THE DANISH SOCIETY FOR MATRIX BIOLOGY

Newsletter

No. 1 December, 2016

From the Chairman

Welcome to the website of the **Danish Society of Matrix Biology** and welcome to our first newsletter! First of all, we would like to introduce you to our society and its objective and the most important activities.

The main objective of the Danish Society of Matrix Biology is "To advance the science of connective tissue, extracellular matrix biology and related subjects". Our society has grown from 10 to over 200 members over the last couple of years and it is still growing! We have optimized our website so you can get easy access to news and information about upcoming meetings, latest research and possibly future positions. We hope that you will like it!

In May 2016 we successfully held our 2016 Danish Society of Matrix Biology (DSMB) annual meeting and more than fifty researchers attended at the Institute of Sports Medicine Copenhagen. Guest speakers were professor Per Aspenberg from Linköbing University, Sweden ("Tendon healing: Mechanical stimulation and drug effects") and Professor Moustapha Kassem from University of Southern Denmark ("Bone tissue regeneration via targeting of skeletal stem cells") - both gave great talks. University of Copenhagen and Institute of Sports Medicine were represented by associate professor Abigail Mackey and associate professor Katja Heinemeier giving inspiring presentations about "Regeneration of human skeletal muscle" and " Is cartilage collagen renewed during life, and does osteoarthritis influence the rate of turnover?", respectively. A couple of young talented investigators were chosen to present their latest research. After the great talks the attendees got together over a glass of wine or coffee, and continued the scientific discussions.

In our newsletters we would like to present the labs and their research from each of the board members of Danish Society of Matrix Biology (DSMB). Hence, I would like start by introducing my own lab below: IOC Sports Medicine Copenhagen (ISMC), University of Copenhagen, Denmark.

Sincerely,

Christian Couppé

Minutes from the Danish Society for Matrix Biology Annual General Meeting
9th of May 2016

Present:
Katja Heinemeier (KH), Marie Kveiborg (MK), Niels Behrendt (NB), Rie Harboe Nygaard (RN), Christian Couppé (CC) from the board and 6 members.
(Lene Kristensen and Patricia Danielsen from the board were absent).

The meeting was chaired by KH. Minutes were taken by Rie Harboe Nygaard.

1. **KH gives a summary of last GA minutes.**

2. **KH gives the chairs annual report.** The economy looks better, which makes it possible to invite speakers from outside Copenhagen and this will hopefully draw more people to the meetings. KH stops as chair at this meeting.

3. **Treasurer's annual report.** LK is not present so KH presents the budget. Increase in income / membership fee from 700 DKK last year to 4000 DKK this year. NB suggests that we should be pro-active to get members to pay the annual fee. Maybe KH could request people to pay on mobilepay.

4. **Election**

   Katja Heinemeier, chair – stops as chair but is willing to continue as treasurer
   Patricia Danielsen, secretary – willing to be re-elected
   Lene Christensen – stops in the board
   Marie Kveiborg - willing to be re-elected
   Niels Behrendt - willing to be re-elected
   Rie Harboe Nygaard – stops in the board
   Christian Couppé – willing to be re-elected and chosen as chair

   Christine Chuang and Alejandro Mayorca Guiliano are elected as new board members

   The new elected board is:

   Christian Couppé, chair
   Katja Heinemeier, treasurer
   Patricia Danielsen, secretary
   Marie Kveiborg
   Niels Behrendt
   Christine Chuang
   Alejandro Mayorca Guiliano

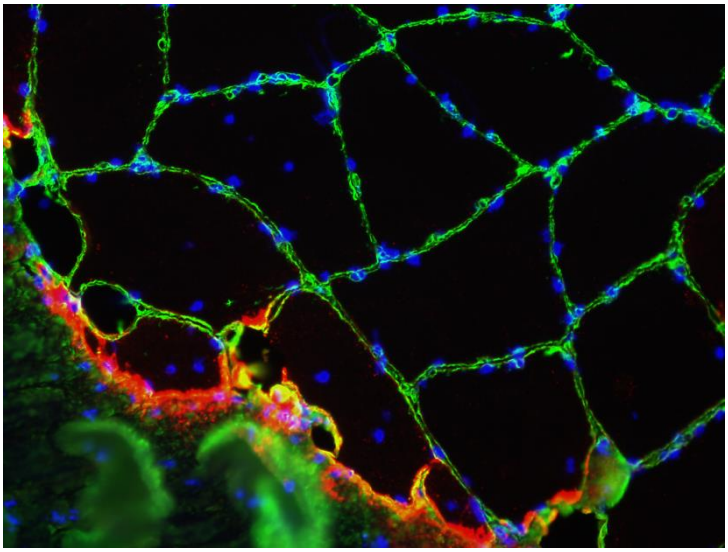
5. **Any other business**
   - The new board aims to go to the European meeting in the UK this year
   - Mailing list – remember to include people in the list (for example speaker Moustapha Kassem)
   - CC sets a date for the next board meeting: 1st of June, 14.30-15.30 at BRIC, Copenhagen.
   - The bank needs a passport number from the board members (KH sends an e-mail around)

Group highlights

The Institute of Sports Medicine Copenhagen (ISMC) Lab

Our group focuses on basic science and clinical research of connective tissues in relation to tendon and skeletal muscles - mainly with focus on understanding of clinical injuries in sports medicine and mechanisms behind musculoskeletal changes with ageing. Institute of Sports Medicine Copenhagen (ISMC) hosts around 25 researchers including 2 professors: Michael Kjaer & S. Peter Magnusson and is organized into 4 research groups (Cellular function in tendon, Matrix structure and function, Muscle tissue and sarcopenia and Protein turnover group). I have included some recent work by Associate Professors Abigail Mackey and Katja Heinemeier from our group below, however, please refer to this link http://ismc.dk/ to read more about our institute and researchers.

Associate Professor Abigail Mackey's research mainly focuses in understanding the interaction between the various cellular processes at play during the regeneration of human skeletal muscle. It is known that macrophages, fibroblasts and satellite cells all have key roles to restore the muscle to its pre-injury state, but cell-cell and cell-matrix interaction during this process is not well understood.



Recent investigation of human myotendinous junction, a region undergoing continual remodelling, revealed an abundance of many collagen types at the muscle-tendon interface, with collagen type XXII being located only at the interface (red in Figure)[1]. In terms of strategies to improve muscle regeneration, ingestion of Ibuprofen appears to speed up the repair of muscle fibres as well and the muscle extracellular matrix but whether this is at the expense of a longer-term strengthening of the tissue remains unknown.

In addition, senior researcher Katja Heinemeier from ISMC has demonstrated that the Achilles tendon core lacks renewal after 17 years of life determined by the ^{14}C nuclear bomb-pulse method.

In the late fifties, nuclear bomb testings were performed that increased ^{14}C levels in the atmosphere, which were reflected in all living organisms. This fluctuation in ^{14}C could be used to determine tissue turnover in forensic Achilles tendon core samples[2].

These findings provided a very important understanding of human tendon function and pathology and may explain why tendons have very poor healing and regenerative potential.

The FASEB Journal • Research Communication

Lack of tissue renewal in human adult Achilles tendon is revealed by nuclear bomb ^{14}C

Katja Maria Heinemeier,*,†,1 Peter Schjerling,*,† Jan Heinemeier,‡ Stig Peter Magnusson,*,† and Michael Kjaer*,†

*Institute of Sports Medicine, Department of Orthopedic Surgery M, Bispebjerg Hospital, and †Center for Healthy Aging, Faculty of Health and Medical Sciences, University of Copenhagen, Denmark; and ‡AMS ^{14}C Dating Centre, Department of Physics and Astronomy, Aarhus University, Aarhus, Denmark

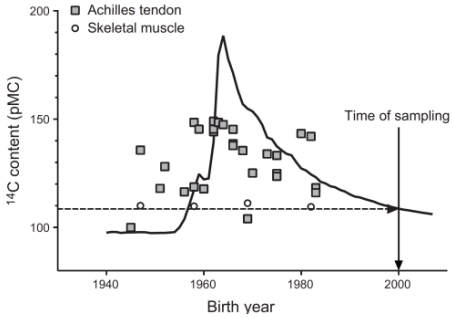


Figure 1. ^{14}C bomb-pulse curve. Concentration of ^{14}C in atmospheric CO_2 (black line), shown as pMC (26). Testing of nuclear bombs from 1955 to 1963 nearly doubled the atmospheric levels of ^{14}C, which was followed by an exponential decrease after the Test Ban Treaty in 1963. Measured levels of ^{14}C are shown in relation to birth year for samples of human Achilles tendon (gray squares) and skeletal muscle (open circles) taken in year 2000. The levels of ^{14}C found in the tendon tissue generally correspond to the atmospheric levels many years before sampling, thus indicating a very slow rate of tissue replacement. Skeletal muscle levels of ^{14}C correspond to atmospheric levels ~2 yr before the time of sampling (dashed arrow), thus indicating continuous tissue turnover, as essentially no memory of lifetime exposure to the bomb pulse remains in the muscle tissue.

Interestingly, almost the same findings were demonstrated in cartilage showing that virtually no replacement of collagen matrix occurred after skeletal maturity and neither OA or tissue damage influenced tissue turnover[3].

RESEARCH ARTICLE

BONE

Radiocarbon dating reveals minimal collagen turnover in both healthy and osteoarthritic human cartilage

Katja M. Heinemeier,[1,2] Peter Schjerling,[1] Jan Heinemeier,[3] Mathias B. Møller,[1] Michael R. Krogsgaard,[4] Tomas Grum-Schwensen,[5] Michael M. Petersen,[5] Michael Kjaer[1]*

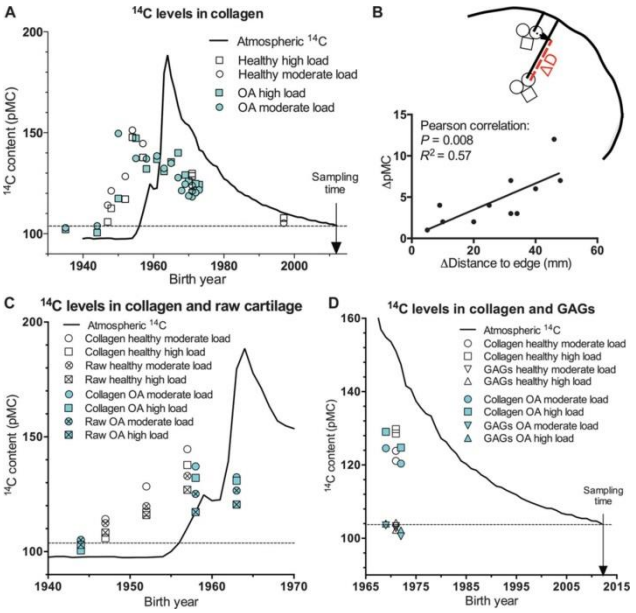


Fig. 3. ^{14}C content in healthy and OA cartilage. (**A** to **D**) The ^{14}C bomb pulse curve shows the chronological atmospheric concentration of ^{14}C (black line) shown as percent modern carbon (pMC) based on data up to 2001 in (*33*) and from 2002 in (*34*) (A, C, and D). In (C) and (D), shorter time spans of the bomb pulse curve are shown. The horizontal dashed line indicates the approximate atmospheric ^{14}C level at the period of tissue sampling (November 2012 to January 2014). (A) ^{14}C concentrations in purified collagen from paired samples of moderately and highly loaded cartilage sampled from both healthy and OA tibial plateaus (n = 23). The trend of the data points mirrors the bomb pulse ~10 years after birth. Vertically aligned symbols represent data from the same individual (except for the data points in 1971 that represent two healthy and one OA donors). (B) Schematic illustration of the measurement of Δdistance to the edge of the joint surface (curved black line) between central and peripheral samples. The shortest distance between sample site and joint edge was always measured. (See also Fig. 1 for explanation of sample dissection.) The graph shows the difference in ^{14}C content (ΔpMC) between the centrally and the peripherally located samples plotted versus their difference in distance to the edge of the joint surface (Δdistance) (n = 11). Only data for individuals born after the peak (1964) are shown. P value was determined by Pearson linear regression. (C) ^{14}C concentrations in intact cartilage ("raw") compared to that in purified cartilage collagen ("collagen") from which GAGs had been removed. Data are shown for paired samples of moderately and highly loaded cartilage, sampled from both healthy and OA tibial plateaus (n = 6). Vertically aligned symbols represent data from the same individual. (D) ^{14}C concentrations in GAG fractions isolated during the collagen purification procedure. Data are shown for paired samples of moderately and highly loaded cartilage from two healthy and two OA donors. The ^{14}C content in purified collagen from the same persons are shown for comparison (n = 4). Vertically aligned symbols in years 1969 and 1972 represent data from one individual in each year, whereas the 1971 data represent two donors.

References:

1. *Jokobsen,J.R et al. 2016. Scand J Med Sci Sports. 2016 Oct 26. doi: 10.1111/sms.12794. [Epub ahead of print]*
2. *Heinemeier, K.M et al.2013, FASEB J. 27(5): 2074-9.*
3. *Heinemeier, K.M et al. 2016. Sci.Transl.Med. 6;8(346): 346ra90.*

Reports from meetings and conferences

2nd Matrix Biology Europe conference, 2016, Athens, Greece

During middle of June 2016, I was given an amazing opportunity to attend the 2nd Matrix Biology Europe (MBE) conference (25th FECTS Meeting) in Athens, Greece. The conference opened with a stimulating lecture from a well renowned scholar and researcher Renato V. Iozzo about 'Novel Proteoglycan Functions in Regulating Autophagy and Angiogenesis'. This was followed by three days filled with enriching and informative lectures covering a broad range of matrix research, from elaborating its functions/interactions in healthy state, their roles in development and progressing, and its application in tissue engineering. The Rupert Timpl Award was presented to Dr. Alexander Nyström with a wonderful and informative presentation entitled: "Delineation of disease modifiers allows for treatment of basement membrane-linked skin disorders".

It was my first time attending an MBE conference and it left me with a strong and lasting impression of all the impressive and innovative research happening in this field. The conference was thoroughly engaging, not only with the lectures, but also with the poster sessions, providing an avenue to discuss current on-going research with the other participants. I would like to extend my thanks and appreciation to the MBE organisers and society for such a social and educational conference, and being able to present my research to the community.

Siriluck (Pam) Vanichkitrungruang
(PhD student)
Heart Research Institute, Sydney, Australia
Panum Institute, BMI, University of Copenhagen

Membership

We encourage everyone to support DSMB by paying a membership fee of 100 dkr. This will give you free access to join DSMB meetings, our newsletters, update of upcoming meetings, workshops and courses. You can pay by:

1) Transferring via MobilePay to +4528556602 (Katja Heinemeier) and WRITE "DSMB, NAME AND EMAIL ADDRESS".

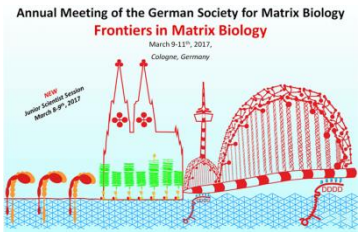
OR

*2) Transferring to the DSMB bank account: Reg: 1551 Account: 1227130 (Danske bank). Please indicate "**DSMB membership**" on your bank transfer and write an email to our treasurer Katja Heinemeier (kh@sund.ku.dk) to let her know that you have paid the membership fee.*

Matrix meeting announcements

2016 TERMIS-Americas
Tissue Engineering and Regenerative Medicine: Personalized and Precise Science, Engineering, and Translation 11th-14th Dec., San Diego, CA, USA
https://www.termis.org/am2016/

2017 GRS and GRC Fibronectin, Integrins & Related Molecules
The Regulation of Cell Behaviour by Cell-Extracellular Matrix Interactions
28thJan.-3rd Feb., Ventura, CA, USA
https://www.grc.org/programs.aspx?id=14722
https://www.grc.org/programs.aspx?id=11305



2017 German Society for Matrix Biology
Frontiers in Matrix Biology 9th -11th Mar., Cologne, Germany
http://matrixbiologie.de/JahrestagungKoeln/CologneDGMB-Index.html

2017 GRC Glycobiology
Glycan Function and Structure from Nucleus to Niche
19th -24th Mar., Ventura, CA, USA
https://www.grc.org/programs.aspx?id=11359

2017 WCO-IOF-ESCEO Florence
World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Diseases 23rd-26th Mar., Florence, Italy
http://www.wco-iof-esceo.org/

2017 GRS and GRC Cartilage Biology & Pathology Glycobiology
Understanding Biology to Achieve Better Cartilage Health
1st -7th April, Lucca (Barga), Italy
https://www.grc.org/programs.aspx?id=16975
https://www.grc.org/programs.aspx?id=13112

2017 BSMB
Matrix Proteoglycans: active participants in cell-ECM communication
3rd-4th April, Oxford, UK
http://www.bsmb.ac.uk/meetings-index/about-the-meeting/

2017 FEBS advanced lecture course
Matrix Pathobiology, Signaling and Molecular Targets
25th-30th May, Spetses, Greece
http://www.febs-mpst2017.upatras.gr/

2017 ISHAS
Hyaluronan
11th-15th Jun, Cleveland, OH, USA
https://www.ishas.org/

2017 GRC and GRS Carbohydrates
Chemical and Biochemical Approaches to Deciphering Glycan Functions
24th-30th June, West Dover, VT, USA
https://www.grc.org/programs.aspx?id=17427
https://www.grc.org/programs.aspx?id=11035

2017 TERMIS-EU
Regenerative Medicine International Society 2017
26th-30th June, Davos, Switzerland
https://www.termis.org/eu2017/

2017 GRS and GRC Matrix Metalloproteinases
Lost in Translation? Rediscovering Metalloproteinases as Disease Targets
8th-14th July, Biddeford, ME, USA
https://www.grc.org/programs.aspx?id=14770
https://www.grc.org/programs.aspx?id=12359

2017 ASMB workshop
Basement membranes
12th-14th July, Nashville, TX, USA
http://www.asmb.net/files/asmb_workshop_2017_-_annoucement_for_news_on_website.pdf

2017 GRS and GRC Collagen
The Multifaceted Nature of Collagens in Development, Disease and Tissue Repair
15th-21st July, New London, NH, USA
https://www.grc.org/programs.aspx?id=14698
https://www.grc.org/programs.aspx?id=12176

2017 GRS and GRC Elastin, Elastic Fibers & Microfibrils
Elastic Tissues and Regulation of Growth Factor Signaling in Development, Homeostasis and Disease
29th July-4th Aug., Biddeford, ME, USA
https://www.grc.org/programs.aspx?id=14714
https://www.grc.org/programs.aspx?id=11200