

PRESS RELEASE

PRESS RELEASE

No. 03 | 2020

February 26, 2020 || Page 1 | 4

Detect cell changes faster

(Dresden, 26.02.2020) Scientists are researching how changes in cell cultures of cartilage and soft tissue can be detected in a cooperative research project of the University of Applied Sciences Zwickau (WHZ), the Fraunhofer Application Center for Surface Technologies and Optical Metrology (AZOM) and the Research Institute of Leather and Plastic Sheets (FILK).

The research project focuses on cell monitoring and the early detection of cell changes or damages. This is particularly important when testing the tolerance of new drugs or cosmetics. In conventional tests, cell health is detected by means of biochemical tests, which determine, for example, the metabolic cell activities. The effect can often only be seen after several days. Transitional states and information on when exactly the first alteration occurs are not yet recorded. Thus, the efficacy can only be assessed by the final result. In the case, for example, that a drug causes a particular reaction in the cells at an early point in time, it is not possible to detect the reaction at the end of the experiment.

New optical measuring method developed

Here, the collaborative research project comes into play. For the investigation of cell vitality, especially in cartilage and soft tissue, the Leupold-Institute for Applied Natural Sciences of the WHZ together with Fraunhofer AZOM developed a new optical measuring method, which allows an online cell measurement. The principle relies on a "white light laser", also known as a supercontinuum source. With intense, ultra-short pulses, it facilitates a non-destructive analysis of cell cultures. The experiments employ primary cells isolated from tissue. These are cultivated in the FILK biological laboratory and placed in different states, e.g. by toxin additions. The scientists are developing an automated optical measurement procedure for evaluating and recording the material change as well as the size of cell components. Using new data analysis methods, the cell states are now recorded time resolved with high sensitivity. The technology facilitates the analysis of thick, deeper cell structures, an important aspect for investigations on three-dimensional cell cultures and tissues.

Head of Corporate Communications

Markus Forytta | Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS | Phone +49 351 83391-3614 | Winterbergstraße 28 | 01277 Dresden | www.iws.fraunhofer.de | markus.forytta@iws.fraunhofer.de

Head of Fraunhofer AZOM

Prof. Dr. Peter Hartmann | Fraunhofer-Anwendungszentrum für Optische Messtechnik und Oberflächentechnologien AZOM | Phone +49 375 536-1538 | Keplerstraße 2 | 08056 Zwickau | www.iws.fraunhofer.de | peter.hartmann@iws.fraunhofer.de

Background

In research, cells are studied to identify disease mechanisms. Individual cells or their components are analyzed by means of white laser light and differentiated according to structural features. Changes in human cells can be caused by environmental influences such as toxins or harmful substances, the administration of drugs or the use of cosmetics. Early detection of possible cell damage is particularly beneficial for product tests in the pharmaceutical and cosmetics industries.

PRESS RELEASE

No. 03 | 2020

February 26, 2020 || Page 2 | 4

About the Application Center for Surface Technologies and Optical Metrology AZOM

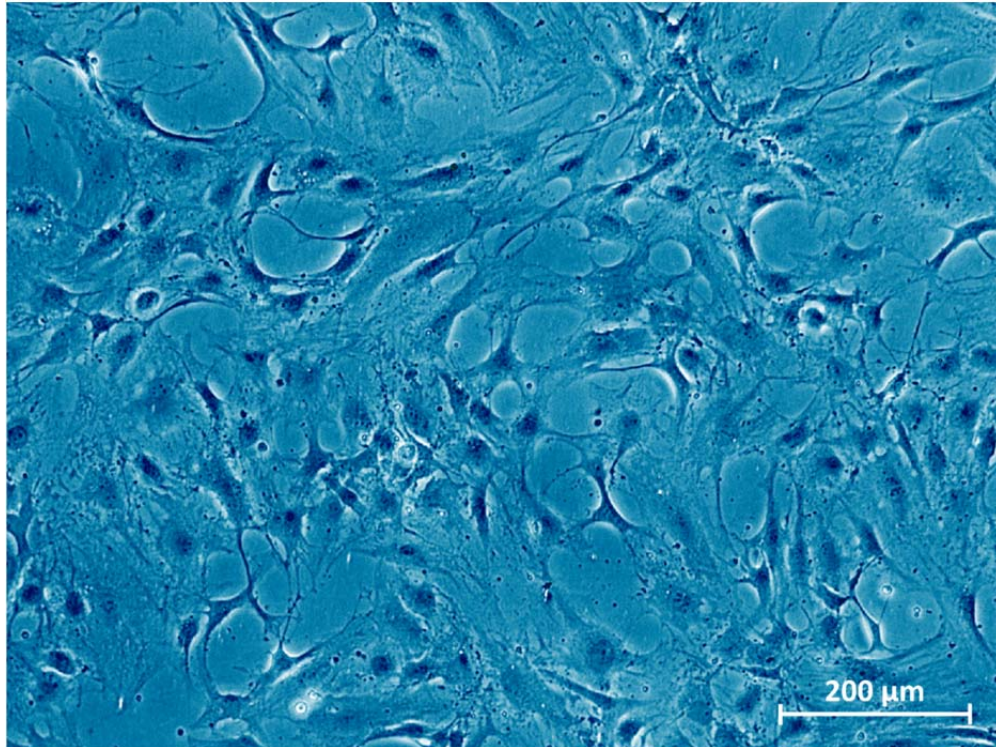
The Fraunhofer Institute for Material and Beam Technology IWS operates the Fraunhofer Application Center for Optical Metrology and Surface Technologies (AZOM) in cooperation with the University of Applied Sciences Zwickau (WHZ). The scientists are researching and developing the latest approaches in optical metrology, image processing, process control and surface characterization. They strive to transfer research results quickly and directly into application-specific solutions for industrial processes. AZOM provides an interface between applied science and industry in the fields of medical technology, automotive engineering, mechanical engineering and semiconductor technology.

About the University of Applied Sciences Zwickau (WHZ)

The West Saxon University of Applied Sciences Zwickau concentrates its research on technology, business and quality of life. About 3 800 students from almost 50 countries are enrolled in eight faculties with about 50 courses of study. The WHZ is particularly successful in applied research. Projects such as the development of a production service data glasses application, the manufacture of capacitive energy storage devices with extremely high charge carrier density or the project to design an automated plug-in system for electromobile local public transport combine 120 years of tradition in engineering education with the requirements of the future.

The **Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS Dresden** stands for innovations in laser and surface technology. As an institute of the Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e. V., IWS offers one stop solutions ranging from the development of new processes to implementation into production up to application-oriented support. The fields of systems technology and process simulation complement the core competencies. The business fields of Fraunhofer IWS include PVD and nanotechnology, chemical surface technology, thermal surface technology, generation and printing, joining, laser ablation and separation as well as microtechnology. The competence field of material characterization and testing supports the research activities.

At Westsächsische Hochschule Zwickau, IWS runs the Fraunhofer Application Center for Optical Metrology and Surface Technologies AZOM. The Fraunhofer project group at the Dortmunder OberflächenCentrum DOC® is also integrated into the Dresden Institute. The main cooperation partners in the USA include the Center for Coatings and Diamond Technologies (CCD) at Michigan State University in East Lansing and the Center for Laser Applications (CLA) in Plymouth, Michigan. Fraunhofer IWS employs around 450 people at its headquarters in Dresden.



PRESS RELEASE

No. 03 | 2020

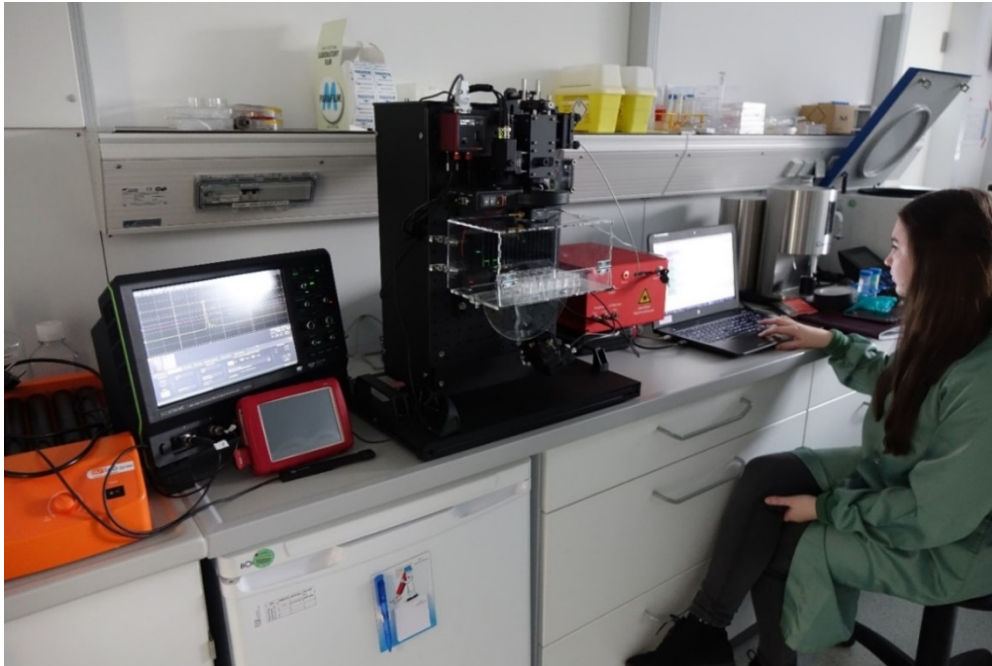
February 26, 2020 || Page 3 | 4

Microscope image of healthy cartilage cells.

© Fraunhofer IWS Dresden

The **Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS Dresden** stands for innovations in laser and surface technology. As an institute of the Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e. V., IWS offers one stop solutions ranging from the development of new processes to implementation into production up to application-oriented support. The fields of systems technology and process simulation complement the core competencies. The business fields of Fraunhofer IWS include PVD and nanotechnology, chemical surface technology, thermal surface technology, generation and printing, joining, laser ablation and separation as well as microtechnology. The competence field of material characterization and testing supports the research activities.

At Westsächsische Hochschule Zwickau, IWS runs the Fraunhofer Application Center for Optical Metrology and Surface Technologies AZOM. The Fraunhofer project group at the Dortmunder OberflächenCentrum DOC® is also integrated into the Dresden Institute. The main cooperation partners in the USA include the Center for Coatings and Diamond Technologies (CCD) at Michigan State University in East Lansing and the Center for Laser Applications (CLA) in Plymouth, Michigan. Fraunhofer IWS employs around 450 people at its headquarters in Dresden.



PRESS RELEASE

No. 03 | 2020

February 26, 2020 || Page 4 | 4

Mona Seemann, research assistant at Fraunhofer AZOM, working in the cell biology laboratory of the FILK Freiberg, investigating cartilage cell cultures.

© Fraunhofer IWS Dresden

The **Fraunhofer-Institut für Werkstoff- und Strahltechnik IWS Dresden** stands for innovations in laser and surface technology. As an institute of the Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e. V., IWS offers one stop solutions ranging from the development of new processes to implementation into production up to application-oriented support. The fields of systems technology and process simulation complement the core competencies. The business fields of Fraunhofer IWS include PVD and nanotechnology, chemical surface technology, thermal surface technology, generation and printing, joining, laser ablation and separation as well as microtechnology. The competence field of material characterization and testing supports the research activities.

At Westsächsische Hochschule Zwickau, IWS runs the Fraunhofer Application Center for Optical Metrology and Surface Technologies AZOM. The Fraunhofer project group at the Dortmunder OberflächenCentrum DOC® is also integrated into the Dresden Institute. The main cooperation partners in the USA include the Center for Coatings and Diamond Technologies (CCD) at Michigan State University in East Lansing and the Center for Laser Applications (CLA) in Plymouth, Michigan. Fraunhofer IWS employs around 450 people at its headquarters in Dresden.