About CÚRAM

Backed by Research Ireland, CÚRAM is a world leading research centre with expertise in medical device technology. With eleven partner institutes and 32 industry partners, researchers at CÚRAM are designing the next generation of medical devices. CÚRAM's aim is to improve the quality of life for people suffering from chronic illnesses like diabetes, cardiovascular disease and Parkinson's disease.

In support of Research Ireland's goal of having the most engaged and scientifically informed public, CÚRAM has developed an innovative Education and Public Engagement programme (EPE) called 'Breaking Barriers'. CÚRAM's EPE programme aims to raise awareness of Irish research and increase understanding of preventative behaviours that can reduce the incidence of chronic illnesses.

Photo: Prof. Laoise McNamara (left) and Hollie Allison (right)

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Further resources such as films, flyers and lesson plan booklets are free to download at: https://curamdevices.ie/public-engagement/teachers

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Strength in Science

The Effects of Exercise on Your Bones

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www.curamdevices.ie

Taighde Éireann Research Ireland

What is The 'Strength in Science' Project?

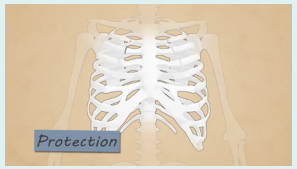
Physical inactivity is one of the leading risk factors for poor health and is now identified by the World Health Organization (WHO) as the fourth leading risk factor for global mortality.

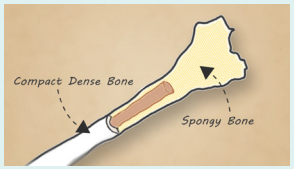
In Ireland, physical inactivity is thought to be responsible for 8.8% of the burden of disease from coronary artery disease, and 10.9% of type 2 diabetes. The 'Strength in Science' project aims to develop cross-curricular resources that are linked with both Science and Physical Education curricula that will increase students' interest in both learning science and participating in exercise.

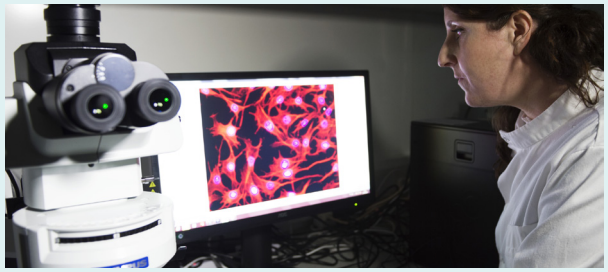
Photo: Prof. Laoise McNamara

How Do Impact Exercises Affect Your Bones?

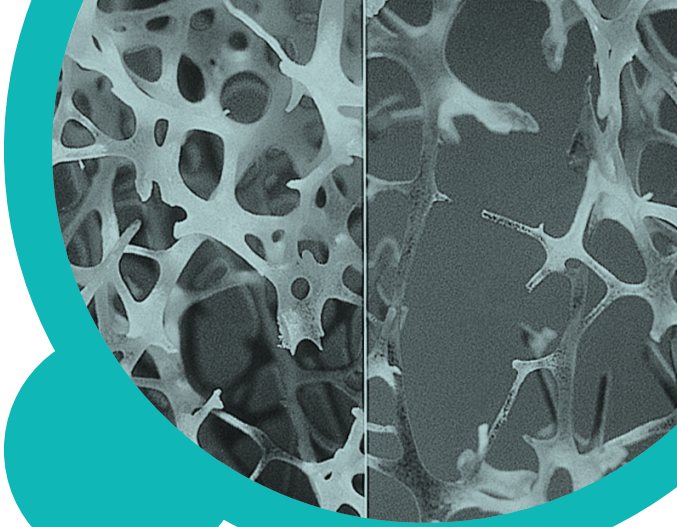
There are three main types of bone cells which constantly repair and reshape your bones as your body needs it. Osteoclasts remove old or damaged bone, and osteoblasts make new bone in its place. Osteocytes act as "sensors" to monitor the mechanical forces that occur due to exercise, and on this basis, control the activity of the osteoclasts and osteoblasts. As you get older, your osteoclasts start to break down the bones more than the osteoblasts build them up. If the bones are broken down too much the result can be osteoporosis.







Exercises that apply forces against your bones stimulate bone cells to build up your bone density. Most people obtain what is called their peak bone mass when they are between 16-25 years old. This is the maximum amount of bone a person has during their life. If you can build your peak bone mass to be as strong as possible in your early teens, it will prevent you from having too much bone loss later in life. A good way to build your peak bone mass is with exercises that exert forces on your bones such as walking, running or jumping!



How Are Irish Researchers Developing Treatments for Osteoporosis?

Prof. Laoise McNamara and her research group at University of Galway are studying the ability of bone cells to sense and respond to forces. In particular, they are testing if osteocytes lose their ability to sense their mechanical environment during osteoporosis. This research is helping to develop new approaches for treating osteoporosis.

Her research group designs experiments to simulate forces that bone cells feel using a special machine called a bioreactor. Osteocytes are placed in a bioreactor which recreates forces that bones encounter. This allows her lab to measure the ability of osteocytes to sense and respond to their mechanical environment.