

**Rehabweek 2022**  
**Erasmus MC labtours**  
Friday, 29 July 2022

## **Introduction Erasmus MC**

### **Erasmus University Medical Centre**

Welcome to the Erasmus University Medical Centre. We dare to step forward in research, education and healthcare and we are committed to a healthy population and excellence in healthcare through research and education.

The Erasmus University Medical Centre is the largest of the eight university medical centres in the Netherlands. The Erasmus University Medical Centre, Erasmus University's Med School and its University Hospitals are integrated into one campus and led by one executive board.



In 1968 our Medical Faculty including the Research & Education centre was opened, the Sophia Children's Hospital opened in 1994 its doors and in 2009 we started building the New Erasmus MC. The new Education Centre opened in 2012 with 40 teaching & lecture rooms for up to 6,000 students and was awarded a number of architectural prizes shortly after. Following years of preparations our new hospital was opened by our King in May 2018. Natural light, space, and clarity are the keywords for our new building in which patients, together with us, will have more control over their stay and treatment.

**Education, Research & Innovation:** Erasmus MC offers BSc, MSc, PhD and Residency programs to train the next generation of medical practitioners and researchers. We are one of the largest European medical schools, with ~2,500 medical students and 220-250 PhD graduations per year. Our overall research aim is to translate bench discoveries to bedside applications and cover all fields from preclinical via clinical to health sciences research. The worldwide impact of our research papers in preclinical, clinical & health sciences is 2,35 which is in the top of the world wide ranking list, just below Harvard (2,37).



For a sneak preview: *Erasmus MC: The Movie* <https://youtu.be/LtjpwmgkJK>

We invite you to register and join one of the Rehabweek 2022 Tours on Friday 29 July 2022.

## **Tour option #2:**

### **Connector tissue repair lab (Orthopaedics) & VR in healthcare and education**

**Times:** 09.30 – 12.00 hrs & 13.30 – 16.00 hrs

**Duration:** each tour 1 hour, 15 min coffee break between the tours

**Number of participants:** 20 persons (to be split in 2 groups of 10)

The following tours will take place in the Research tower of the Erasmus University Medical Centre, all visitors will need to be registered on forehand to gain access to this building, please have your ID available upon entry.

#### **Connective Tissue Repair Lab (part 1)**

In a multidisciplinary group with researchers from the departments of Orthopaedics & Sports Medicine & Otorhinolaryngology & Oral and Maxillofacial Surgery, we investigate cellular processes in cartilage and bone repair.

We **aim** to understand what limits connective tissue repair and search for methods to improve it. The ultimate goal is to stimulate the body's intrinsic repair capacity or to tissue engineer cartilage or bone outside the body, that can be used for transplantation. We investigate how to control the formation of good quality cartilage and bone (which cells, which stimuli, which biomaterials) and the role of the immune system on tissue repair.

We **focus** on cellular processes in cell differentiation (in particular stem cells) and inflammation. Our translational research is performed from a cell biological view point using principles of developmental biology, pathophysiology and tissue engineering. We use several cell- and tissue culture models, animal and clinical samples to study disease mechanisms as well as to develop and test new treatment approaches. We focus in particular on culture models that mimic the situation as good as possible by combining tissues.

The tour starts with a welcome and general introduction to cartilage and bone tissue engineering. Selected projects on cartilage and bone defect healing and tissue engineering approaches at the connective tissue repair lab will give the participants an overall view on what we can study *in vitro* as well as *in vivo* and where are the limitations (Andrea Schwab, photo).

During the labtour you have the chance to learn in more detail on the following topics:

- *In vitro* cell culture and cell differentiation for cartilage and bone tissue engineering (Mike Broeders – Gleitz)
- Biomaterials for tissue engineering and regenerative medicine (Michele Fenu)
- *In vitro* and *in vivo* models to evaluate tissue engineering strategies for bone and cartilage repair (Andrea Lolli)

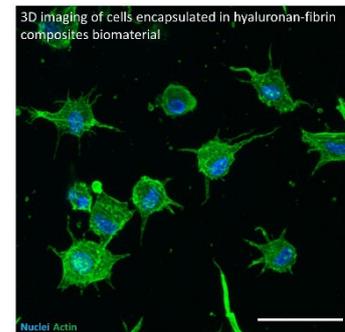
#### **In vitro cell culture and cell differentiation for cartilage and bone tissue engineering**

The participants will be introduced to two types of stem cells we use in our research: mesenchymal stem cells and induced pluripotent stem cells. These cells can self-renew, differentiate and functionally develop into different cell types when cultured in the “right” conditions. Participants will learn about the important characteristics of these stem cells, how we isolate/generate relevant cell types for cartilage and bone, and about their potential for application in cartilage and bone research.

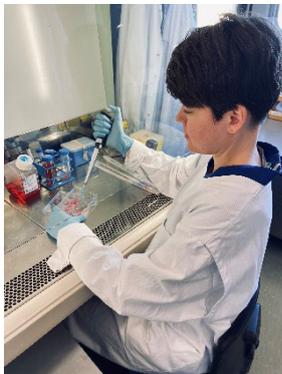
### Biomaterials for tissue engineering and regenerative medicine

The group will be introduced to the concepts of biomaterials being used as supporting structures in defect treatment. The group will learn what are biomaterials and why we use hydrogels, a special class of biomaterials for tissue engineering approaches. Biomaterials can stimulate cells to differentiate and deposit matrix. Therefore, it is also of interest for us to visualize cells embedded into a hydrogel and develop tools to evaluate cell-biomaterial interaction.

©Image taken by M.Fenu



### In vitro and in vivo models to evaluate novel tissue engineering strategies for bone and cartilage repair



The participants will learn about culture methods to engineer cartilaginous and mineralized/bone tissue *in vitro* and *in vivo*. Further the group will be introduced to an osteochondral model that can be used to simulate cartilage/bone defects and evaluate novel biomaterials or molecules for their capability to stimulate repair. These platforms are of particular interest for *in vitro* models since they allow to test new treatment approaches in a more complex 3-dimensional environment than normal cell culture in monolayers.

After the labtour we will have a discussion demonstrating osteochondral tissue formation using our models.

### ***VR in healthcare and education (part 2)***

VR applications are used on a daily basis within the Erasmus MC for improving healthcare and also in our education for students and experienced surgeons and nurse specialists.

Within the Sophia Children's Hospital a virtual reality exposure tool was developed and is being researched on its effectiveness on anxiety and pain reduction in children undergoing elective day care surgery. By preparing children for anaesthesia and surgery with an innovative virtual reality exposure tool, instead of distracting them, we hope to improve clinical and psychological outcomes.

The Thorax Centre of Erasmus MC also uses VR goggles for the preparation of congenital heart defect operations. Here the CT scan is converted into a 3D image. Especially with children's hearts it proves useful, the surgeons see things in VR that they could otherwise not visualize so well. Possibilities of VR within thoracic surgery are endless. A team is working on a simulation for operating the heart-lung machine for perfusionists in training. The use of VR images to prepare for lung-saving surgery for lung cancer has also taken off. A multicentre study into its effectiveness will start soon. VR software was also developed to practice resuscitation after open-heart surgery and is part of the induction period for assistant physicians in thoracic surgery.



During COVID a number of VR applications were introduced. In a number of hospitals in Rotterdam, including the Erasmus MC, VR was used in aftercare to help ex-covid patients and their families understand what

happened during the covid-IC admission. Together with the city of Rotterdam the Erasmus MC developed a VR-app with instructional videos for nurses who start working at a COVID unit from another discipline. This way, nurses can quickly gain experience with essential procedures on corona patients. The app was available free of charge to all nurses in the Netherlands.

This program will introduce you to a number of VR applications used in our University Medical Centre.

***Morning program:***

09.30 u            **Arrival** at the Erasmus MC (exact location TBC)  
Group to be split in 2 smaller groups of 10 persons each

09.45 u            **Start** of the first tour

10.45 u            **Coffee break**

11.00 u            **Start** of the second tour

12.00 u            **End of visit**

***Afternoon program:***

13.30 u            **Arrival** at the Erasmus MC (exact location TBC)  
Group to be split in 2 smaller groups of 10 persons each

13.45 u            **Start** of the first tour

14.45 u            **Coffee break**

15.00 u            **Start** of the second tour

16.00 u            **End of visit**