

**Institute for  
Chemistry and Bioanalytics**

# Institute for Chemistry and Bioanalytics



## **At the Institute of Chemistry and Bioanalytics (ICB) we characterize & produce new substances, and develop & apply test systems**

Our research is interdisciplinary, driving innovation at the intersection of chemistry, biology, medicine and pharmaceutical technology. In chemistry, we produce and characterize new substances and materials using synthetic chemistry, analytics, process engineering, as well as surface- and nanotechnology. In bioanalytics, we develop patient-friendly diagnostic test systems for which we have a wide range of molecular biology, protein biochemistry and cell cultivation technologies at our disposal. For drug development, we design in vitro tests and cellular 3D test systems to mimic organ function, which can partially replace animal testing.

Through modern methods we design and develop intelligent formulations for the precise delivery of drugs and biologicals in therapeutic medical applications.

Data science underlies many of our projects and opens up new possibilities for increased efficiency. Our organization is based on teamwork between research groups with a high degree of individual responsibility. Our specialist staff have years of experience in industry, which they apply in both their research and their teaching.

## Interdisciplinary fields

We have highly focused areas of expertise, allowing us to work on applied R&D projects in a wide range of interdisciplinary fields in life sciences.

### Chemistry, natural substances and analytics



#### **Organic & Bioorganic Chemistry**

Preparation, modification and analysis of low molecular weight and bioorganic compounds in the milligram to gram range.



#### **Instrumental analytics**

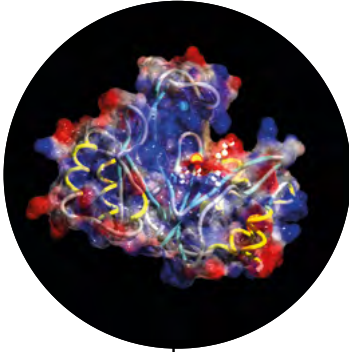
State-of-the-art analytical methods allow the identification and quantification of molecules at the lowest concentrations.

### Chemical engineering

#### **Reaction technology, process development and safety**

We use cutting edge technology and modelling software to develop, pilot and optimize chemical processes for the life sciences sector, from concept to finished product. Safety, efficiency and sustainability are at the heart of our work.





### **Proteins and enzymes**

These are central to the functioning of cells; protein engineering allows development for technical applications.



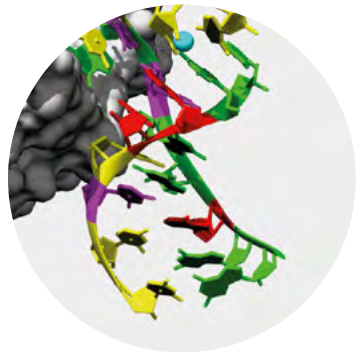
### **Bioinformatics**

An organism's genetic information is found in the nucleotide sequence. Our work involves the analysis and prediction of changes in this genetic material and the consequences for disease progression and therapies.



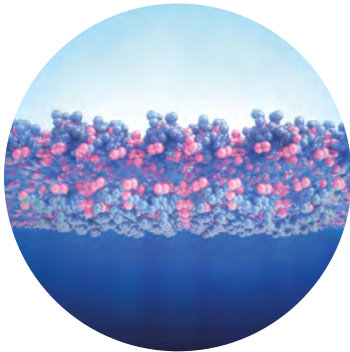
### **Cell Biology and in vitro Toxicology**

We apply complex cell cultures, molecular markers and tissue engineering to the study of disease and to the testing of efficacy and toxicity.



### **In vitro diagnostics**

We develop highly precise but easy-to-use test systems for in vitro diagnostics. These are used for early detection and diagnosis of diseases, enabling more effective individualized treatment of patients.



### **Nanotechnology, Materials and Biointerfaces**

In our state-of-the-art laboratories particles, materials and surfaces are developed, modified, characterized to address a wide range of problems.

### Data Science in Life Sciences



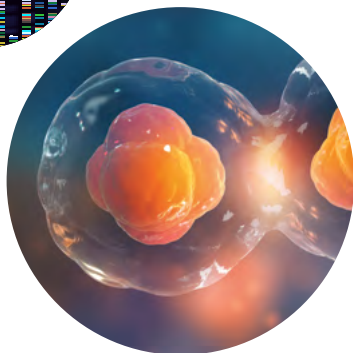
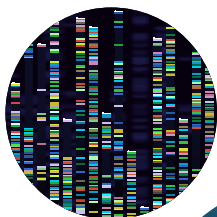
### **Data Science in Life Sciences**

We develop and use digital tools to better understand and optimize processes and to accelerate innovation in research, development and medicine.

# Expertise and infrastructure

## Chemistry and Materials

- Synthesis of biologically active molecules and oligomers at laboratory scale synthesis, including pressure reactors, peptide synthesizers, microwave synthesis, microreactors
- Nanomaterials and surfaces, supramolecular chemistry
- Process technology 100-litre reactor, scale-down reactor, continuous-flow reactor, rectification column, pervaporation/vapor permeation (10 – 20 l/h), polymer and ceramic membrane, etc.
- Piloting, flow chemistry, membranes, reaction calorimetry and DSC
- Laboratory automation/robotics

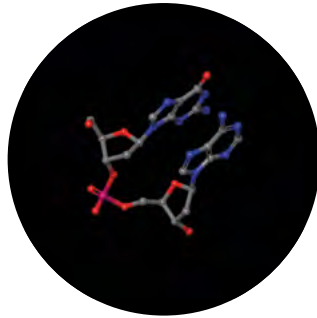


## Analytics and Microscopy

- Instrumental analytics, structure elucidation, proteomics, metabolomics
- Digitization, Data Science and Machine Learning
- Spectroscopy (IR, UV-VIS, fluorescence, CD)
- High-resolution chromatography coupled to high-resolution mass spectrometry (UHPLC-QTOF MS/MS)
- 400 MHz NMR system with Prodigy probe head and SampleJet
- Calorimetry (isothermal and scanning)
- Bio-specific interaction analysis
- Electron microscopy (transmission/scanning)
- X-ray microscopy
- Atomic force microscopy
- Confocal fluorescence microscopy
- 2D-3D imaging spectroscopy
- Laboratory automation/robotics

## Cell, Molecular and Protein Biology

- Production, modification, characterization and optimization of proteins
- Cell biology and in vitro toxicology
- In vitro diagnostics
- DNA and RNA diagnostics
- Mutagenesis
- Surface Plasmon Resonance, Bio-Layer Interferometry
- Bioprinting platform
- 3D and Microphysiological Systems (MPS)
- Pipetting robots, colony pickers
- Thermocycler
- Gel electrophoresis
- Laboratory Automation
- Data Science
- Data Science incl. Bioinformatics



## Services

- Measurement of 1D and 2D NMR spectra for structure elucidation and quantitative purity determination
- An extensive range of analytical methods
- Literature and patent research



## Continuing education

[www.fhnw.ch/lifesciences/continuing-education](http://www.fhnw.ch/lifesciences/continuing-education)



# FHNW School of Life Sciences



At the new FHNW Campus in the heart of Europe's largest life sciences region, the School of Life Sciences does cutting-edge research for a better future. State-of-the-art infrastructure and equipment, including a new Process Technology Centre, enable our researchers and industrial partners to work together to develop new technologies and products from concept to market.

The campus has an ideal location close to public transport links and with a view over Basel. In addition to the School of Life Sciences, the new FHNW Campus MuttENZ houses the Schools of Architecture, Civil Engineering and Geomatics, Education, Social Work and Engineering, where around 4 500 people study and work.



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For further information about  
our research fields:

[www.fhnw.ch/icb-en](http://www.fhnw.ch/icb-en)

The FHNW incorporates nine facilities:

- FHNW School of Applied Psychology
- FHNW School of Architecture, Civil Engineering and Geomatics
- FHNW Academy of Art and Design
- **FHNW School of Life Sciences**
- FHNW Academy of Music
- FHNW School of Education
- FHNW School of Social Work
- FHNW School of Engineering
- FHNW School of Business

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