risk Factors Affecting Vascular age (CRAVE) Study**
D Terentes-Printzios, C Vlachopoulos, P Xaplanteris, N Ioakeimidis, K Aznaouridis, K Baou, P Pietri, D Kardara, C Stefanadis
Hippokration Hospital, Athens, Greece
- P10.11 Mean Arterial Pressure is a Stronger Predictor of Stroke in South Asian than European Men, Independent of Other Cardiometabolic Risk Factors; The SABRE Study**
S Eastwood¹, T Tillin¹, J Mayet², A Wright³, A Hughes¹, N Chaturvedi¹
¹University College London, London, UK, ²Imperial College London, London, UK, ³Imperial College Healthcare NHS Trust, London, UK
- P10.12 Aortic Stiffness is an Independent Determinant of Left Ventricular Diastolic Dysfunction in Metabolic Syndrome Patients**
L Ryliskyte^{1,2}, J Celutkienė^{1,2}, S Solovjova^{1,2}, R Puronaitė¹, J Badariene^{1,2}, R Navickas^{1,2}, A Laucevičius^{1,2}
¹Vilnius University Hospital Santariskiu Klinikos, Vilnius, Lithuania, ²Vilnius University, Medical Faculty, Clinic of Cardiovascular Disease, Vilnius, Lithuania
- P10.13 Differential Effects of the Presence of Diabetes or Hypertension on Carotid Intima Phenotype** **ABSTRACT WITHDRAWN**
J Park¹, E Kim¹, J-Y Kim², J-H Bae³, W-S Kim⁴
¹Kwandong University, Seoul, Republic of Korea, ²Wonju Severance Christian Hospital, Wonju, Republic of Korea, ³Konyang University Hospital, Daejeon, Republic of Korea, ⁴Korea Research Institute of Standards and Science, Daejeon, Republic of Korea

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P10.14 Aortic Pulse Wave Velocity is an Independent Cardiovascular Event Predictor in High Cardiometabolic Risk Group

R Navickas^{1,2}, L Ryliskyte^{1,2}, R Puronaitė^{1,2}, S Solovjova^{1,2}, J Badariene^{1,2}, A Laucevicius^{1,2}

¹Vilnius University Hospital Santariskiu Klinikos, Vilnius, Lithuania, ²Vilnius University, Vilnius, Lithuania

P10.15 The Relation between Hypertension and Different Demographic Data Among Hypertensive Sudanese Patients

O Khair

International University of Africa, Khartoum, Sudan

16:50

Parallel Poster Session XI: Modelling

Chair: J Humphrey & K Reesink

Location: Lobby

P11.1 The PU and QA Loop Methods Over- and Underestimate Local Carotid Wave Speed: A Consistent Explanation and Solution to the Problem

P Segers, A Swillens, L Taelman, J Vierendeels

Ghent University, Ghent, Belgium

P11.2 A 1d-MODEL for the Simulation of the Arterial Wall Displacement

M Collette^{1,2}, P Chauvet^{3,2}, G Leftheriotis⁴

¹Groupe ESAIP - Centre de Recherche, Saint Barthélemy d'Anjou, France, ²Université d'Angers, LARIS - Laboratoire Angevin de Recherche en Ingénierie des Systèmes, Angers, France, ³Université Catholique de l'Ouest (UCO), Angers, France, ⁴Centre Hospitalier Universitaire d'Angers, Angers, France

P11.3 Development and Validation of Realistic Aortic Phantom Tailored for Each Patient

E-J Courtial^{1,2}, M Orkisz², P Douek², R Fulchiron¹

¹Université de Lyon - Bâtiment POLYTECH Lyon, Villeurbanne, France, ²Université de Lyon, Villeurbanne, France

P11.4 Investigation of the Arterial Ageing and Isolated Systolic Hypertension by Fluid Dynamics-Based Modelling

A Guala, C Camporeale, L Ridolfi

Politecnico di Torino, Torino, Italy

P11.5 Cardiac and Vascular Tissue Properties Determine the Central Blood Pressure Waveform: Consequences for Pulse Wave Analysis

M Heusinkveld^{1,2}, B Spronck¹, J Lumens¹, T Delhaas¹, A Hughes³, K Reesink¹

¹Maastricht University, Maastricht, The Netherlands, ²Eindhoven University of Technology, Eindhoven, The Netherlands, ³University College London, London, UK

P11.6 Towards Aortic Pressure and Flow Waves Modelling in the Clinic

S Epstein, J Alastruey, P Chowienzyk

King's College London, London, UK

P11.7 The Decay of Aortic Blood Pressure During Diastole: Influence of an Asymptotic Pressure Level on the Exponential Fit

S Parragh^{1,2}, B Hametner^{1,2}, T Weber³, B Eber³, S Wassertheurer¹

¹AIT Austrian Institute of Technology, Health & Environment Department, Vienna, Austria,

²Vienna University of Technology, Department for Analysis and Scientific Computing, Vienna, Austria,

³Klinikum Wels-Grieskirchen, Cardiology Department, Wels, Austria

P11.8 Arterial Elasticity Determination by PPG Signals Processing using Pulse Waveform Decomposition and Second Order Derivative

M Huotari, J Röning

University of Oulu, Oulu, Finland

P11.9 Age- and Pressure-Dependence of Pulse Wave Velocity (PWV): Model Prediction and Observations

B Gavish¹, G Pucci², F Battista², G Schillaci²

¹Yazmonit Ltd., Eshtaol, Israel, ²Department of Medicine, University of Perugia and Terni University Hospital, Terni, Italy

SCIENTIFIC PROGRAMME

FRIDAY 10 OCTOBER 2014

P11.10 Can the behavior of Liquids under High Pressures Help Interpreting Stiffness-Related Measures in Arteries?

B Gavish

Yazmonit Ltd, Eshtaol, Israel

P11.11 Venous Valves Dynamics and the Hemodynamics of the Muscle Pump Effect: A Modelling Approach

J Keijsers^{1,2}, C Leguy¹, W Huberts³, A Narracott⁴, J Rittweger¹, F van de Vosse^{2,3}

¹German Aerospace Center, Cologne, Germany, ²Eindhoven University of Technology, Eindhoven, The Netherlands, ³University of Maastricht, Maastricht, The Netherlands, ⁴University of Sheffield, Sheffield, UK

P11.12 Simplification of a Non-Linear Mechanical Model of Human Common Carotid Artery with Sensitivity Analysis

L Voisin¹, L Marais^{1,2}, M Zidi², I Masson², S Laurent^{1,3}, P Boutouyrie^{1,3}

¹Inserm U970 - HEGP, Paris, France, ²CNRS EAC 4396 - Université Paris Est Créteil, Créteil, France,

³Université Paris Descartes, Paris, France

19.30 Conference Dinner and Award Presentations

Location: Le Caverne de Geulhelm

SCIENTIFIC PROGRAMME

SATURDAY 11 OCTOBER 2014

- 09.00 **Oral Session V: Invited Lecture & Free Communications in Association with North American Artery Society**
Chair: G Mitchell & J Cockcroft
Location: Auditorium 2
- 09.00 5.1 **Epoxyeicosatrienoic Acids in the Regulation of Vascular Tone**
L Yang, J Cheriyan, C McEniery, I Wilkinson
University of Cambridge, Cambridge, UK
- 09.10 5.2 **A New Pressure-Waveform Derived Vascular Stiffness Index and its Comparison to Pressure-Dependent Arterial Compliance**
T Phan, J Li
Rutgers University, Piscataway, USA
- 09.20 5.3 **Platelet Aggregation is Modulated by Arterial Stiffness in End Stage Renal Disease**
L Tran^{1,2}, T Serrato¹, P Lacolley², Y Bezie³, S Marchais¹, V Regnault², B Pannier¹
¹Manhès Hospital, Fleury-Merogis, France, ²INSERM Unit 1116, Vandoeuvre les Nancy, France, ³Saint Joseph Hospital, Paris, France
- 09.30 5.4 **Pulse Wave Velocity Distribution in a Cohort Study - from Arterial Stiffness to Early Vascular Ageing (EVA)**
P Cunha^{1,2}, J Cotter^{1,2}, P Oliveira⁴, I Vila^{1,2}, P Boutouyrie⁵, S Laurent⁵, P Nilsson⁶, A Scuteri⁷, N Sousa^{2,3}
¹Centro Hospitalar do Alto Ave / Minho University, Guimarães, Portugal, ²University of Minho, Braga, Portugal, ³ICVS/3B's - PT Government Associate Laboratory, Braga/Guimarães, Portugal, ⁴Universidade do Porto, Oporto, Portugal, ⁵Université Paris Descartes, Paris, France, ⁶Lund University, Skane University Hospital, Malmo, Sweden, ⁷San Raffaele Pisana IRCCS, Rome, Italy
- 09.40 5.5 **Relationship between Large Arteries Changes, Antiangiogenic Drugs Pharmacokinetics and Cancer Response**
M Alivon^{1,2}, B Blanchet³, M Vidal³, F Goldwasser⁴, S Laurent^{1,2}, P Boutouyrie^{1,2}
¹Inserm U970, Paris, France, ²Paris Descartes University, Paris, France, ³Cochin Hospital Pharmacology Department, Paris, France, ⁴Cochin Hospital Oncology Department, Paris, France
- 09.50 5.6 **Aortic is Superior to Brachial Ambulatory Blood Pressure Monitoring for the Detection of Early Damage at the Heart and the Carotid Artery but Not at the Retinal Microcirculation: The Non-Invasive Aortic Ambulatory Blood Pressure Monitoring for the Detection of Target Organ Damage (SAFAR) Study**
A Protogerou¹, E Aissopou¹, A Argyris¹, C Tountas¹, G Konstantonis¹, E Nasothimiou¹, T Papaioannou¹, A Achimastos¹, J Blacher¹, M Safar², P Sfikakis²
¹University of Athens, Athens, Greece, ²Paris Descartes, Paris, France
- 10.00 5.7 **Aortic Pulse Wave Velocity Increases after 2 Years in Patients with COPD: Data from The ARCADE Study**
N Gale, A Albarrati, M Munnery, I Softely, D Shale, J Cockcroft
Cardiff University, Cardiff, UK
- 10:10 **Invited Lecture:**
NO Generation, Blood Pressure and Vascular Stiffness: Lessons from the Angiotensin AT2 Receptor
T Unger, *Cardiovascular Research Institute Maastricht, The Netherlands*
Location: Auditorium 2
- 10:30 **McDonald Lecture:**
Cross-Sectional Arterial Mechanics: The Renaissance
S Laurent, *Paris, France*
Chair: L Van Bortel
Location: Auditorium 2
- 11:00 **Refreshments, Exhibition and Posters**
Location: Trajectum & Lobby

SCIENTIFIC PROGRAMME

SATURDAY 11 OCTOBER 2014

- 11:30 **DEBATE:**
Central Pressure Should be Used in Clinical Practice
Pro: J Sharman, *Hobart, Australia*
Contra: G Mitchell, *Cardiovascular Engineering, Massachusetts, USA*
Chair: J K Cruickshank
Location: Auditorium 2
- 12:30 **Lifetime Achievement Award Presented to:**
A Hoeks, Maastricht, The Netherlands & R Reneman, Maastricht, The Netherlands
Chair: H Struijker-Boudier
Location: Auditorium 2
- 12:45 **Concluding Remarks**
Location: Auditorium 2
- 12:50 **Artery Society Business Meeting (Members only)**
Location: Auditorium 2
- 12:50 **Light Lunch, Exhibition and Posters**
Location: Trajectum & Lobby

INVITED SPEAKER ABSTRACTS

OPENING LECTURE

Pulsatile Hemodynamics and the Microcirculation (in Association with the European Society of Hypertension Working Group on Vascular Structure and Function)

E Agabiti-Rosei, *Università degli Studi di Brescia, Brescia, Italy*

Macrovasculature, microvasculature, and the heart determine the structure and function of the circulatory system. Due to the viscoelastic properties of large arteries, the pulsatile pressure and flow that result from intermittent ventricular ejection is smoothed out, so that microvasculature mediates steadily the delivery of nutrients and oxygen to tissues. The disruption of this function, which occurs when microvascular structural alterations develop in response to hypertension, leads to end-organ damage. Microvascular structure is not only the site of vascular resistance but also the origin of most of the wave reflections that generate an increased central systolic blood pressure. The presence of structural alterations in the small resistance arteries may be considered an important link between hypertension and ischemic heart disease, heart failure, cerebral ischemic attacks and renal failure. An increased arterial wall thickness together with a reduced lumen may play an important role in the increase of vascular resistance, and may also be an adaptive response to the increased haemodynamic load. The increased media to lumen ratio is also a powerful predictor of subsequent cardiovascular events. In addition, essential hypertension seems to be associated with a rarefaction of arterioles and capillaries. Nowadays many data of the literature suggest that hypertension-related damage to the micro and macrovascular system may be manageable through pharmacological agents. Among them, beta-blocking agents and diuretics have never modified the microvascular structure, whereas renin-angiotensin system antagonists and calcium entry blockers had an opposite effect being able of reversing structural alterations, thereby reducing central wave reflections and, finally, causing a selective systolic blood pressure reduction.

CAREER DEVELOPMENT LECTURES

Arterial Hemodynamics in Aging Populations

G Verwoert, *Erasmus MC, Rotterdam, The Netherlands.*

Cardiovascular disease is the number one leading cause of morbidity and mortality worldwide. A large proportion of cardiovascular diseases can be prevented by addressing risk factors and early assessment of target organ damage. The leading cardiovascular risk factor is raised blood pressure, however this relationship is more complex than only the two extremes, systolic and diastolic blood pressure. The pulsatile component of blood pressure plays a role in predicting cardiovascular disease. The association between arterial stiffness and hypertension is of interest, because the functional relationship is likely bidirectional and can be best described as feed forward in vicious cycle. We confirmed the association of arterial stiffness with isolated systolic hypertension (ISH) and showed that subjects with ISH have a stiffer aorta compared to normotensive subjects and subjects with combined systolic and diastolic hypertension. This difference was most pronounced at older age.

Heart failure is a growing health problem in the aging population. To improve treatment of heart failure, the mechanisms regarding development of heart failure should be unraveled. We confirmed the relation between SBP and heart failure and demonstrated that both pulse pressure and aPWV are associated with the development of heart failure. Population-wide primary prevention and individual health-care intervention strategies for cardiovascular disease have contributed to declining mortality trends. If people at risk for developing cardiovascular disease can be identified and measures taken to reduce their cardiovascular risk, a vast majority of fatal and non/fatal cardiovascular events can be prevented. We have added aortic stiffness to the Framingham risk factors and determined if the risk classification for CHD improved. However, the addition of aortic stiffness led to minor reclassification of subjects within 10-year cardiovascular disease risk categories, suggesting low additional value of aortic stiffness in the clinical management of CHD in the elderly.

INVITED SPEAKER ABSTRACTS

CAREER DEVELOPMENT LECTURES

A Multiphysics Computer Modeling Framework in Support of the Quest for Reliable and Robust Local Arterial Stiffness Assessment

A Swillens¹, L Taelman¹, A Caenen¹, D Shcherbakova¹, M Pernot², B Verhegghe¹, J Degroote¹, J Vierendeels¹,

¹Ghent University, Gent, Belgium, ²Institut Langevin, Paris, France

Arterial stiffness has proven to be a powerful, early marker of cardiovascular diseases, with most clinical data relying on carotid-femoral pulse wave velocity (PWV) measurements, a rather global assessment of arterial stiffness. Direct, local evaluation of carotid stiffness is clinically useful, but remains technically more challenging. Hence, we have been investigating the performance of such local strategies, both from a biomechanical and image acquisition perspective. In particular, the PU-loop method (and its derived techniques) as well as ultrasonic tissue characterization techniques have been under consideration. In the former approach, PWV is derived from the slope of the blood pressure (P) versus velocity (U) signal in early systole. The latter refers to our investigation of shear wave elastography, assessing tissue stiffness by tracking shear waves artificially evoked in the tissue via the acoustic energy of an ultrasound probe. However, previously mentioned measurement strategies are hampered in the presence of intricate vascular anatomy or tissue mechanics, inducing complex pulse/shear wave phenomena, erroneously affecting stiffness assessment. Hence, we developed a computer modeling platform for in-depth investigation and validation of these measurement strategies, allowing comparison of the simulated measurement outcome with the true tissue properties, fully defined in the simulation but typically lacking during in-vitro/in-vivo evaluation. Hence, this is a multi-physics model, integrating both the biomechanics and imaging, which has allowed us to analyze arterial stiffness assessment techniques in varying biomechanical conditions as well as to investigate new imaging approaches and signal processing.

Diabetes Confers a Greater Excess Risk Cardiovascular Disease in Women than in Men: Current Evidence, Potential Mechanisms, Clinical Implications, and Future Directions

S Peters^{1,2}, *¹University of Oxford, Oxford, UK, ²Utrecht University, Utrecht, The Netherlands*

A lack of sex-specific data from early epidemiological studies has typically led to the assumption that the associations between risk factors and disease outcomes are equivalent in women as in men. But increasingly, evidence to support the existence of clinically meaningful sex differences in the relationships between certain risk factors, such as smoking and diabetes with chronic disease is becoming apparent – often to the detriment of women. Determining reliably whether there are clinically meaningful sex-differences in risk factor-disease associations is important, not solely to better understand the aetiology of CVD, but also from a population and public health vantage. Current estimates of the burden of CVD, that are used to inform public health policy, assume that these risk factors effect cardiovascular risk similarly in women as in men. However, if this assumption is proven to be invalid then it would necessitate the revision of the estimates to more accurately reflect the true nature of the relationships in women and men. Moreover, just as possible racial differences in the relationships between risk factors and diseases are considered when tailoring specific interventions for different communities, so could information on important sex differences be used to provide an added impetus for targeted interventions aimed at the treatment and management of these risk factors in both sexes. Recently we have conducted two systematic reviews and meta-analyses of the sex-specific effects of diabetes on risk of stroke and coronary heart disease. Both studies suggested that women with diabetes had a substantially greater excess risk compared with their male equivalents, even after consideration of differences in baseline levels of other major risk factors. In this talk, the results from these studies will be presented, potential biological, behavioral, or social mechanisms involved will be discussed, clinical implications will be considered, and directions for future research will be provided.

INVITED SPEAKER ABSTRACTS

SPECIAL GUEST LECTURES

Cerebral Circulation & Cognition in the Elderly

G Biessels, *University Medical Centre Utrecht, Utrecht, The Netherlands*

Vascular disease is an important cause of cognitive decline and dementia. Approximately 20% of patients with a stroke develop dementia within a year after the event. Even more often, cerebrovascular disease is involved in cognitive decline or dementia in people without an obvious history of stroke. Autopsy studies identify vascular pathology in the majority of patients with dementia, also in those with a clinical diagnosis of Alzheimer's disease. The concept "Vascular cognitive impairment" (VCI) has been introduced as an umbrella term to capture all forms of cognitive impairment – regardless of severity or cognitive profile – that are associated with and presumably caused by cerebrovascular disease. Hence, VCI is heterogeneous, both with regard to aetiology and course of development, ranging, for example, from an acute strategic brain infarct to insidious diffuse white matter pathology. Importantly, causes of VCI may not be restricted to vascular brain lesions. Abnormalities in vascular function, resulting in altered cerebral haemodynamics, may also be involved, and might represent a potentially modifiable cause of cognitive dysfunction. Currently, the role of haemodynamics in VCI is addressed in a Dutch multidisciplinary research program, called "The Heart-Brain connection". This program addresses the following questions. 1) To what extent do hemodynamic changes contribute to VCI? 2) What are the mechanisms involved? 3) Does improvement of the hemodynamic status lead to improvement of cognitive dysfunction? In my presentation I will provide background on VCI, review evidence for links between haemodynamics and cognition and introduce the research program of the Heart-Brain connection consortium.

Molecular Mechanisms of Arterial Stiffening: Role of Vascular Smooth Muscle Cells

P Lacolley, *INSERM Unit 1116, Vandoeuvre les Nancy, France*

Vascular Smooth Muscle Cells (VSMCs) are the stromal cells of the vascular wall, continually exposed to mechanical signals and biochemical components generated in the blood compartment. They are involved in all the physiological functions and the pathological changes responsible for arterial stiffening. Due to their contractile tonus, VSMCs of resistance vessels participate in the regulation of blood pressure and also in arterial stiffness. VSMCs of conduit arteries respond to hypertension-induced increases in wall stress by an increase in cell protein synthesis and extracellular matrix secretion. These responses are mediated by complex signaling pathways, mainly involving RhoA and extracellular signal-regulated kinase1/2. Serum response factor and miRNA expression represent main mechanisms controlling the pattern of gene expression. A progressive decrease in plasticity and reprogramming potential of VSMCs plays a complementary role contributing to the increase in arterial stiffness and associated cardiovascular risk factors in old humans. These key signaling pathways have become the focus of modern aging research and will undoubtedly provide a rich resource for the development of selective drugs interfering with either of these processes and prevention of the number one cause of death in the modern world.

INVITED SPEAKER ABSTRACTS

FOCUS: MODELLING THE ARTERIAL SYSTEM

Modelling the Arterial System: Biomechanics of Central Artery Stiffening

J Humphrey, *Yale University, New Haven, USA*

Central arterial stiffening is both an indicator and an initiator of cardiovascular disease, and aging is a ubiquitous cause of stiffening. In this talk, we will discuss the utility of biomechanical models in understanding particular effects of arterial stiffening on systemic hemodynamics and we will discuss advantages of using mouse models to obtain detailed longitudinal information on regional variations in arterial wall properties. In particular, we will focus on delineating intrinsic material and structural stiffness as a function of location along the aorta and we will show results from 3-D computational simulations of the hemodynamics that account for interactions between the blood and regional wall properties. Amongst the different findings, one emerging concept is that adaptive responses appear to favor the maintenance of material stiffness near normal values while offsetting increased hemodynamic loads or genetic defects with changes in structural stiffness. If true, such a response would have important mechanobiological implications.

The Design of an Optimal Arterial Network

A Hughes, *University College London, London, UK*

The arterial circulation is a network that delivers oxygen and nutrients to cells. Blood flow is achieved by means of a muscular pump but diffusion plays a key role at a cellular level necessitating a branching structure where no cell is more than ~25microm from a capillary. The design of the cardiovascular system is subject to a variety of 'constraints' and 'costs'. It has been postulated that the design of the arterial network might be understood in terms of the need to minimize competing 'costs' within the context of physical or material limits to the system. These designs can also be envisaged as being subservient to space filling or fractal considerations. The signalling mechanisms underlying these designs remain to be fully characterised, although shear stress, wall tensile stress and metabolic stimuli are likely candidates. I will also review evidence that deviations from a minimal cost condition or optimal design may provide both a measure of disease severity and insights into the underlying disease mechanism.

INVITED LECTURE

NO Generation, Blood Pressure and Vascular Stiffness: Lessons from the Angiotensin AT2 Receptor

T Unger, *University of Maastricht, Maastricht, The Netherlands*

Vascular remodeling participates in the development and progression of cardiovascular conditions such as hypertension, atherosclerosis or aneurysm. This process is fine-tuned by neuro-humoral regulatory pathways: the renin-angiotensin system (RAS), being one of the most important. Chronic RAS activation, via AT1 receptor (AT1R) stimulation sets on a series of pro-proliferative, pro-fibrotic, pro-inflammatory signals that promote vascular remodeling and lead to adverse cardiovascular outcomes. The prevention of these outcomes after the blockade of this "deleterious" RAS might be at least in part mediated by the activation of the "protective" RAS. The "protective" RAS involves the AT2 receptor (AT2R) with anti-proliferative, anti-fibrotic, anti-inflammatory and anti-oxidant effects. Some of these protective actions of AT2R stimulation are mediated by AT2R-induced NO generation. Stimulation of AT2R with the new selective, orally active AT2R agonist, Compound 21, in L-NAME hypertensive rats reduced vascular stiffness (pulse wave velocity) and induced vascular structural improvements without lowering blood pressure. These effects cannot be ascribed to NO generation. Alternative effector pathways include activation of protein phosphatases that inactivate the pro-fibrotic MAPKs or anti-apoptotic Bcl-2, down-regulation of MAPKs with NADPH oxidase inhibition and subsequent attenuation of oxidative load, inhibition of NF- κ B activity by epoxidation of 11,12-epoxy-eicosatrienoic acid, direct and indirect anti-inflammatory action with augmented IL-10 production and T cell differentiation, and, finally, heterodimerization of the AT2R with AT1R that abrogates the AT1R-dependent pro-fibrotic effects.

INVITED SPEAKER ABSTRACTS

MCDONALD LECTURE

Cross-Sectional Arterial Mechanics: The Renaissance

S Laurent, *Université Rene Descartes, Paris, France*

These last years, the widespread use of regional pulse wave velocity in clinical practice has overlooked the usefulness of local arterial stiffness. Indeed, the elastic properties of large superficial arteries (carotid, femoral, brachial and radial) can be assessed locally through the systolic-diastolic variations in arterial lumen diameter and thickness using high resolution echotracking systems, and local pulse pressure using aplanation tonometry. The mechanical properties of deep arteries like the thoracic aorta can be assessed using cine magnetic resonance imaging (MRI). The aim of this review is to discuss how the measurement of the geometrical and functional properties of large arteries contributed to important conceptual achievements in arterial mechanics. Several aspects are discussed that concern the pathophysiology, pharmacology and epidemiology of arterial stiffness. We explain (1) how the precise phenotyping of the changes in large and small artery during essential hypertension can enter a vicious circle of aggravation named large/small artery cross-talk; (2) how the understanding of the wall material elastic properties that are associated with arterial wall hypertrophy in essential hypertension, has lead to the discovery of putative novel mechanisms involved in arterial stiffness; (3) how local measurements of arterial stiffness can help to find the true pathway followed by the pressure wave, when a single-site measurement/arm cuff oscillometric method is used; (4) how the study of arterial remodeling and mechanics during long-term antihypertensive treatment can unmask a blood-pressure independent reduction in arterial stiffness; and, finally (5) how carotid stiffness can predict cardiovascular events independently of regional pulse wave velocity.

INVITED SPEAKER ABSTRACTS

DEBATE

Central pressure should be used in Clinical Practice

Pro: J Sharman, *University of Tasmania, Hobart, Australia*

The original purpose for developing the technique to record brachial blood pressure (BP) more than 100 years ago was to estimate aortic (central) BP. While high brachial BP is an important cardiovascular risk factor, it is clear that major differences in central systolic BP (SBP; e.g. >30 mmHg) can occur among people with similar brachial SBP. It is also proven that central SBP responses to antihypertensive therapy can differ substantially from brachial SBP responses, such that true treatment effects cannot be gauged from conventional brachial BP. Importantly, assessment of central BP results in: 1) improved predictive accuracy of future cardiovascular events beyond brachial BP and other cardiovascular risk factors; 2) superior diagnostic accuracy over brachial BP and; 3) different patient management than usual care guided by brachial BP. Collectively the above data satisfy criteria for central BP being a better cardiovascular risk biomarker than brachial BP. As with all medical advances there are areas of research need and international consensus is required on issues such as standardization of techniques. However, central BP can now be accurately estimated (with appropriate waveform calibration) using brachial cuff methods in an approach that is familiar to clinicians, acceptable to patients and amenable to widespread use. In other words, this modern BP technique finally satisfies the original purpose for measuring BP as intended more than 100 years ago. Although the tipping point towards routine use is yet to be reached, the body of evidence continues to favour the view that central BP should be used in clinical practice.

Contra: G Mitchell, *Cardiovascular Engineering, Massachusetts, USA*

The heart, brain and kidneys are key targets of pulsatile damage in older people and in patients with longstanding hypertension. These central organs are exposed to central systolic and pulse pressures, which may differ from the corresponding peripheral pressures measured in the brachial artery. Studies employing the generalized transfer function as a means to estimate central pressure have demonstrated a large difference between central and peripheral systolic and pulse pressure that diminishes with age but remains substantial even in octogenarians. As a result of this persistent difference, some have advocated that central pressure may represent a more robust indicator of risk for target organ damage and major cardiovascular disease events. From the perspective of risk prediction, it is important to acknowledge that a new technique must add incremental predictive value to what is already commonly measured. Thus, in order to justify the added complexity and expense implicit in the measurement, central pressure must be shown to add significantly to a risk factor model that includes standard cardiovascular disease risk factors. A limited number of studies have shown marginally better correlations between central pressure pulsatility and continuous measures of target organ damage in the heart. A similarly limited number of prospective studies in unique cohorts have suggested that central pressure may provide marginally better risk stratification, although no reclassification analysis has been published. Thus, currently available evidence does not provide sufficient justification for widespread adoption and routine use of central pressure measurements in clinical practice.

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