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MEDICA 2018: The OsteoSys project

Individualized therapy for patients with osteoporosis

More than six million people in Germany suffer from osteoporosis. The disease is characterized by chronic bone resorption, leading to frequent fractures as a consequence of the bone loss. In many cases, treating the condition with drugs does not work well, and people with osteoporosis often suffer from cardiovascular diseases at the same time. Research partners in the OsteoSys project are working toward customized, personalized treatment. Researchers at the Fraunhofer Institute for Applied Information Technology FIT are contributing, among other things, their development of a sample management system to the project. This system will be presented for the first time at the MEDICA 2018 trade fair in Düsseldorf.

Osteoporosis sufferers have to cope with bone loss, leading to frequent fractures and unstable, fragile bones. The risk of osteoporosis increases with age. Progressive loss of bone mass leads to complicated fractures, which often results in patients needing long-term care. Health insurance companies project this will cost billions as demographic change takes hold. In Germany, more than six million people already suffer from the widely prevalent disease – most particularly women, who make up 80 percent of the total.

Focusing on the interaction between bone metabolism and the cardiovascular system

Drug therapies are intended to inhibit bone depletion, but patients often do not respond to treatment. Studies also indicate a link between osteoporosis and cardiovascular diseases. Furthermore the primary therapy for loss of bone mass is to increase calcium intake, the mineral is said to increase the stability of the bones. But raising the dosage of the mineral can lead to calcium deposits in veins, leading potentially to an increased risk of vascular occlusion and heart attack. The OsteoSys project (see box "Overview of the OsteoSys project") therefore aims to investigate the interactions between cardiovascular diseases, inflammation, and bone metabolism, with a view to providing patients with personalized therapy and minimizing drug-related side effects.

Whether genetic or epigenetic (the influence of the environment on genes), the scientists take factors at the level of cells or organs into account to develop biomarkers and algorithms that predict adverse effects and enable patients to receive individualized treatment.

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The role of the Fraunhofer FIT researchers in Sankt Augustin is to integrate data and create algorithms and models for the project. They are also establishing a sample management system and biobank management tools. "The software we develop to manage samples and laboratory procedures supports physicians in handling samples. Efficient data management supports our partners in their research work through the secure and traceable exchange of data, samples, and information," says Carina Goretzky, a scientist at Fraunhofer FIT.

The sample management software platform will be on display at the Fraunhofer booth (Hall 10, Booth G05/H04) at the MEDICA trade fair in Düsseldorf from November 12 to 15.

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Overview of the OsteoSys project

Duration: Mid-2016 to mid-2019

Tasks:

- Develop a sample and database management system and an extension tool for biobank administration
- Work on new ultrasound diagnostic tools to non-invasively determine bone fracture risk
- Establish a standard procedure to analyze antigen-specific T cells
- Identify specific markers and algorithms to predict adverse effects

Project partners

- Beckman Coulter
- Fraunhofer Institute for Applied Information Technology FIT
- Marien Hospital Herne (coordinator)
- Ruhr-Universität Bochum
- St. Anna Hospital Herne
- Essen University Hospital

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In the OsteoSys project, researchers are developing a system to simplify the handling and administration of samples. © Shutterstock | Picture in color and printing quality: www.fraunhofer.de/en/press

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