

LIFE AND WELLBEING SCIENCE

Linking our bones to genes and metabolism

MELISSA MARIE FORMOSA



Our bones are an amazing organ that together with muscles, tendons, ligaments and joints, form part of the musculoskeletal system. Besides providing support and structure to the human body, bones allow for movement and flexibility while protecting vital organs such as the brain, heart and lungs from injury. Without this rigid yet lightweight framework, the body would collapse on its own mass.

Bones are involved in the production of red blood cells needed for the transport of oxygen throughout the body. They also act as a storage centre of minerals, predominantly calcium, and participate in endocrine regulation. More importantly, bones are not static. Throughout life, this living tissue undergoes continuous remodelling cycles, whereby old bone is degraded and replaced by healthier bone, repairing any defects in the process, and releasing minerals, hormones and factors required for the proper functioning of the body. Fascinating, right?

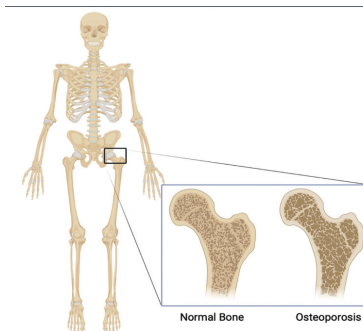
Despite its strength and efficient repair mechanisms, bones are still susceptible to disease and injury. One of the most common bone diseases is osteoporosis. The word 'osteoporosis' means porous bones, whereby

bones weaken as a result of decreased bone mass and strength becoming increasingly brittle. The disease often develops without any obvious symptoms and might only be discovered when a fracture occurs. For this reason, bone mineral density measurements are performed to diagnose osteoporosis, predict fracture risk and monitor treatment efficiency.

Worldwide, around 200 million people are affected by osteoporosis, with the most common and debilitating fragility fractures being those of the hip, spine and wrist. Fractures can be life-changing, causing chronic disabling pain and possibly loss of independence. This stresses the need for increased awareness and proactive measures to safeguard our bones.

Several risk factors increase the risk of osteoporosis, including poor diet (lack of calcium and vitamin D), smoking, high alcohol consumption, lack of physical activity, low body mass index, medication, coexisting diseases, and genetic factors, amongst others. A group of researchers at the University of Malta are seeking to identify the disease-causing genetic factors of osteoporosis as part of the project GeOM (unravelling the genetic determinants of familial osteoporosis in Malta) and MetaBone (metabolomics to identify novel biomarkers for bone disease).

The team, consisting of biomedical scientists, molecular biologists, endocrinologists and bioinformaticians will apply advanced technologies coupled with bioinformatics targeting the DNA, microRNAs (involved in the regulation of gene expression) and metabolites (by-products of metabolism).



Osteoporosis meaning 'porous bone' which causes bones to become weak, fragile and susceptible to fractures.

The research aims to increase the knowledge on bone biology and development of osteoporosis, providing invaluable information that can be translated into novel diagnostic biological markers and improved treatment options for osteoporosis.

Dr Melissa Marie Formosa is a senior lecturer at the Faculty of Health Sciences within the University of Malta and she leads the GeOM and MetaBone projects focused on Osteoporosis in Malta. Projects GeOM (REP-2020-011) and MetaBone (REP-2021-012) are financed by the Malta Council for Science & Technology, for and on behalf of the Foundation for Science and Technology, through the Research Excellence Programme.

MYTH DEBUNKED

'Can adults develop a food allergy?'

My dear Charlene used to love mushrooms, until she devoured two mushroom burgers a few Christmases ago. She quickly had difficulty breathing, turned red (and itchy) and required medical attention. When the onslaught was over, she professed her surprise as she had consumed mushrooms regularly during her childhood; soups, fried in garlic, risottos. So, she asks, can you develop a food allergy in your adulthood?

When you have a food allergy, your immune system mistakenly identifies components in your food as dangerous and attacks them with histamines. Your body may respond with symptoms like hives, itchy skin, vomiting, dizziness, swelling, and difficulty breathing. In the worst cases, sufferers can go into anaphylactic shock, which can be life-threatening if not treated immediately. The most common foods that cause food allergy in adults are peanuts, milk, fish, shellfish, and tree nuts (almonds, walnuts, pecans and cashews).

Many of us associate food allergies with childhood, but a recent 2018 study which surveyed 40,443 adults in the US reported that one in four adults suffering from food allergy develop a food allergy for the first time as an adult.

Even more worrisome is the fact that more than 51 per cent of adults with food allergies will at some point experience a severe reaction that requires medical care.

CONTRIBUTORS

EDWARD DUCA
JEAN-PAUL EBEJER
PETER BORG
DANIELLE MARTINE FARRUGIA
JOSEF BORG
CLAUDIA BORG

E-MAIL

SCI-SUNDAY@UM.EDU.MT

PHOTO OF THE WEEK



Niagara Falls without water. In June 1969, a joint American-Canadian commission decided to dewater them for five months to study the geological composition of the falls and forestall their potential destruction after a series of natural rockslides over the years.

SOUND BITES

• Cutting 20 per cent of sugar from packaged foods and 40 per cent from beverages could prevent 2.48 million cardiovascular disease events (such as strokes, heart attacks, cardiac arrests), 490,000 cardiovascular deaths, and 750,000 diabetes cases in the US over the lifetime of the adult population, according to a new study.

[HTTPS://WWW.SCIENCEDAILY.COM/RELEASES/2021/08/210827082431.HTM](https://www.sciencedaily.com/releases/2021/08/210827082431.htm)

• Climate change is not only a human problem; animals have to adapt to it as well. Some 'warm-blooded' animals are shape-shifting and getting larger beaks, legs, and ears to better regulate their body temperatures as the planet gets hotter:

[HTTPS://WWW.SCIENCEDAILY.COM/RELEASES/2021/09/210907110718.HTM](https://www.sciencedaily.com/releases/2021/09/210907110718.htm)

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DID YOU KNOW?

- Word of the day: HYPNOPOMPIA – the half-conscious state when you are just waking up.
- A school in southern California briefly banned Merriam Webster's Dictionary (10th edition) from classrooms after a parent complained a definition was too "sexually graphic".
- About 40 per cent of the ants in an ant colony are 'lazy' and spend most of their time just sitting around.
- The human brain runs on 20 watts of electricity – enough to power a dim light bulb.
- There are two types of tickling. The light, feather-like tickle that does not induce laughter is called knismesis, and the intensive, laughter-inducing one is called gargalesis.

For more trivia see: www.um.edu.mt/think