

BIORESOURCE PAPER

Interlab Cell Line Collection: Bioresource of Established Human and Animal Cell Lines

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The Interlab Cell Line Collection (ICLC) was established in 1994 as a core facility of the National Institute of Cancer Research. It supplies: human and animal cell lines; Short Tandem Repeat (STR) profiling of human cell lines; quality control service; mycoplasma detection and eradication service; safe deposit service and patent deposit service of cell lines and hybridomas. The catalogue of services is on-line, and the cell lines are distributed all over the world.

Keywords: Human cell line; animal cell line; tumour cell line; mycoplasma detection; STR profiling

Funding statement: The bioresource was established and run thanks to the institutional support and to funding by public sources (European Commission, Italian Ministries) and private funding (Charities).

(1) Bioresource Overview

Description of the initiative

Human and animal cell lines are widely used in basic and translational biomedical research, as they constitute a simple and representative model system for functional studies and identification of diagnostic tools and therapeutic targets. Each cell line has unique features and can be used for specific studies. It is therefore important to know the characteristics of the cell lines and link the description to their availability. The Cell Line Data Base (CLDB) [1] was designed and implemented in the early 1990s in the frame of the Interlab Project [2]. The Interlab Cell Line Collection [3], has been established in 1994. ICLC soon became a point of reference at a national and international level for biomedical and biotech researchers [4, 5]; since 2010 it acts as reference laboratory for authentication of human cell lines through STR profiling [6]. ICLC belongs to the European Culture Collections Organization and to the network of International Deposit Authorities (IDA) for patent purposes <http://www.wipo.int/export/sites/www/treaties/en/registration/budapest/pdf/ida.pdf>.

The ICLC curator has taken part in the OECD (Organisation for Economic Co-operation and Development) Task Force for BRCs (Biological Resource Centres) and has contributed to the preparation of the OECD best practice guidelines for BRCs [7]. ICLC has taken part in the European network of Biological Resource Centres (BRCs), in the frame of two European projects: CABRI [8] and EBRCN. The bank has been a partner of Preparatory Phase and

actively participates in the European infrastructure of biobanks and biomolecular resources (BBMRI-ERIC) and in its Italian National Node of BBMRI.it. It also participates in an international working group on biobanks sustainability [9] and in the BRIF initiative [10].

Classification (1)

Human, Animal

Species

- Common Pipistrelle, *Pipistrellus pipistrellus*
- Domestic cat, *Felis catus*
- Domestic dog, *Canis lupus familiaris*
- Domestic cattle, *Bos Taurus*
- Black-bellied hamster, *Cricetus cricetus*
- House mouse, *Mus musculus*
- Norway rat, *Rattus norvegicus*
- Horse, *Equus caballus*
- American Mink, *Neovison vison*
- Green monkey, *Chlorocebus aethiops*
- European Rabbit, *Oryctolagus cuniculus*

Classification (2)

Biological samples and associated data.

Context:

Spatial coverage

The Bank is located in Genoa, Italy (Latitude: N 44° 24' 41.909" Longitude: E 8° 58' 29.1259")

The cell lines have been produced and deposited in the bioresource by researchers based both in Italy and in other countries.

The services of the Bank are provided worldwide.

Temporal coverage for accessibility

From 01/11/1994 on. Expected date of last inclusion: unknown.

(2) Methods

Steps

The cell lines of the ICLC catalogue are either produced within the Institute where the bioresource is based or collected from external researchers, and subsequently deposited by the originator. The authorized use of the cell line is specified in the Deposit sheet. The cells undergo a first quality control (identity, sterility, mycoplasma) and are then expanded and preserved. Master and Working/Distribution Banks are produced and each batch is fully quality controlled. When the cell line is available for distribution and the depositor has agreed upon its description, the information is included in the on-line catalogue. The cell lines are distributed to qualified researchers, through a Material Transfer Agreement. Standard Operating Procedures are available for each step of the process: access of the cell lines to the bank, management, quality control, identification, storage, catalogue and distribution.

Stabilization/preservation

Cryopreservation in two milliliter cryovials, Foetal Bovine Serum 50–95%, culture medium 0–40%, Dimethylsulfoxide (DMSO) 5–10%.

Type of long-term preservation

Frozen in gas phase liquid nitrogen refrigerators.

Storage temperature

–135°C to –190°C (liquid nitrogen vapours and liquid nitrogen).

Shipping temperature from source to preservation or research use

The cell lines are either produced within the Institute or collected from external researchers, and subsequently deposited. The shipping temperature is either –60 to –78,5°C (dry ice), or room temperature (flasks in culture 18–25°C).

Shipping temperature from storage to research use

–60 to –78,5°C (dry ice); room temperature (flasks in culture 15–25°C)

Quality assurance measures

The IRCCS department which hosts the bank operates in compliance with ISO9001:2008 (BUREAU VERITAS Certificate n. IT248888). The bank follows Good Laboratory Practices and operates in compliance with: the OECD Best Practices for Biological Resource Centers (1) when addressing quality management for biobanks and BRCs in general terms; to the *WHO Laboratory quality*

management system (8) for issues common to biobanks and other laboratories; to the *WHO/IARC guidelines for biological resource centres for cancer research* (9), for more detailed technical recommendations for the specific research domain. The bank participates in the European Research Infrastructure for Bio-Banking and Biomolecular Resources (BBMRI-ERIC) and follows the BBMRI-ERIC Partner Charter.

1. The personnel of the bank is fully trained and highly experienced, training is fully documented
2. Standard Operating Procedures available for each step of the processes of the bank, including training; traceability guaranteed through registration of each step of the biobanking process
3. Periodic audits are performed by the Quality office of the Institute, and fully documented
4. Cell lines are kept in a quarantine lab until quality control has been completed
5. All human cell lines are identified through Short Tandem Repeat profile and a certificate is provided to the users
6. All batches of cell lines are tested for mycoplasma (two validated assays), bacteria and fungi
7. Master and working/distribution banks are produced for each cell line of the catalogue
8. Remote wireless monitoring system of temperature, pressure, CO₂, humidity for relevant equipment (freezers, incubators, cell culture laboratories), freezers equipped with alarms for immediate intervention in case of black-out
9. All cell lines preserved in at least two separated liquid nitrogen containers
10. Controlled access to the facility and to the document archive
11. Controlled access to the computers and daily backup of relevant files.

Source of associated data

Questionnaire to the depositor, experimental data, results of previous studies on the cell lines, scientific literature, return of results from users.

Ethics Statement

The ICLC cell bank belongs to the institutional Biological Resource Centre, which has produced an Ethical Code, a Consent form and a Material Transfer Agreement form, approved by the local Ethics Committee (March 8th, 2010). Disposal of biological samples no longer in use is performed following the institutional procedure: bio-hazardous wastes are inactivated (autoclaved or bleach treated) and placed into the medical waste boxes provided by the hospital.

Constraints

N/A

(3) Bioresource description

Object name

Disease-oriented biobank: established human and animal cell lines

Bioresource name

Interlab Cell Line Collection
ICLC

Bioresource location

Banca Biologica e Cell Factory – Centro di risorse biologiche
U.O. Servizio di Immunoematologia e Trasfusionale
IRCCS Azienda Ospedaliera Universitaria San Martino –
IST – Istituto Nazionale per la Ricerca sul Cancro
L.go R. Benzi, 10 16132 Genoa – Italy

Bioresource contact

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Bioresource URL

<http://www.iclc.it>

Identifier used

NA

Bioresource type

Oncology

Type of sampling

Disease based (established tumour cell lines)

Anatomical site

N/A

Disease status of patients/source

Mainly cancer patients

Clinical characteristics of patients/source:

N/A

Vital state of patients/source

Vital state not known, source surgical samples, blood and body fluids

Clinical diagnosis of patients/source

Mainly cancer

Pathology diagnosis

The description of diagnosis is made on the basis of controlled terms for tumours and pathologies.

Control samples

N/A

Biospecimen type

Cell lines

Aliquots: cryovials containing $2 - 5 \times 10^6$ cells. The batch size is 10–30 samples.

Size of the bioresource

The catalogue of the bioresource contains 210 human cell lines and 77 animal cell lines, derived from 43 animal species. A total number of about 6.500 frozen ampoules is stored. Most human cell lines (189) and animal cell lines (61) are derived from tumours.

A subset of cell lines (71) was received from the European Collection of Animal Cell Cultures (ECACC) in the frame of the European project Biomedicine and Health (BIOMED 2) 1994–1998.

The growth of the Bank depends on several variables. A growth of 5 to 10% yearly is foreseen.

Release date

The resource is available since November 1994

Access criteria

The bioresource deals with established cell lines, which are virtually immortal. Therefore, there is no need for a strict prioritization policy. The catalogue is available on-line both through the ICLC website (www.iclc.it) and through other sources (Cell Line Data Base, CABRI). The request form is available on-line both in Italian and in English, together with the Material Transfer Agreement and the instructions for ordering. The MTA states that "... The cell lines are distributed, as frozen ampoules, growing cultures or genomic DNA, to qualified researchers, who are responsible of their correct preservation and use. In order to receive the cell line(s) the researcher must ... confirm that he/she is authorized to receive, on behalf of his/her employer, the cell line(s) requested ...". In addition: "... In case the cell line(s) belongs to the Biological Level 2 containment, this is clearly specified in the technical sheet; the researcher confirms that he/she has access to adequate laboratories...". Beside this, no restriction is applied, and the cells are shipped anywhere in the world, to countries that accept dry ice shipments and which can be reached in a maximum of 5 days. The cost recovery for frozen cell lines is € 270 plus shipment; an extra cost of € 100 is charged for Class 2 Genetically Modified Organisms (GMOs).

(4) Reuse potential

Recently, the authentication of established human cell lines through STR profiling has become mandatory for publication of papers where human cell lines are used. The wide use of this international standard adds reliability to the results of research. Uncontrolled exchange of non-authenticated cell lines is now finally seen as a danger for the quality of research, and cell banks providing the service of authentication are now much more used. Researchers producing new cell lines can "protect" their work by publishing the molecular profile, thus providing a reference for authentication. Likewise, researchers using the cell lines can be confident that the results previously published have been obtained with cell lines whose molecular profile has been identified and confirmed.

The ICLC Material Transfer Agreement states that "... If the cell lines are referred to in any publication, the ICLC catalogue code will be included, and reference to the original paper will be added...". Whenever possible, ICLC updates the description of the cell lines in the catalogue with data produced and published by the researchers who have obtained the cell lines, by adding the new references to the "Further bibliography" field.

Author Roles

- Barbara Parodi – Biobank Curator
- Ottavia Aresu – Quality control until Dec. 2013
- Paola Visconti – Cell line processing and quality control
- Maria Assunta Manniello – Shipping management and quality control
- Paolo Strada – Biobank Director

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- the students who have worked in the bank to prepare their thesis (Anna Maria Parodi, Francesca Schena, Virginia Andreotti, Claudia De Cecco, Marina Bisso).

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