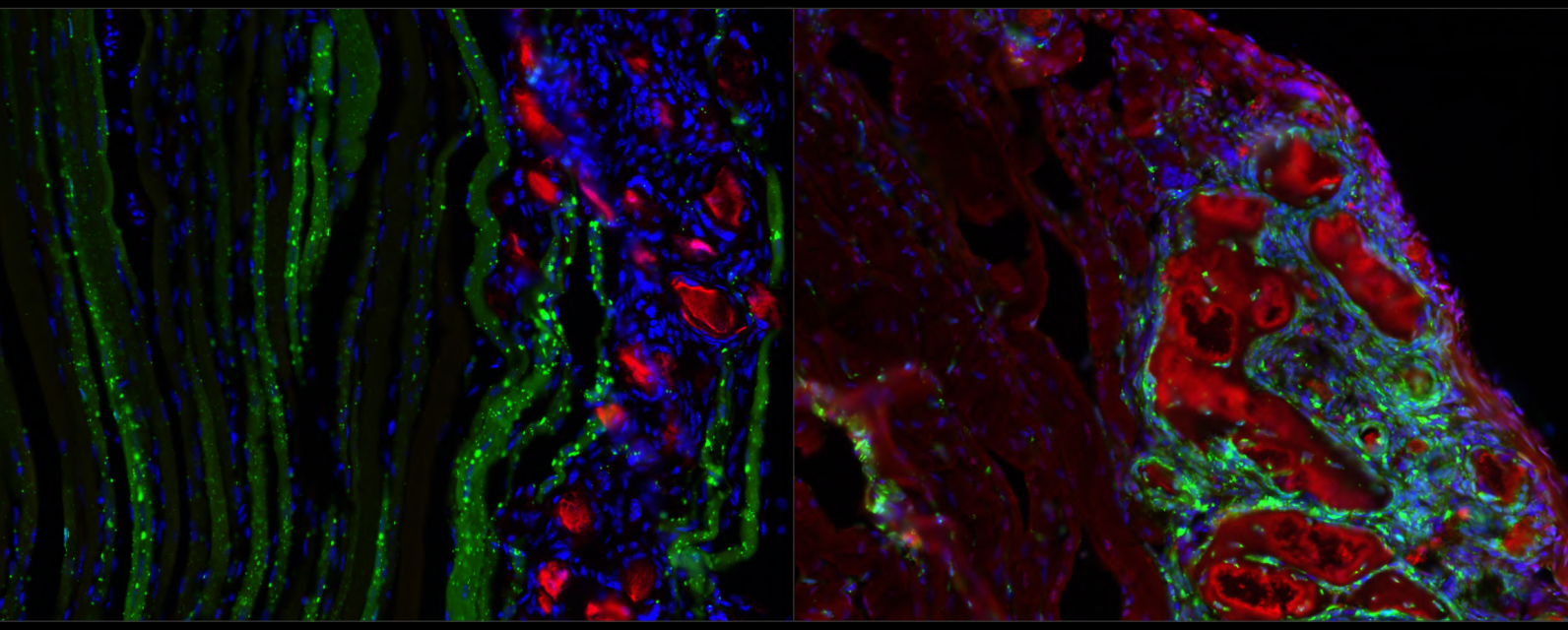
Issue 8, May 2022

ANZBMS Newsletter

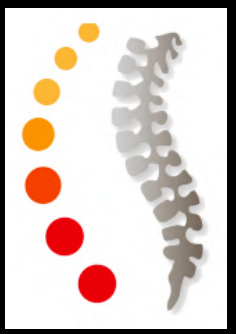


ANZBMS-MEPSA-ANZORS Annual Scientific Meeting

Committee updates

ANZBMS publication highlights

Cover image: *The left image shows the distribution of ZsGreen expression and osteocalcin (red) in mice expressing ZsGreen in satellite cells (SCs); while the right image shows the overlap of ZsGreen and type I collagen (red) in mice expressing ZsGreen fibro-adipogenic progenitors (FAPs). These demonstrate bone nodules develop in areas of FAP proliferation, not where SCs regenerate myofibers. Courtesy of Hsu-Wen Tseng and colleagues (see Pg. 11).*



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Next Issue: August 2022

newsletter@anzbms.org.au

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Welcome to the ANZBMS newsletter

Hope you are well! In this issue, Prof Mark Forwood introduces the new members of Council and the committee chairs (Pg. 3).

We're all excited for this year's in-person Annual Scientific Meeting! This meeting will be held in conjunction with MEPSA and ANZORS. Find out more details on this excellent program from the Program Organising Committee on Pg. 4. Abstract submission and Earl Bird Registration is 3rd June. Do not miss out on the ANZBMS awards (Pg. 7)!

The Therapeutic Committee has provided new updates on Romosozumab (Pg. 5), and management of primary hyperparathyroidism in adults (Pg. 6).

The IFMRS's online learning platform, HubLE, invites you all to share your feedback via their survey, and check out their new content including the recent H. Fleisch virtual workshops (Pg. 9).

Our publication section continues to highlight the work of ANZBMS members, and this edition features a range of publications from basic to clinical research (Pg. 10-17).

We would like to thank Dr Nicolas Hart and Dr Victoria Leitch for their contributions to previous newsletters and welcome Dr Yaser Peymanfar to the editorial board. We are recruiting new members! If you are interested in joining our Editorial Board, please contact us! It's a great opportunity to connect and work with other ANZBMS members.

Have news to share or want to provide us with feedback? Contact us at newsletter@anzbms.org.au

Happy reading!

ANZBMS Newsletter Editorial Board

ANZBMS Newsletter Editorial Board

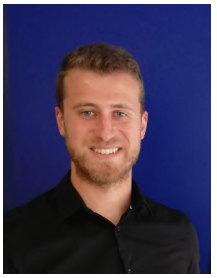
Niloufar Ansari

Martha Blank

Madhuni Herath

Hanh Nguyen

Yaser Peymanfar



James Smith

Natalie Wee

Emma West

President's comment

Professor Mark Forwood

ANZBMS President
Chair of Anatomy, School of Pharmacy and Medical Sciences
Griffith University, Gold Coast

"Come senators, congressmen
Please heed the call
Don't stand in the doorway
Don't block up the hall
For he that gets hurt
Will be he who has stalled
There's a battle outside and it's ragin'
It'll soon shake your windows
And rattle your walls
For the times they are a-changin"

(Bob Dylan, The Times They Are A-changin'; 1964)

ANZBMS Colleagues, whether the battle ragin' "outside" is resolved by the time you read the newsletter, the times have been a changing for ANZBMS. As many terms of office came to an end, we have new members of Council and turnover on committees. First, I thank outgoing Chairs (Grahame Elder, Rachel Davey, Melissa Cantley, Nathan Pavlos, Tania Winzenberg, Michelle McDonald, Craig Munns, and Christian Girgis) and their outgoing committee members. I also thank Richard Prince (Therapeutics), Tuan Nguyen (Research), and John Kemp (ECIC) who continue. Your work has been integral to the standing of our Society.

Second, I would like to welcome our new committee Chairs and committee members. It is within this structure that the key strategic planning and Society business is performed, which is key to achieving ANZBMS objectives. Incoming Chairs are: Rachel Davey (Finance), Christian Girgis (Clinical Practice), Gustavo Duque (Meetings), Melissa Cantley (Communications), Nick Pocock (Densitometry), Bridie Mulholland (ECIC Co-Chair), and Ayse Zengin, Peter Simm and Hong Zhou (POC Co-Chairs). We also have the fantastic work of our Newsletter editorial team.

Chairs have worked to update Terms of Reference (ToR) and develop strategic objectives for 2022-23. One development I want to highlight is formalisation of the Densitometry Committee ToR by Nick Pocock. In my ANZBMS memory, there has always been conflation of the Committee and the Densitometry Course and its faculty. The new ToR distinguishes the committee very clearly from the training course. The ToR ensures that there is mutual representation of committee on faculty and *vice versa*, ensuring continuity of policy and training content. The new Committee comprises Nick Pocock (Chair), Weiwen Chen, Gustavo Duque, Christian Girgis, Chris Schultz, and Joseph Wong. I won't list faculty members here (see website), but I thank them for their service to the Densitometry Course over a long period since 2005, including the "pivot" to a virtual training course in 2021. The course is recognised in all States, with the recent exception of SA, as suitable to apply for a DXA operator's licence. The course is also recognised by The Australasian Association of Nuclear Medicine Specialists (AANMS) and the Royal Australasian College of Physicians (RACP) for DXA training of Nuclear Medicine and Endocrinology registrars, respectively. The course is a key educational platform for ANZBMS. With the Postgraduate Training Course for Advanced Trainees, these ANZBMS courses deliver excellent professional education to clinicians and allied health professionals.

Finally, we will have our first face-to-face meeting in almost 3 years with ANZBMS-MEPSA-ANZORS together on the Gold Coast in August. The POC has developed an excellent program and the ANZBMS international invited speaker is Dr Andrew Burghardt, UCSF, an expert in high-resolution imaging and computational analysis of musculoskeletal tissues. We will have the popular ECIC sessions 'Clinical Cases in Metabolic Bone Disease', and the 'Career Development session' will be *'Building Resilience in STEM: Bouncing forward not just back from adversity'* delivered by the WALT Institute (very relevant to the challenges of the past 3 years). Combined with our high standard of musculoskeletal science, and the location on the Gold Coast, it should be a fantastic meeting. I look forward to seeing you all there.

m.forwood@griffith.edu.au www.linkedin.com/in/mark-forwood-7565a440
https://experts.griffith.edu.au/18894-mark-forwood

2022 Annual Scientific Meeting Details

The Annual Scientific Meeting is now under 3 months away, with an exciting program awaiting and very little chance that our first face-to-face meeting in 3 years will be thwarted! The meeting is being held in conjunction with ANZORS and MEPSA, and will also deliver concurrent ANZBMS specific content. This includes the full suite of award sessions, as well as combined sessions with the other societies where we can share our collective expertise. The ANZBMS international speaker is Prof Andrew Burghardt (UCSF) who will present on his ground-breaking work in high-resolution imaging and computational analysis of musculoskeletal tissues. He will be joined by talks from Dr Monika Frysz (UK) and Dr Timo Damm (Germany), the latter two being selected as part of the ECIC's Bridging Overseas Network Exchange (B.O.N.E) Program.

Other key sessions include Assoc Prof Michelle McDonald and Assoc Prof Claudia di Bella speaking from laboratory and clinical perspectives on cancer and bone. We look forward to hearing from Prof Anne-Marie Hill on the role of allied health clinicians in falls prevention, and Ms Sandy Bevc, the president of XLH Australia, on the role advocacy groups play in musculoskeletal research. The thorny issue of clinical transition will be considered by experienced clinicians Dr Anne Trinh and Dr Jenny Harrington, while some of our most decorated ANZBMS members will have a battle of wits in a debate on exercise vs therapeutics, including Prof Peter Ebeling, Prof Belinda Beck, Prof Robin Daly, and Assoc Prof Rory Clifton-Bligh.

Dr Melissa Cantley and the ECIC team have put together some terrific sessions including the popular *Clinical Cases in Metabolic Bone Disease*, a speed networking afternoon, the traditional 'bones and brews' evening and a career development lunch '*Building Resilience in STEM: Bouncing forward not just back from adversity*', delivered by Elizabeth and Christine from the WALT Institute, who specialise in coaching and training people in STEM; a session much needed after the past 3 years.

There will be also be plenty of space for oral abstracts to showcase the latest research from our ANZBMS members so please finalise those last-minute results and get your abstracts in! Finally, the awards sessions will provide a platform for early career researchers to share their findings - we strongly encourage applications for these awards.

We hope there's something for everyone in the program and we look forward to welcoming you in person on the Gold Coast!

Dr Ayse Zengin, Dr Peter Simm, and Prof Hong Zhou (POC Co-Chairs)

Romosozumab - new PBAC call for public submission due 25 May

It has been acknowledged that ANZBMS public submissions in March 2020 played an important role in approval of romosozumab for funding by the PBAC. So, thank you to those who found time to do this. As a result, romosozumab was approved for prescription on the PBS in July 2021 under excessively restricted guidelines currently applied to teriparatide for secondary use, when agents that slow bone turnover, antiresorptives, have failed to prevent further fracture.

Given the major efficacy of this sclerostin inhibitor, an excellent example of the importance of basic bone biology to clinical care, many are suggesting romosozumab should be considered for patients who have had or who are at high risk of fracture due to impaired bone structure, *as first-line* therapy, as well as after failure of antiresorptive therapy.

We are advised that submissions for romosozumab will go before the PBAC meeting in July 2022 as follows.

1. Expanded second-line PBS listing criteria:

a BMD T-score ≤ -2.5, (currently ≤ -3.0)

AND at least one symptomatic new fracture after at least 12 months continuous therapy with antiresorptive therapy

2. Proposed first-line criteria:

a BMD T-score ≤ -2.5

AND a recent (*i.e.* last 24 months) hip or clinical vertebral fracture OR at least 2 (including 1 in the last 24 months) clinical fractures

Consumer comments can be made in one of three ways:

1) via the online portal, available: at:

https://ohta-consultations.health.gov.au/ohta/online-comments-to-pbac-july-2022/

2) by emailing the PBAC directly (commentsPBAC@health.gov.au);

3) by sending a letter to PBAC Secretariat, MDP 952, Department of Health and Ageing, GPO Box 9848, Canberra ACT 2601.

As noted above, the PBAC ***does take into account submissions*** in its decision making. The exact way it does it is outlined in the online portal under "related". So unlike other requests for comment, it seems that time spent in this unpaid work may benefit our patients.

There are 5 questions posed:

1. Please outline your experience with the medical/health condition.
2. How is the medical/health condition currently treated?
3. What do you see as the advantages of this proposed medicine, in particular for those with the medical condition and/or family and carers?
4. What do you see as the main disadvantages of this proposed medicine?
5. Please provide any additional comments you would like the PBAC to consider.

The Therapeutics Committee is working on an evidence-based submission to the PBAC that may be of use for your individual submission. It will be circulated for general comment soon.

Prof Richard Prince, Chair of Therapeutics Committee

ANZBMS Position Statement on Primary Hyperparathyroidism in Adults

Back in 2019, the Endocrine Society of Australia, with experts from ANZBMS and the Australian and New Zealand Endocrine Surgeons Society, commenced work on evidence based guidelines for Australian and New Zealand for the medical and surgical management of primary hyperparathyroidism. Our thanks are due to the co-authors and especially Fran Milat and Mathis Grossmann who led the medical sections and made major contributions to the surgical sections.

Last year, the documents were circulated for comment and in late 2021 the two documents, one on the medical management and one on the surgical management, were published in Clinical Endocrinology. Thanks to the efforts of Maddie Herath, ANZBMS can share these documents as an important update on the management of primary hyperparathyroidism. Given that since 1932 there have been 12,710 publications on the subject, it is helpful for clinicians to have the data summarized by expert colleagues.

Milat F, et al. Primary hyperparathyroidism in adults-(Part I) assessment and medical management: Position statement of the endocrine society of Australia, the Australian & New Zealand endocrine surgeons, and the Australian & New Zealand bone and mineral society. Clin Endocrinol (Oxf). 2021 Dec.doi: 10.1111/cen.14659.

Miller JA, et al. Primary hyperparathyroidism in adults-(Part II) surgical management and postoperative follow-up: Position statement of the Endocrine Society of Australia, The Australian & New Zealand Endocrine Surgeons, and The Australian & New Zealand Bone and Mineral Society. Clin Endocrinol (Oxf). 2021 Dec. doi: 10.1111/cen.14650.

Amongst many important changes, the new Guidelines expand the event horizon to 10 years and codify non classical potential adverse effects of hypercalcemia on the neuromuscular and other systems, as well as advising on who should undertake parathyroid surgery.

ANZBMS recommends these evidence-based thoughtful updates on the management of primary hyperparathyroidism in 2022. Those who understand that the evidence base is complex may be interested in two recent publications.

Seib CD, et al. Risk of Fracture Among Older Adults With Primary Hyperparathyroidism Receiving Parathyroidectomy vs Nonoperative Management. JAMA Intern Med. 2022 Jan 1;182(1):10-18.

Pretorius M, et al. Mortality and Morbidity in Mild Primary Hyperparathyroidism: Results From a 10-Year Prospective Randomized Controlled Trial of Parathyroidectomy Versus Observation. Ann Intern Med. 2022 Apr 19.doi: 10.7326/M21-4416.

Prof Richard Prince, Chair of Therapeutics Committee

Member achievements

The Australian Institute for Musculoskeletal Science (AIMSS) has been awarded Gold Star from International Osteoporosis Foundation as a recognition to their post fracture care coordination program/fracture liason service at Western Health (Sunshine, Footscray, and Williamstown Hospitals).

Congratulations to AIMSS Director, Prof Gustavo Duque, and other members of the AIMSS on this award.

The global map of the best practice can be found **here**.

Dr Emma Buckels, University of Auckland

Maurice and Phyllis Paykel Trust Project Grant

Tian Nie , The University of Melbourne

Austin LifeSciences Prize for Discovery Research

ANZBMS Awards. Applications close: 3 June

- ANZBMS Highest Rated Student Abstract Award
- ANZBMS Travel Grants
- Roger Melick Young Investigator Award
- Christopher & Margie Nordin Young Investigator Poster Award
- Amgen-ANZBMS Outstanding Abstract Award
- ANZBMS Kaye Ibbertson Award for Bone and Mineral Medicine
- Sol Posen Research Award
- The ANZBMS Career Achievement Award
- Clinical Case Awards

Meet our newest ANZBMS members

Prof Mathis Grossmann

Affiliation: The University of Melbourne, Department of Endocrinology Austin Health

Research category: Clinical research

Research interests: Our research focuses on the roles of reproductive hormones in health and disease. Our group conducts observational and interventional trials in men with i) low testosterone and chronic disease, ii) hypogonadism, iii) prostate cancer receiving androgen deprivation therapy, and iv) women with breast cancer receiving aromatase inhibition to understand how reproductive hormones regulate musculoskeletal health and glucose homeostasis, both at the clinical and the molecular level.

What you hope to gain from joining ANZBMS? My recent research focus has gradually shifted to understand the roles sex steroids play in bone health. Joining the ANZBMS will allow me to become an active part of this society, and more closely interact with other research groups and clinicians.

Dr Lieke Scheepers

Affiliation: Menzies Institute for Medical Research, University of Tasmania. I hold a Farrell Family Senior Research Fellowship.

Research category: Molecular / clinical epidemiological research

Research interests: I am an epidemiologist by training and my research focuses on life course epidemiology, pharmacoepidemiology and clinical trials in the domain of musculoskeletal disorders. I am passionate about conducting research on large population based studies, particular birth cohorts, and aim to elucidate biological mechanisms that play a role in the development of chronic conditions in children and adolescence, such as poor bone health and obesity.

What you hope to gain from joining ANZBMS? Being part of the Research Committee gives me an opportunity to engage with other researchers. I hope to create exciting opportunities for future collaborations.

We are recruiting new members!

We are seeking expressions of interest to fill **3 positions** in our ANZBMS Newsletter editorial board. If you are interested to join our team, please contact us at **newsletter@anzbms.org.au**

HubLE News

HubLE is 3 years old! It has been a year since the HubLE relaunch. Last year was a challenging but incredible year for HubLE. We released 49 pieces of content; we had more than 5000 visits of our website, and more than 144500 tweet impressions! We look forward to expanding our activities in the coming year to support early investigators from across the world.

Visit our website **www.huble.org** or scan the QR code below to share your research in one of our five key features:

- **HubLE Graphics:** Images, infographics, and doodles.
- **HubLE Publications:** Published research in the form of author interviews, thesis summaries, and scientific highlights.
- **HubLE Exchange:** Scientific exchanges and reports from scientific meetings featuring community members.
- **HubLE Opinions:** Opinion pieces emphasizing critical barriers and topics of debate facing the community.
- **HubLE Resources:** Innovative scientific methods and techniques, research groups, and new research.

Give us your feedback!

We are always looking for ways to improve the HubLE content and user experience. Please take a moment to respond to **this short survey** and tell us what you think.

Take part in the conversation!

The **IFMRS** has recently launched **a new online discussion forum**, which we're calling Concord (as a more positive spin on Discord, the name of the platform). Going forward, this is where we'd like most of the discussions around the HubLE content and musculoskeletal research generally to take place. Registration is free and it's easy to use. **Register now!**

And check out the recordings of two virtual **H. Fleisch workshops** hosted by IFMRS in April:

1. Bone Health in Weight Extremes.
Speakers: Dr Madhusmita Misra, Dr Jacqueline Maya, Prof Morten Frost, and Dr Morten Steen Hansen.

2. Overcoming Challenges for Musculoskeletal Health in Low and Middle-Income Countries.
Speakers: Dr Ayse Zengin, Dr Alexander Schade, and Ms Maureen Sabawo.

Join the HubLE community today!

To share your ideas and learn from our international community, visit our website **www.huble.org** and view the latest content from the HubLE community including Exchange interview with Neharika Bhadouria (Purdue University, USA) at ORS 2022, and HubLE Publications interview with Marco Ponzetti (University of L'Aquila, Italy).

Female representatives: Australian Diabetes and Endocrinology Societies

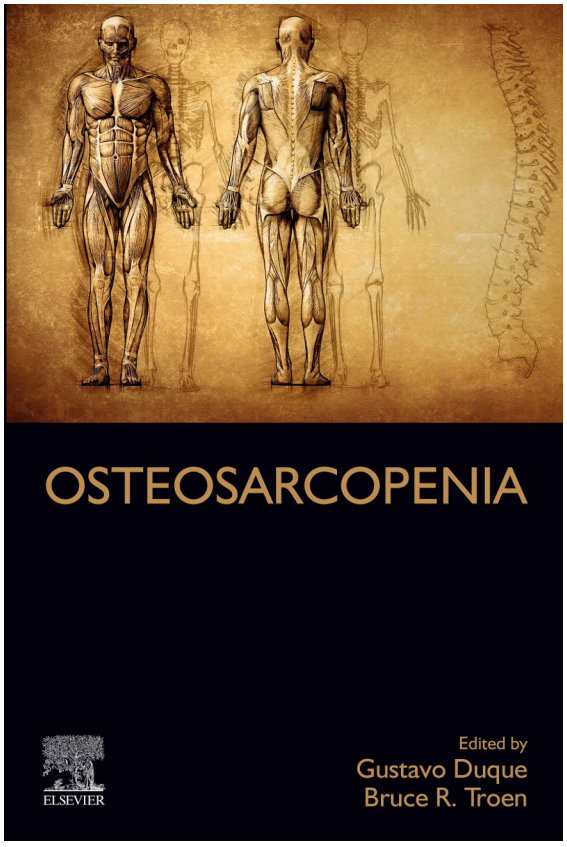
Diverse representation in leadership positions of scientific societies and academia is essential for the growth and development of societies. Women continue to be under-represented in leadership positions.

Lisa Raven and *Ann McCormack* studied female representation in three major Australian diabetes and endocrinology societies, and their respective annual scientific meetings between 2016-2020: Australian Diabetes Society (ADS; Australasian Diabetes Congress), ANZBMS (ANZBMS Annual Scientific Meeting) and the Endocrine Society of Australia (ESA; ESA Annual Scientific Meeting).

Their results showed an equal representation of females and males as conference speakers and session chairs. However, there was a gender gap in more prestigious roles of plenary speakers and society council members.

More details can be found **here**.

Member publications



Duque G, Troen BR. Osteosarcopenia. 2021.

Bone and muscle are closely interconnected. The normal muscle and bone loss that occur with ageing is aggravated by the presence of multiple shared risk factors, thus generating two pathological conditions, sarcopenia and osteoporosis, respectively.

Recently, the combination of osteopenia/osteoporosis and sarcopenia, known as osteosarcopenia, has been identified as an important and highly prevalent condition that predisposes to multiple adverse outcomes.

The pathophysiology of osteosarcopenia involves a complex set of interactions between bone, muscle and fat. Osteosarcopenic patients have very particular clinical, biochemical, diagnostic, and functional characteristics that could be identified in clinical practice. In addition, new therapies targeting both muscle and bone are being developed.

This book reviews current evidence on osteosarcopenia from a translational perspective.

From its pathophysiology, the book progresses into the clinical characteristics of patients with osteosarcopenia. In addition, the authors analyze preventive measures and therapeutic interventions that can benefit both muscle and bone simultaneously. A practical approach to osteosarcopenia in clinical practice is also provided. In addition, evidence on the Falls and Fractures Clinic as the most cost-effective model of care for osteosarcopenia is also presented.

Member publications

Tseng H, Girard D, Alexander KA, Millard SM, Torossian F, Anginot A, Fleming W, Gueguen J, Goriot ME, Clay D, Jose B, Nowlan B, Pettit AR, Salga M, Genet F, Le Bousse-Kerdiles MC, Banzet S, Levesque JP. Spinal cord injury reprograms muscle fibroadipogenic progenitors to form heterotopic bones within muscles. Bone Res 2022;10(22) doi: 10.1038/s41413-022-00188-y.

What is the background of the study?

Neurogenic heterotopic ossifications are pathological heterotopic bones that develop in peri-articular muscles following severe lesions to the central nervous system. It is a common and very incapacitating pathology in victims of traumatic brain and spinal cord injuries. There is no pharmacological treatment to prevent their development because the pathobiology of neurogenic heterotopic ossifications is poorly understood. We wanted to determine whether these heterotopic bones form by transdifferentiation of muscle stem cells or by some other mechanisms because if we want to identify drugs that stop the development of these ossifications, we want to be sure we target the correct cells. Skeletal muscles contain two very different populations of stem cells: satellite cells (SCs) which are actual muscle stem cells differentiating into myoblasts and myocytes, and fibro-adipogenic progenitors (FAPs) also called interstitial cells which are mesenchymal. To determine which of these two progenitor cell populations are responsible for the formation of neurogenic heterotopic ossifications, we performed genetic lineage tracing experiments in two mouse strains that specifically express the fluorescent protein ZsGreen in satellite cells or FAPs.

What did you find and what message do you want readers to take away?

We found that in both humans and mice the 'cell of origin' for neurogenic heterotopic ossification was the muscle mesenchymal FAPs. There was no transdifferentation of myogenic satellite cells. Interestingly, we found that spinal cord injury reprogramed FAPs in the damaged muscle. In healthy muscle regeneration, proliferating FAPs undergo apoptosis to avoid fibrosis and let satellite cells and myoblasts regenerate myofibers. We found that in the context of a spinal cord injury, FAPs do not undergo apoptosis but keep proliferating to form a fibrotic tissue that ultimately undergo osteogenic differentiation. Therefore, the spinal injury derails muscle regeneration by reprogramming FAPs in the injured muscles to an osteogenic program.

What is an application of your finding?

This new knowledge may provide new therapeutic opportunities to reduce neurogenic heterotopic ossification development in victims of severe central nervous system traumas. Clearly the pathways to target to prevent the development of neurogenic heterotopic ossifications are those that push muscle FAPs to survive, proliferate and differentiate into osteoblasts. For instance, the JAK/STAT3 pathway downstream on the oncostatin M receptor which highly expressed by mesenchymal cells is a potential target. We have found in our model that the clinical JAK1/2 inhibitor, ruxolitinib, reduces neurogenic heterotopic ossifications in our mouse model.

Did you face any challenges during the study?

The biggest challenge we faced was that breeding mice for our lineage tracing studies was time consuming. Due to COVID19 lockdowns in 2020 and 2021, we had to reduce breeding to its bare minimum. As a consequence, it took an additional 8 months to re-establish the colonies in sufficient numbers to conduct requested experiments for the revision. Very frustrating!

Member publications

Pagel CN, Kularathna PK, Sanaei R, Young ND, Hooper JD, Mackie EJ. Protease-activated receptor-2 dependent and independent responses of bone cells to prostate cancer cell secretory products. Prostate. 2022. doi: 10.1002/pros.24316.

What is the background of the study?

Bone is known to be a preferential site for prostate cancer metastases and prostate cancer cells are known to secrete a range of soluble factors including serine proteases, some of which have been shown to activate protease-activated receptor-2 (PAR2). The study examined the effects of medium conditioned by 4 prostate cancer cell lines on the behaviour of murine osteoclast precursor cells and osteoblasts in order to identify PAR2-dependent and PAR2-independent effects on proliferation, differentiation, and gene expression.

What did you find and what message do you want readers to take away?

The results of the study showed that medium conditioned by all the prostate cancer cell lines studied inhibited the differentiation of osteoclast precursor cells and medium conditioned by prostate cancer cell line (MDA-PCa-2b) that induces osteoblastic bone lesions *in vivo* increased osteoblastic differentiation in a PAR2-dependent manner. Another striking finding of the study was the PAR2-independent stimulation of osteoblast proliferation and the increased expression of genes associated with lysosomal function by medium conditioned by MDA-PCa-2b cells. The message we would like readers to take away is that prostate cancer cells that form osteogenic lesions are able to influence the behaviour of bone cells by both PAR2-dependent and -independent mechanisms, and that the effect of this is likely to be stimulation of osteoblast differentiation and modification of the bone microenvironment to favour survival and growth of prostate cancer cells.

What is an application of your finding?

A potential application for an understanding of how prostate cancer cells are able to influence and modify bone cell behaviour and the bone microenvironment would be in the design and application of therapeutic agents that block the pathways involved to study if they reduce or slow the metastasis of prostate cancer to bone.

Did you face any challenges during the study?

Probably not surprisingly the major challenge in completing the study was Covid-19 pandemic and the lockdowns that occurred in Melbourne.

Durongbhan P, Davey CE, Stok KS. SPHARM-PDM based image preprocessing pipeline for quantitative morphometric analysis (QMA) for in situ joint assessment in rabbit and rat models. Sci Rep. 2022. doi: 10.1038/s41598-021-04542-8.

What is the background of the study?

We have previously proposed a suite of whole-joint quantitative morphometric analysis measurements (QMA) and have demonstrated its reproducibility and sensitivity in assessing joint health in preclinical rat and rabbit models of osteoarthritis using micro-computed tomography (microCT). However, these measurements are sensitive to tibial alignment and appropriate volume of interest selection of the joint compartments; often a technically challenging and time-consuming manual task.

What did you find and what message do you want readers to take away?

In this study, we have developed a novel automatic, efficient, and model-invariant image processing pipeline to tackle these issues using spherical harmonic basis functions and

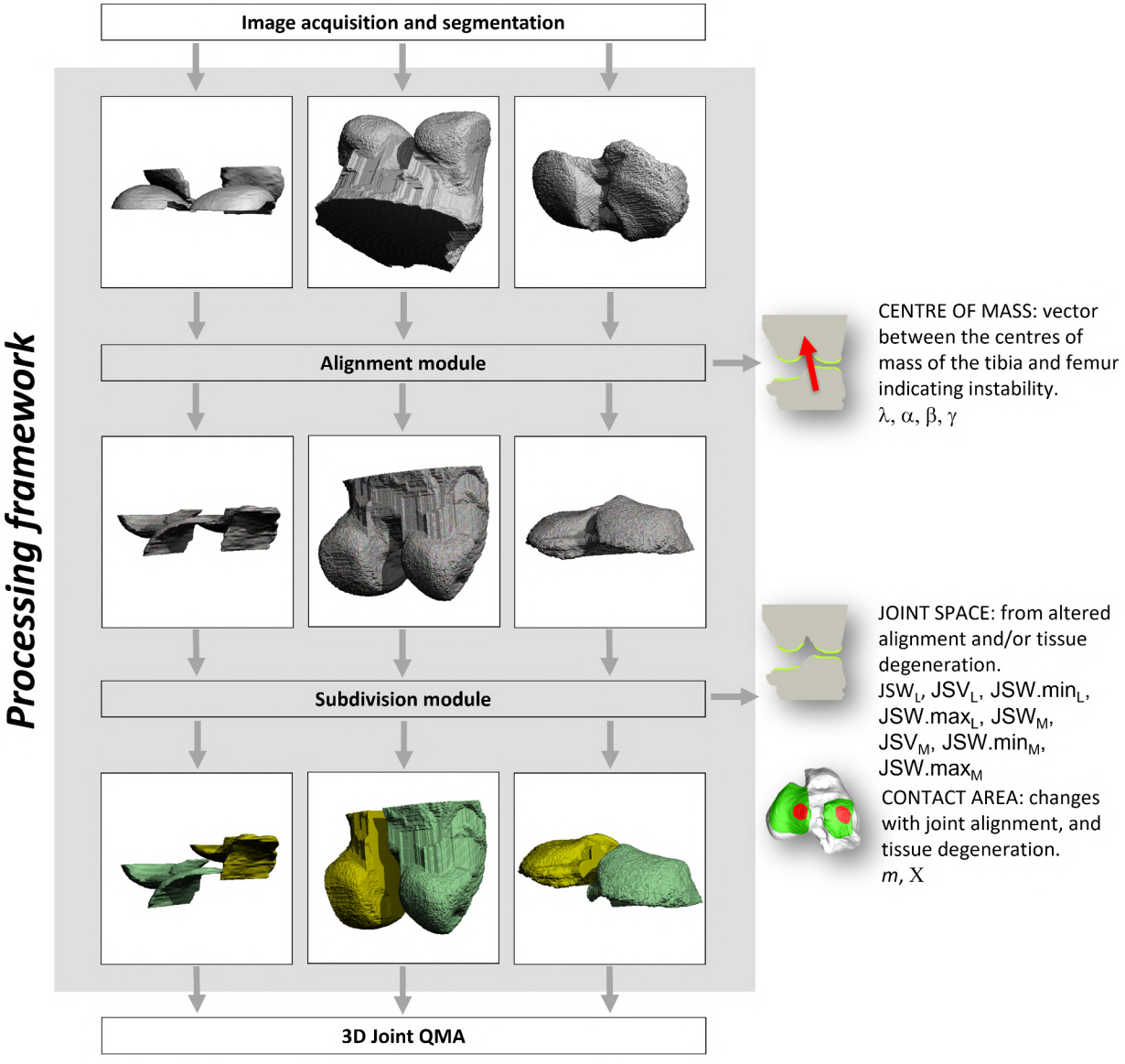
persistence homology. Repeated tibio-femoral joint scans of small (rat) and medium (rabbit) animals were processed using the workflow to demonstrate model invariance, and their joint QMA was evaluated. The measured QMA were found to have high reproducibility (intraclass correlation coefficient > 0.75) and less than 9.5% root-mean-squared error compared to manual processing while reducing the processing time and technical requirements.

What is an application of your finding?

The preprocessing framework allows for a rapid and reproducible quantitative morphometric analysis of the tibio-femoral joint. An application of this work in studies involving larger numbers of scans, e.g. longitudinal studies, would considerably cut the processing time and manpower needed to obtain reliable whole-joint QMA results.

Did you face any challenges during the study?

It was challenging to define tibial alignment at the beginning of the study. An initial definition was based on aligning the tibial anatomical axes to the principal z-axis of the Cartesian coordinate system. However, scanning the tibial shaft in high resolution for tibio-femoral alignment was not the most efficient allocation of data storage space and processing resources. Thus, an alternative definition has to be explored, resulting in the current preprocessing workflow.



Member publications

Pasco JA, Sui SX, West E, Anderson KB, Rufus-Membere P, Tembo MC, Hyde NK, Williams LJ, Liu ZS, Kotowicz MA. Fatty Liver Index and Skeletal Muscle Density. Calcif Tissue Int. 2022. doi: 10.1007/s00223-021-00939-9.

What is the background of the study?

Study participants were men assessed in the 15-year follow-up phase of the Geelong Osteoporosis Study. Accumulation of fat in the liver (hepatosteatosis) and infiltration of fat into skeletal muscle (myosteatosis) are both associated with impaired physiological function and poor health outcomes. Hepatosteatosis is a characteristic of non-alcoholic fatty liver disease and myosteatosis a characteristic of poor muscle quality in sarcopenia. We aimed to investigate the association between hepatosteatosis and myosteatosis, using the fatty liver index (FLI) and muscle density as indicators of fat accumulation in liver and muscle. The FLI was calculated from measured body mass, height, waist circumference, and circulating levels of triglycerides and gamma-glutamyltransferase; muscle density was measured by pQCT at the radius and tibia.

What did you find and what message do you want readers to take away?

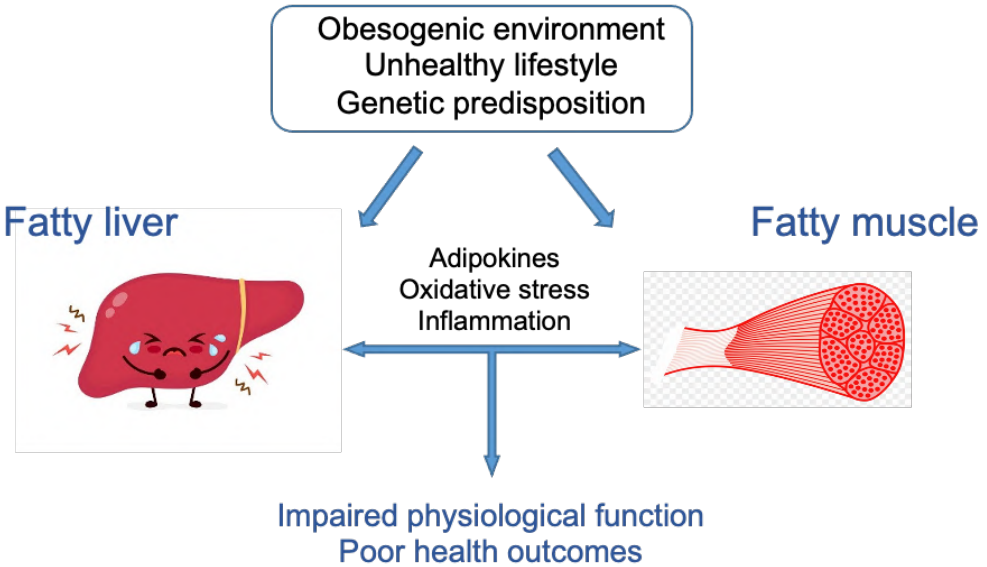
We hypothesised that the organs involved in glucose homeostasis, namely the liver and skeletal muscle, share the metabolic derangement associated with metabolic syndrome. The association between the FLI and muscle density supports this hypothesis and has implications with respect to muscle function, carbohydrate and fat metabolism associated with age-related changes in body composition in an obesogenic environment..

What is an application of your finding?

Therapies directed at hepatosteatosis may have implications in terms of improving muscle function through a modification of fatty infiltration into muscle.

Did you face any challenges during the study?

As the study is cross-sectional, we cannot infer causality. The FLI and muscle density are surrogate markers of hepatosteatosis and myosteatosis, and need to be confirmed using more direct measures



Member publications

Hauck D, Nery L, O'Connell R, Clifton-Bligh R, Mather A, Girgis CM. Bisphosphonates and bone mineral density in patients with end-stage kidney disease and renal transplants: A 15-year single-centre experience. Bone Rep. 2022. doi: 10.1016/j.bonr.2022.101178.

What is the background of the study?

People with chronic kidney disease (CKD) frequently experience fracture, and their outcomes following fracture are poorer than those without CKD. The aetiology of bone disease in CKD is multifactorial but includes osteoporosis along with complex biochemical factors, including hyperparathyroidism, loss of 1-alpha-hydroxylation of vitamin D and underlying CKD effects.

Bisphosphonates (BPs) are generally not indicated in people with an estimated glomerular filtration rate (eGFR) < 30 ml/min, due to lack of safety data, concerns about toxicity as BPs are renally excreted and potential for adynamic bone disease. Nevertheless, some patients particularly those with very high bone turnover may benefit from BP use.

There are sparse data on the use of BPs in CKD patients on haemodialysis but in general, data do support their use in those who receive a renal transplant, in whom an improvement in eGFR may restore secondary factors of poor bone health.

This study looks at retrospective data from a 15-year period, examining the use of BPs in CKD patients at Royal North Shore hospital, seeking to answer the following questions:

- Are BPs safe in CKD patients, including those on dialysis and following transplantation?
- Do BPs have quantifiable effects on bone density in CKD patients and is this determined by their transplant status?
- Does our 15-year experience generally support the use of BPs in CKD patients on dialysis, and renal transplants ?

What did you find and what message do you want readers to take away?

Although, we were hoping to examine fractures in our CKD patients, the number of fracture events in this cohort was not sufficient to compare rates of fracture between those receiving or not receiving BPs. Further, fractures often preceded the initiation of BPs and were the determining factor in the use of BPs in this population.

This real-world study showed no adverse effects of BP use on several biochemical parameters, including calcium, phosphate or alkaline phosphatase, in CKD patients receiving BPs. CKD patients with renal transplants had no decline in eGFR when prescribed BPs. From this perspective BPs were safe.

In multivariate regression analysis, bone density improved in response to BPs only in those who received a renal transplant. In patients on dialysis, bone density declined at a slower rate in those receiving BPs.

What is an application of your finding?

BPs appear safe in CKD patients on dialysis but clear demonstration of efficacy in this 15-year real world study was lacking. Consistent with what we already know, BP use is safe and effective in the post-transplant setting and should be routinely considered.

Did you face any challenges during the study?

Real world studies pose numerous challenges - confounding by a number of factors which we attempted to adjust for, incomplete data and a limited understanding of the significance of bone mineral density assessment by DXA in the CKD population.

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Calendar of Events and Webinars

NATIONAL

Australian and New Zealand Society for Sarcopenia and Frailty Research Annual Scientific Meeting
7 – 9 July 2022
Brisbane, Queensland
Abstracts due 1 May 2022
More information here

ANZBMS-MEPSA-ANZORS 2022
1-4 August 2022
Brisbane, Queensland
Abstracts due 3 June 2022
More information here

INTERNATIONAL

ENDO 2022
11-14 June
Atlanta, GA, USA
More information here

10th International Conference on Children's Bone Health
Abstracts due: 14 February 2022
2 – 5 July 2022
Dublin, Ireland
More information here

BRS Annual Scientific Meeting 2022
6 – 8 July 2022
Manchester, UK
Abstracts due 7 March 2022
More information here

International Society of Bone Morphometry Annual Meeting 2022
10 – 13 July 2022
Odense, Denmark
Late-Breaking abstracts due 20 May 2022
More information here

49th International Musculoskeletal Biology Workshop (ORS)
23 – 27 July 2022
Snowbird, Utah
More information here

20th International Congress of Endocrinology (ICE)
25-28 August 2022
Singapore
More information here

ORS ISFR 17th International Biennial Meeting
September 5 - 7, 2022
Edinburgh, Scotland
Abstracts due 20 May 2022
More information here

ASBMR 2022 Annual Meeting
September 9 - 12, 2022
Austin, TX, USA
More information here

ASBMR Webinar Series
Monthly webinars
More information here

ECTS Webinar Series
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IO - ASBMR Rare Bone Disease TeleECHO
Delivered virtually the first Thursday of each month 15:00 EST
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OI Foundation Osteogenesis Imperfecta TeleECHO clinic series
Delivered virtually the second Wednesday of each month 15:00 EST
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ANZBMS-MEPSA-ANZORS 2022

SAVE THE DATE 1st – 4th AUGUST, 2022

Gold Coast Convention & Exhibition Centre

Combined Scientific Meetings of the Australian and New Zealand Bone and Mineral Society, The Molecular and Experimental Pathology Society of Australasia & The Australian and New Zealand Orthopaedic Research Society.

Abstract Submission Deadline: **Friday 3rd June**
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