

CENTRE FOR OMIC SCIENCES ACCESS PROCEDURE



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1. CENTER FOR OMIC SCIENCES PRESENTATION

The Centre for Omic Sciences (COS) is a unique, large-scale scientific and technology facility equipped with cutting-edge technologies for metabolomics and supporting studies in proteomics, transcriptomics, genomics, microscopy, sample preparation and biomarker validation. COS provides supportive services for companies and academia. Located at the Centre for RDI on Nutrition and Health (Reus-Spain), COS offers scientific advice and support for services that range from experimental design, omic assessment using COS facilities, and in-vitro and in-vivo models.

Our mission is to generate, deliver and transmit our research in omic fields to companies and the scientific community by providing competitive technology applications in biology, biochemistry, nutrition, biotechnology, genetics, medicine, pharma and chemistry to increase their market competitiveness or scientific expertise, respectively.

The COS vision is to become a hub facility in omic sciences based on a metabolomics approach and to become a reference centre in Europe for omic science research and services.

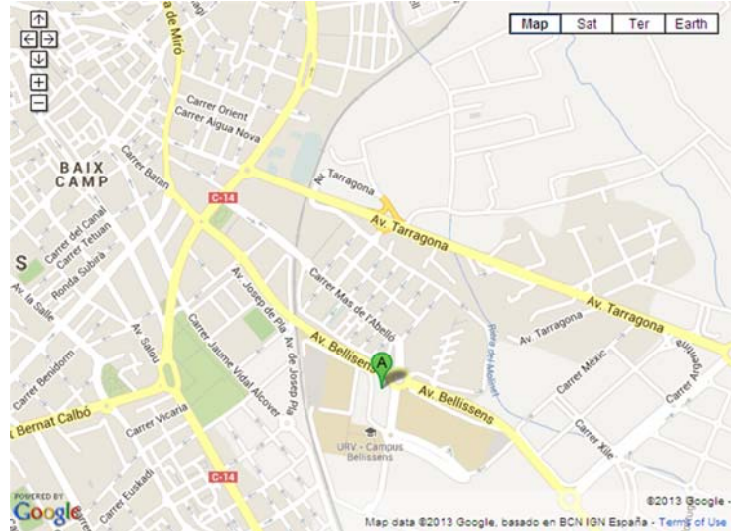
COS has a specific research infrastructure that reinforces regional competitiveness in agro-food, biotechnology, pharmaceutical, health care and related sectors.

- ❖ **BASIC OPERATION RULES**
- ❖ **Access to building and laboratories**

COS is located at the Centre of RDI in Nutrition and Health, in the Bellisens Campus, in Spain.

Centre for Omic Sciences

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43204-Reus (Spain)
Phone: (+34) 977.300.431
info@omicscentre.com
The coordinates for the GPS are:
41.146167, 1.120499



- ❖ **Schedule**

COS is opened to clients and users from 9:00 to 18:00 on Monday to Friday. Apart from this general schedule, building is opened from 8:00 to 20:00 from Monday to Thursday, and from 8:00 to 18:00 on Friday, when users can access to the facilities, previous accord with the technician in charge.

❖ **Contacts**

COS General info at + 34 977 300 431 or info@omicscentre.com

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❖ Services and Technical Instrumentation

Metabolomics

Metabolomics is focused on profiling and quantification of small, naturally occurring compounds that collectively constitute the so-called metabolome. Small molecules serve as direct signatures of biochemical activity and therefore are easier to correlate with phenotype. Offered services are:

- Metabolome profiling or global metabolomics.
- Lipidomics.
- Relative and absolute quantitation of small molecules (targeted metabolomics).

Metabolomics equipment:

- 2 Agilent 6490 with iFunnel technology Triple quadrupole LC/MS
- 1 Agilent 6550 iFunnel LC/MS Q-TOF
- 1 Agilent 6530 LC/MS Q-TOF
- 1 Agilent 7200 Q-TOF for GC/MS
- 1 Agilent Triple Quadrupole GC/MS
- 1 Leco GCxGC-TOFMS
- 1 Thermo Orbitrap Velos Pro
- 1 MALDI-TOF-TOF
- NMR 600 MHz Bruker Avance III spectrometer fitted with a cryoprobe and a SampleJet robot
- NMR 500 MHz Bruker Avance III spectrometer coupled to an HR-MAS probe and a X-PRESS Sample Changer
- Bravo liquid handling robot
- Gilson liquid handling robot

Proteomics

Proteomics is the large-scale study of proteins in biological systems. The proteome is the entirety of protein components, including the modifications made to a particular set of proteins, produced by an organism or system. This proteome may vary with time and suffer modifications under different experimental conditions or stress, that a cell or organism undergoes.

Infrastructure in the facility is centred on state-of-the-art mass spectrometry for MS and LC-MS/MS experiments and includes chromatographic and electrophoretic systems for protein and peptide separation. Proteomics provide the ability to implement optimized methods to profile proteins in biological fluids and tissues, to quantify proteins, to identify protein, posttranslational modifications, and to study protein-protein interactions and we also have the capability to modify and develop entirely new assays as required by our clients.

The service integrates different technologies:

- Gel-based Proteomics
- MS-based Proteomics
- Interactomics

Proteomics equipment:

- 2 Agilent 6490 with iFunnel technology Triple quadrupole LC/MS

- 1 Agilent 6550 iFunnel Q-TOF LC/MS
- 1 Thermo Orbitrap Velos Pro
- 1 MALDI-TOF-TOF
- Agilent 2100 Bioanalyzer
- NanoDrop ND-2000 spectrophotometer
- EXQuest spot cutter: fast, hands-free gel excision
- Bioplex 200 bead array instrument
- Biacore 3000 analyzer: Protein-molecule interaction service.
- Bravo liquid handling robot
- Imaging systems:
 - Pharos XP: Imager and Scanner for fluorescence, chemiluminescence, chemifluorescence, densitometry, and gel documentation
 - ChemiDoc: imager CCD instrument for chemiluminescence

Genomics and Transcriptomics

Genomics involves the study of genes and their function. Genomics aims to understand the structure of the genome, including gene mapping, DNA sequencing, and exploring the molecular mechanisms and the interplay of genetic and environmental factors in organisms.

Transcriptomics is the study of transcriptomes, the complete set of RNA transcripts produced by the genome at any one time. It is specifically focused on how transcript patterns are affected by development, disease, or environmental factors such as hormones, drugs, etc.

Our service integrates different technologies:

- **SEQUENCING:** Capillary electrophoresis 3500 Genetic Analyzer for Sanger sequencing and Ion Torrent PGM for next-generation sequencing applications.
- **MICROARRAYS:** Agilent microarrays for RNA and miRNA measurements.
- **qPCR:** ABI 7900HT real-time PCR instrument.

Our Genomics & Transcriptomics facilities offer service from single gen to genome-wide analysis for standard and next generation sequencing, genotyping, quantitative PCR, and full Agilent microarrays processing with the following equipment:

- 3500 DNA Genetic Analyzer
- Ion Torrent PGM
- ABI PRISM 7900HT Fast Sequence Detection System
- 2720 thermocycler
- 9800 Fast thermocycler
- Verity 96-well thermocycler
- Hybridization Oven
- Agilent Scanner
- Agilent 2100 Bioanalyzer
- NanoDrop ND-2000 spectrophotometer
- Bravo liquid handling robot
- Alpha Innotech Chemilmager
- Agilent GeneSpring GX
- GeneMapper
- ABI Primer Express
- SDS v4.0

In vitro models

COS provides robust systems-biology since we have developed in- vitro models for screening biological activities of new bioactives, drug candidates, cosmetics and/or chemicals.

COS has developed, optimized in-vitro models (eg adipocytes, fibroblasts, macrophages, endothelial, hepatocytes, myocytes) at your disposal and the ability to prepare a new cell line to quickly provide you with a view of the effect of the molecule at a molecular and cellular level.

To complement these studies, we have a digestive model for analyzing the biotransformation of substances and for implementing very high resolution bioavailability studies by means of metabolomic equipment.

In vivo models

COS also performs in-vivo studies with various animal models in order to obtain data on tissues, organs and complex biological systems.

- Studies of genomics, transcriptomics, proteomics and metabolomics in biofluids and cells from various tissues, also in PBMCs (Peripheral blood mononuclear, pluripotent characteristics) which are useful to obtain data reflecting the behaviour of any organ in response to a bioactive (natural or not) and extrapolated to humans.
-
- Studies on the effects of bioactives and their mechanism of action for preventing obesity, hypertension, dyslipidemia, and other risk factors for metabolic syndrome and cardiovascular disease, using:
 - Zucker Rats
 - Wistar rats
 - Hamsters (own dyslipidemia developed model)
 - Mice
- Toxicity studies (according to OCDE recommendations)

Human intervention studies

The data from in- vitro and in- vivo assays on experimental models are essential but often, the success of scientific approach will heavily rely on proven efficacy in well-controlled intervention studies with human volunteers.

The omics application in human samples provides a properly integrated essential data set through bioinformatic tools, allowing us to build a scientific metabolic explanation of the effect and behaviour of the biology system and its action mechanism.

COS has the knowledge and facilities to design and coordinate controlled, randomized, prospective studies in collaboration with a consolidated health network with vast experience in performing these studies.

- Human clinical trials, design and execution
- Capacity to develop residential and non-residential studies
- Facilities
- Metabolic Kitchen and chilled food storage

- Dining room
- Medical Room
- Medical Laboratory (Biological Samples Analysis)
- Interview and Screening rooms

The nutritional intervention studies are designed in compliance with European regulations and with ethics for good practices while observational studies are designed according to the Strobe statement.

2. GENERAL SERVICE PROCEDURE

❖ Introduction

COS involves a comprehensive group of top Research infrastructures fully equipped in metabolomics and supporting units of proteomics, transcriptomic genomic and biomarkers validations.

COS facilities provide services upon demand to internal and external. These services comprise use of core facilities at appropriate internal and external rates for the different services.

Once a year, COS offers an competitive open access to their infrastructure to researchers from the scientific community of the EU countries and related stakeholders for conducting research, acquiring knowledge or training in technology used in the installation.

To give service to ICTS users, COS opens their infrastructure the 20% of total equipment facility time to users that access to the facility through a competitive open call for special projects that need a integrative approach for their design and execution that can be developed by the users as trainees or by the COS team.

❖ Types of clients and access

Users are classified as:

- Internal: Researchers from Universitat Rovira i Virgili or associated institutions within the CEICS (Campus Excel·lència Catalunya Sud)
- External: Researchers from other institutions and companies

Possible access types are:

- **Access upon demand:** Services that are described and no need special integrative approach from the different units and assessment of the staff.
- **Access under competitive open access calls** for integrative projects as users or trainees

The access upon demand is opened and users only have to send their needs e submitted continuously by email to info@omicscentre and/or filling the application form published in the website <http://omicscentre.com/contact/>

3. PROCEDURE FOR REQUESTING COMPETITIVE OPEN ACCESS FOR SPECIAL INTEGRATIVE PROJECTS

It is planned to have a competitive call for open access once a year for projects based on an integrative omics approach that need the different equipment for execution by the different techniques that are available in the center. There are two modalities:

- Execution of projects by the COS team
- Execution of projects by the training users

This document details the Access Protocol to the Centre for Omic Sciences. The guidelines are based on criteria of efficacy, efficiency and transparency.

The evaluation will be done by the Access Committee which must provide detailed objectives and an approximate time line for completion.

Conditions of funding will depend on the institution of the applicant, and it shall be borne by the client, unless COS gets funds specifically for finance these type of access, the access would be granted as hours of equipment and support team.

COS collects all activities applications by email (info@omicscentre.com) and forwards them electronically, including any additional documentation, to the Access Committee.

The request for access to the COS resources must be in English, and should include the following information:

- A description of the global scientific project which frames the activity proposal (maximum 1 page) including the reference number of the overall scientific project if financed by a public call.
- A description and justification of the concrete activity that requires access to the COS resources (maximum 2 pages).
- A short CV of the PI (Principal Investigator) of the applicant group that must necessarily include reference to the most relevant publications (maximum of 5 references) of the last 5 years.
- If you plan to use the equipment as autouser, then ask whether there is training or certificate required to use the instruments. Training may involve a fee.

After receiving the request for access, COS may contact at any time with the applicant for further information or to request clarification of information submitted. The Access Committee is composed of 3 members appointed for a period of 3 years, two of them are relevant scientists and one is a member of the COS organization. Once we have all the information, the Access Committee proceeds to evaluate all activities and prioritize them writing a report.

The report prioritizes the allocation of resources to activities. A consequence of this prioritization and limited resources available can be left out high-quality activities. Furthermore, this report justifies the reasons for gaining or refusing access to the COS for each submitted activity.

The accepted activities are published and a private explanation is given to the not accepted ones with a relevant explanation, and giving the possibility of re-submit the same activity to be re-evaluated in a future announcement.

❖ **Evaluation and selection of applications**

The basic criteria for the award of projects using the COS resources are:

- The relevance of the global scientific project that includes the activity proposal (20%)
- The justification for the proposed activity and the tasks to be developed in the COS to complete the global scientific project (30 %).
- The scientific credentials of the applicant research group (10%).
- Experience and training in the equipment (10%).
- The real need for an integrative omic approach to perform the project (20%).
- The technical feasibility of the project by COS equipment (10%).

Once considered as a possible project to develop, this committee will make an order list of the proposals based on the punctuation.

❖ **Usage Terms**

COS requires that you mention the use of COS facilities in any of your publications with the sentence "The author thankfully acknowledges the resources, technical expertise and assistance provided by the Centre for Omic Sciences", and requests you to send a copy or a link to it to info@omicscentre.es.

❖ **Sample Submission**

Prior to submitting a sample, please arrange for a consultation with specialized technician. Please note that Samples will not be accepted without prior consultation. In the case of the provision of non-presence access, users must provide information about the samples and fill the documents specific to each service.

By their nature biological samples may be subject to ethical protocols and / or biomedical law and data protection. Users thus comply with current provisions and sent the samples provided anonymously and with no possibility of tracking codes.

Once the samples arrive at COS, the original identification will be kept. If it deems by the technician, the name can be changed, always keeping the registered correlation with the original names. The samples stored at appropriate minimum time for analysis and will be returned, redirected or destroyed as directed by user in input sample documents.

❖ **Preparation of samples**

The sample preparation protocols will be adapted according to the technical and analytical service requirements.

If the users perform the testing of samples, they must record their activities on the computer or manually filling the control usage sheet of the equipment.

❖ **Delivery of results and data management**

The data generated will be protected from cross access through the creation of specific sessions or privatizing access to the folders that contain them.

While archiving the results of the analysis, following the criteria of each technician, will remain a storage system that ensures the traceability of measurements.

In all cases the results and / or reports will be sent to users by email or via intranet in a confidential and secure manner.

4. QUALITY POLICY MANAGEMENT SYSTEM

COS promotes the adoption of a quality management system (SGQ) fulfilling the requirements of international process-based standard ISO 9001:2008.

5. ENVIROMENTAL MANAGEMENT

The COS through the environmental Management Unit from URV, has a policy of selective chemical/ biological waste collection. Chemical or biological waste must be managed in a safe and environmentally responsible manner. Users will follow University protocol in compliance with legislation of waste management and are responsible for appropriate storage (container compatibility), labeling, and movement of full accumulation containers to the Environmental Management Unit. Chemical or biological waste must be accumulated at or near the point of generation (i.e., in the experimental area, not in adjacent rooms/closets).

6. RISK PREVENTION

General safety rules when working in a COS laboratory:

- Use suitable shoes, safety goggles, lab coat and other protections when working in the laboratory.
- Never smoke, eat and drink in the laboratory.
- Follow instructions of safety data sheet of the chemical products regarding use, handling, storage and waste management.
- Do not leave open bottles out of safety cabinets or stockrooms.
- Use personal protective equipment (EPI) when needed. They are available in all laboratories. Safety is users' responsibility.
- Solvents or aerosols must be handled in a fume hood and/or in well ventilated area.

Specific warnings for NMR metabolomic lab:

- The superconducting magnet system generates strong magnetic fields and has a tank of cryogenic liquids (liquid nitrogen and helium).

- Persons with implanted or attached medical devices such as pacemakers or embedded metallic objects such as prosthetic parts must remain outside the 5-gauss perimeter.
- Keep metal objects outside the 10-gauss perimeter.
- Leave area immediately and warn staff in the event of a magnet quench.

- Avoid helium or nitrogen contact with any part of the body.

Specific warnings for reactants in genomic-transcriptomic lab metabolomic lab:

- Ethidium bromide: mutagenic compound that alter the chain of DNA and RNA. It is toxic by contact and inhalation. Always work with gloves and under fume hood
- Sodium Hydroxide: Handle with care. It causes severe burns.
- Sodium carbonate: cause eyes irritation.
- Isopropanol: flammable. Irritating to eyes. Inhalation of vapors may cause drowsiness and dizziness.

Specific warnings for liquid nitrogen tank:

- Always wear gloves, closed shoes, safety glasses, lab coat and suitable dewars to manipulate liquid nitrogen.
- Work in a well ventilated area. Breathing cold gas cause severe pulmonary injury.
- In case of contact with the cryogenic liquid, quickly remove frozen clothes. If they are adhered to your skin, remove gently with warm water

6. INCIDENTS

There is an official form of non-compliance. Fill this document to notify incidences such as a failure of equipment, lack of material or any trouble with the equipment or facilities and give it to the technician.

7. COMPLAINTS AND SUGGESTIONS

Sheets for suggestions and/or complaints are available. Fill it and leave it in the suggestion box or send to the technician.

This document show the operational rules and aims to guide the users through the Center for Omics Sciences (COS). We work to improve our services and any suggestions, complaints and other opinions will be welcome.