



EU-CardioRNA

CA17129: Catalysing transcriptomics in cardiovascular research

CardioRNA LIVE!

In the autumn of 2020 we were unable to meet in person in Zagreb. Instead, we took the opportunity to connect our members from all corners of the earth with the first EU-CardioRNA COST Action Digital meeting: CardioRNA LIVE! We welcomed 120 speakers and attendees over four days of talks and discussion, representing 34 countries including New Zealand, South Africa, the United States, Armenia and Russia.

Monday 7th September

Meeting Summary

CardioRNA LIVE! Kicks off at 15:00 with EU-CardioRNA Chair Yvan Devaux, welcoming everyone to the first digital meeting and newcomers to the Action. Yvan gives reminder of the goals of the Action and each working group (WG).

We hear from each of the 4 WG Leadership teams – Fabio Martelli for WG1 (Regulatory function of the transcriptome), David de Gonzalo Calvo for WG2 (Best practices and experimental standards), Kanita Karaduzovic-Hadziabdic for WG3 (Development of cohort inventory database) and Emma Robinson for WG4 (Dissemination). We receive updates on the progress towards milestones for each WG including scientific publications, important position papers, creation of the new cohort database, now in testing amongst WG3 members. Finally we hear how online media, including social media and the website, is being used to communicate work of Action members as well as opportunities within the Action and how EU-CardioRNA stayed connected, productive and upbeat during the COVID-19 lockdown.

Our first scientific session was centered on the heart-brain axis, a recent focus for the CardioRNA COST Action. The scientific sessions for CardioRNA LIVE! began with a keynote talk from Prof Resia Pretorius from Stellenbosch University, S. Africa. She describes how her and her team are developing novel bionanosensor technology for detection of neurodegenerative biomarkers such as for Parkinson's Disease. This was followed by a lively discussion.

The first day was completed by short talks from early career researchers Albano Meli (FR) and Leontien Van der Bent (NL) in new cardiomyocyte-neuronal co-culture tools and emerging small RNA families such as tRNA fragments as biomarkers for acute stroke.

An EU-CardioRNA Special Issue is currently open for submissions on the Brain-Heart axis in the International Journal of Molecular Sciences, Guest edited by Fabio Martelli, Yvan Devaux, Wolfram Doehner and Inga Zerr. https://www.mdpi.com/journal/ijms/special_issues/rna_brain_heart_cost



Viewing Yvan Devaux's application


CardioRNA COST Action

Main objective

- Accelerate **transcriptomics** in cardiovascular disease and further the translation of experimental data into usable **applications** to improve **personalized medicine** in this field

Start date: 03/10/2018
End date: 02/10/2022




Yvan Devaux

Participants (54)

Search


- ER Emma Robinson
- IC Irina Carpusca
- YD Yvan Devaux
- ABUI0002
- AJ Aleksandra Jankovic
- AO Alex Gallinat O'Callaghan
- AJ Amela Jusic
- AX angela xuereb




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ER Emma Robinson(Me)




IC Irina Carpusca(Host)




YD Yvan Devaux



RP Resia Pretorius



A ABUI0002




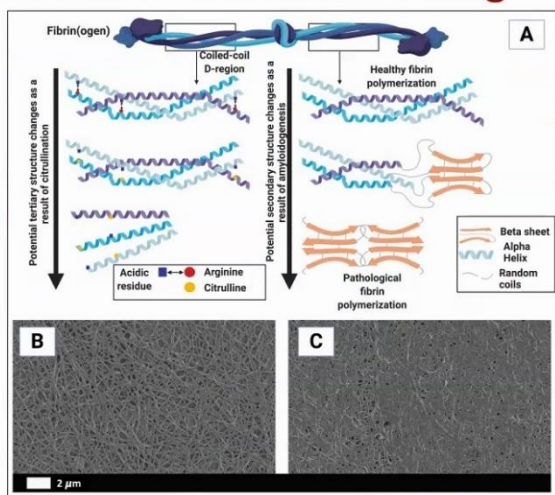
AM Albano Meli

Viewing Resia Pretorius's app...

Structural changes in the biochemistry of the fibrin(ogen) molecule that lead to abnormal clotting

Kell DB, Pretorius E. Proteins behaving badly. Substoichiometric molecular control and amplification of the initiation and nature of amyloid fibril formation: lessons from and for blood clotting. *Progress in Biophysics and Molecular Biology* 2017; **123**: 16-41.





A

Fibrin(ogen)

Coiled-coil D-region

Healthy fibrin polymerization

Pathological fibrin polymerization

Potential tertiary structure changes as a result of citrullination

Potential secondary structure changes as a result of amyloidogenesis



Acidic residue Arginine Citrulline


Beta sheet Alpha Helix Random coils

B

C

2 μm





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CardioRNA LIVE!

Tuesday 8th September

Meeting Summary

Day 2 of the CardioRNA LIVE! scientific sessions focused on RNAs in translational cardiovascular research. We welcome newcomers from New Zealand, Greece and Armenia. Rajesh Katare (NZ) shared his ongoing work on microRNA function in heart failure, risk and comorbidities, followed by Constantinos Stathopoulos (GR) talking about the new evolving field of the tRNA fragment family as regulatory RNAs. We then heard about the goals, milestones and progress of the newly joined CardioRNA near neighbour country and institute, Foundation for Armenian Science and Technology (FAST) from representatives Suzanna Shamakhyan, Andre Serobian and Smbat Gevorgyan, the ultimate aim of whom is make Armenia a science driven innovative country by 2041.

Fabiana Martino (CZ), poster presentation winner from the EU-CardioRNA 4th MC and WG meeting in Maastricht in February 2020 discussed her PhD research into the role of hnRNPC in heart failure through interaction with sarcomeric proteins.

Finally, Jaya Krishnan of Goethe-Universität Frankfurt gave a keynote lecture on novel mechanisms linking non-coding RNA regulation of metabolic processes to the biology of heart failure.

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ER IC GK CE

Emma Robinson(Me) Irina Carpusca(Host) Gabriela Kuster Rajesh Kataré costanza emanuelli Yan Devaux

Research Direction

Three aspects:

1. Identify the novel molecular biomarkers for early diagnosis of the heart disease.
2. Understanding the molecular mechanisms underlying the development of heart disease.
3. To develop novel therapeutic approach to treat the heart disease.

Key methods and Techniques used in my lab

In Vivo

- Chronic myocardial infarction
- Chronic limb ischemia
- Echocardiography guided in vivo gene delivery
- in vivo angiogram

In vitro

- Studies using human and mouse cardiomyocytes/endothelial cells CSCs/iPSCs
- General molecular techniques including FACS
- microCT (for imaging)
- HPLC

- Access to more than 600 RAA, LV and blood samples from patients

HEARTOTAGO

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ER IC TP SS

Emma Robinson(Me) Irina Carpusca(Host) Constantinos Stathopoulos Thierry Pedrazzini Yan Devaux Suzanna Shamakhyan

Viewing Constantinos Statho...

tRNA biology as a tool and target in disease



Constantinos Stathopoulos
School of Medicine
Department of Biochemistry
University of Patras, Greece
<http://rna.med.upatras.gr>



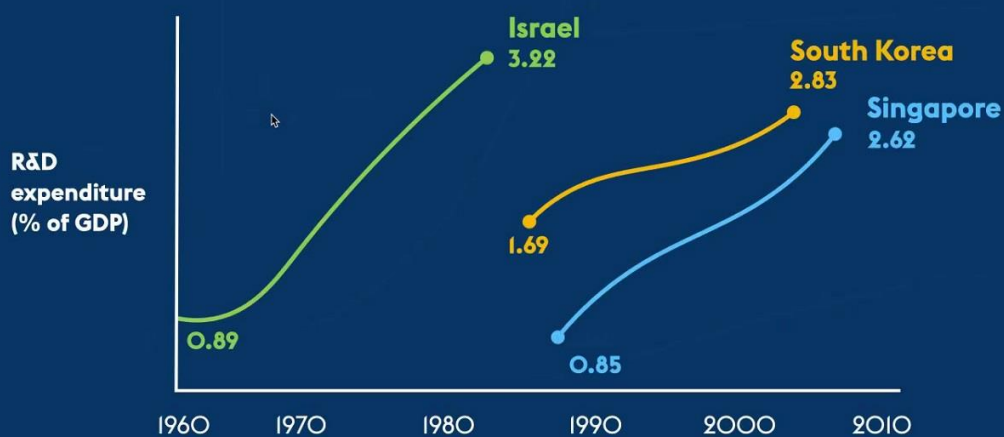
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IC TP RK AL

Irina Carpusca(Host, mej) Yan Devaux Thierry Pedrazzini Suzanna Shamakhyan Rajesh Kafare alain Lacampagne

Viewing Suzanna Shamakhya...

Leapfrogging Success Cases





EU-CardioRNA

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CardioRNA LIVE!

Wednesday 9th September

Meeting Summary

Day 3 of CardioRNA LIVE! kicked off with a keynote lecture from Alain Lacampagne (INSERM, Montpellier) on the role of ryanodine receptor signaling in the heart-brain in systemic multi-organ disease. We then heard from newcomer Konstantinos Drosatos (USA) about the work of his group on the poorly understood Kruppel-like factors and their newly emerging role in cardiac metabolism in response to cardiovascular risk factors such as type I diabetes.

Poster prize winner Francesco Ruberto (CH) presented his work on novel lncRNA, Clipper, regulating cardiomyocyte metabolism and proliferation in development and regeneration.

Next, new members from Italy Gaia Spinetti and Michele Ciccarelli told us about the role of ncRNAs in vascular regenerative cells, such as endothelial cells, in cardiometabolic diseases and new and multiple roles of G protein receptor kinases in regulating cardiovascular metabolism in pathology, respectively.

We heard from short term scientific mission (STSM) awardee, Rui Sérgio de Sousa Luís (PT), computational scientist who went to University of Bath (UK) to train in using single cardiac cell RNA-sequencing analysis in order to understand more about specific aetiologies of cardiomyopathy.

To finish Day 3, we were happy to welcome newcomer and early careers investigator from COST international partner country, Brazil, Juliana Floriano. Juliana reported on the effects of COVID-19 on the Brazilian population and her work in collaboration with European partners, including CardioRNA vice-chair Costanza Emanuelli, to share information and resources on long-term cardiovascular complications following viral infection. Juliana informed the network about possibilities to share data and samples from “Nona”, a perinatal biorepository aiming to develop microRNA biomarkers to support the cardiovascular health of mother and child in pregnancies.

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ER IC TP F GS

Emma Robinson(Me) Irina Carpusca(Host) Michele Ciccarelli Thierry Pedrazzini Fabio Gaia Spinetti

GRK2 removal and overexpression reciprocally modify mitochondrial morphology and function upon IR exposure

Basal 3h post IR 8h post IR

Scramble-siRNA or pcDNA3.1

siRNA-GRK2

pcDNA3.1-GRK2

cost

Franco et al, Cell Death and Discov, 2018

9

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ER IC TP MC F

Emma Robinson(Me) Irina Carpusca(Host) Rui Sousa-Luis Thierry Pedrazzini Michele Ciccarelli Fabio

Viewing Rui Sousa-Luis's app...

Current preliminary results

Legend:

- 0 Heart (TNNT2)
- 1 Tripotential Cardiac Progenitor (HAND1)
- 2 Endoderm (SOX3)
- 3 PSC (POU5F1)
- 4 Neural Crest (SOX10)PSC (FOXD3)
- 5 Endoderm (FOXA2)
- 6 Cardiac (IS)Endoderm (LEFTY2)
- 7 Heart (NOX2.5)
- 8 Neural Progenitor (PAX6)
- 9 Neural Crest (SOX7)
- 10 Neural Progenitor (PCDH6)
- 11 PSC (MTX)
- 12 HSPA1B
- 13 PSC (SCG3A2)
- 14 Mesenchymal Stem Cell (COL3A1)
- 15 Heart (CDKN2D)
- 16 Neural (STIM2)
- 17 PSC (SCG3A1)
- 18 Endothelial (SOX7)
- 19 PSC (YBX1)

Churko, J.M., Garg, P., Treuille, B. et al. Defining human cardiac transcription factor hierarchies using integrated single-cell heterogeneity analysis. *Nat Commun* 9, 4906 (2018). <https://doi.org/10.1038/s41467-018-07333-4>

- Ventricle cardiomyocyte (39%)
- Atrial cardiomyocyte (49%)
- Vascular smooth muscle cell (2%)
- Smooth muscle cell (3%)
- Epithelial cell (7%)

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TP

AL

F

⋮

Emma Robinson(Me)Irina Carpusca(HorT)Juliana FlorianoThierry Pedrazzinialain LacampagneFabio

Viewing Juliana Floriano's scr...

unesp

UNIVERSIDADE ESTADUAL PAULISTA

"JULIO DE MESQUITA FILHO"

Unidade de Pesquisa Experimental

Faculdade de Medicina - Câmpus de Botucatu

InstitucionalLaboratórios/BiotériosPesquisasInfraestruturaAdministrativaNúcleo de Educação

UNESP / HOME DO SITE / PESQUISA / UNIPEX / PROJETOS EM ANDAMENTO / PROJETOS INTERNACIONAIS /

"Nona" - Biorrepositório Perinatal

"Nona" perinatal biorepository

"Nona" perinatal biorepository: Developing microRNA biomarkers to support the cardiovascular health of Mother and Child in pregnancies complicated by gestational diabetes mellitus (GDM) in the Brazilian population.

[For english version, click here](#)


A co-joint project between Unesp and Imperial College London - ICL

Responsible researchers:

Prof. Dr. Costanza Emanuelli professor at ICL, NATIONAL HEART AND LUNG INSTITUTE - NHLI

Prof. Emeritus Marilza Vieira Cunha Rudge - FMB- Unesp

Dr. Juliana Ferreira Floriano - FMB-Unesp



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CardioRNA LIVE!

Thursday 10th September

Meeting Summary

The final day of CardioRNA LIVE! kicked off with WG member Timo Brandenburger (DE), who is identifying candidate microRNA biomarkers for prognosis following acute kidney injury, working together with fellow CardioRNA member Matthias Hackl at TAMIRNA.

Next, we heard from CardioRNA newcomer Sebastian Albinsson (SE) on the role of microRNAs for vascular adaptation to mechanical forces. Maastricht meeting poster prize winner, Teodora Barbalata (RO) updated us on her research panel of miRNAs and inflammatory markers in hyperglycemic patients with peripheral artery disease. Newcomer Prashant Srivastava (UK) explained how he uses his bioinformatics expertise to carry out multi layered network analysis to uncover molecular underpinnings of complex diseases including cancer and vascular disease, as well as cell-cell and organ-organ interaction.

The meeting ended with a keynote lecture from David Montgomery, currently Director of Clinical Excellence for Intercept Pharmaceuticals. David has extensive experience and a passion for helping people to find strategies to optimize communication between and within teams working in the clinical trial development and execution. He shared with us his experiences on barriers and shields in effective communication, which can be enhanced in the current climate of remote working and virtual interaction, and ways these can be overcome or improved. *"The problem with communication is the illusion that it has been achieved."* This final lecture was followed by a passionate discussion on the importance of communication, especially in the COVID-19 era.

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ER IC M 36

Emma Robinson(Me) Inna Carpusca(Host) Matthias Hackl Timo Brandenburger Yan Devaux 37 173 6592

Viewing Timo Brandenburger...

NcRNAs in renal recovery: study protocol

70 patients

AKI KDIGO-Stadium 2 OR KDIGO Stadium 3

↓ Yes

Exclusion criteria

↓ No

Consent and inclusion

↓

Blood- und urine day 0, day 1, day 2, day 7

↓

NGS, qPCR experiments Follow up day 90, 365. Data analysis

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ER IC IP 36

Emma Robinson(Me) Inna Carpusca(Host) Ines Potočnjak Sebastian Albinsson Yan Devaux 37 173 6592

Viewing Sebastian Albinsson...

Expression of miR-143/145 is essential for the myogenic response

A

Active diameter (μm)

Pressure (mmHg)

WT KO

B

Myogenic tone (%)

Pressure (mmHg)

WT KO

Pressure (mmHg)	WT (μm)	KO (μm)
0	150	150
50	200	200
100	250	200
150	250	200

Pressure (mmHg)	WT (%)	KO (%)
0	0	0
50	5	5
100	25	5
150	25	5

The screenshot shows a Cisco Webex Meetings interface. At the top, there's a menu bar with 'File', 'Edit', 'Share', 'View', 'Audio', 'Participant', 'Meeting', and 'Help'. Below the menu, a participant bar shows several participants: Emma Robinson(Me), Irina Carpusca(Host), David Montgomery (active), Ines Potočnjak, Prashant Srivastava, and a phone number 37 173 6592. The main content area displays a presentation slide titled 'Covid-19 – Science in the Spotlight' with the subtitle 'News story'. The slide text reads: 'Coronavirus (COVID-19): scientific evidence supporting the UK government response'. It also includes a paragraph: 'The national and global response to the spread of COVID-19 continues to develop quickly and our collective knowledge of the virus is growing by the second.' Below this, it states 'Published 20 March 2020' and 'Last updated 31 July 2020 — see all updates'. At the bottom of the slide, it says 'From: Government Office for Science and Scientific Advisory Group for Emergencies'. The slide also features the 'cost' logo (European Cooperation in Science & Technology) and a row of icons for various functions like chat, share, and mute. The number '9' is visible in the bottom right corner of the slide area.

Concluding Words

We would like to thank all CardioRNA LIVE! speakers, discussion leaders as well as attendees for their active participation in the **first digital EU-CardioRNA meeting**. For some it was mid-afternoon (Europe), for some, early morning (USA, Brazil) and for others even the middle of the night (New Zealand). Thank you all for joining. A special thank you to our CardioRNA project manager Irina Carpusca, without whom this meeting would not have been possible. A flower arrangement is wending its way to you.

<https://www.jacquelawson.com/ecard/view/s43460ffd965c46a3925222a88bd9a08e?ob=1>

It is unfortunate we could not all meet in person in Zagreb, Croatia as previously intended as also a big thank you to Ines Potočnjak, who had started to plan the sessions that we'd hoped to have in Zagreb. Our next planned face-to-face meeting is next September in the beautiful Pavia in the Lombardy area of northern Italy, hosted by Carlo Gaetano and Fabio Martelli.

Until next time...

Emma Robinson, Irina Carpusca, Yvan Devaux, and the CardioRNA Core Group.