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REQUEST FOR SUPPORT FROM THE GOVERNING COUNCIL SPECIAL FUND: A. SCIENTIFIC EQUIPMENT B. AUTOMATION SOFTWARE FOR IARC PUBLICATIONS

1. An inter-disciplinary research approach is embedded within the IARC Medium-Term Strategy (MTS) (2026–2030), with close integration of laboratory sciences, biostatistics, bioinformatics and epidemiology. This strategy requires high quality laboratories and access to key items of state-of-the-art scientific equipment, supported by integrated information systems that ensure standardized data management and improved traceability. It also requires sustained support for research platforms dedicated to epidemiological research.

2. The IARC Biobank is a core resource supporting the Agency's mission of coordinating and conducting research on cancer by housing biospecimens from population cohort studies and research projects. The Histopathology Laboratory provides essential support to a wide range of Agency research projects, including cancer genomics, environmental and exposure studies, molecular epidemiology, and international collaborations. Tissue samples are processed within this laboratory, which plays an essential role in preparing material for tumour examination and molecular analyses. Ensuring that samples are preserved in a stable and secure environment, and that tissue samples and histopathology images are processed and digitally scanned, is therefore a major priority and fundamental for the long-term continuity of IARC's research.

3. The first part of this request concerns four pieces of equipment identified as essential: A.1. replacement and improvement of the biobank Laboratory Management System (LIMS) for full sample traceability; A.2. an automated tube labelling and sample aliquoting; A.3. a dedicated LIMS to track and monitor all steps of the Histopathology laboratory activities, and A.4. a new liquid nitrogen (LN) tank following the sale of a defective tank.

4. The second part of this request concerns the purchase of a specialized publication software for the book production teams from the Evidence Synthesis and Classification (ESC) Branch and the IARC Publishing, Library Services, and Web-Publishing (PLW) team. The ESC Branch is in charge of the publication of *the IARC Monographs*, the *IARC Handbooks*, and the Blue Books, and the IARC PLW team oversees the production and dissemination of all other official IARC publications. Five members of IARC staff across ESC and PLW are currently using eXtyles, a software that will be phased out in 2026. Several options were considered to replace this critical software and an estimated cost of €70 000 would be required to cover the purchase of the new software, the various implementation fees and maintenance costs for the first year.

A. PURCHASE OF SCIENTIFIC EQUIPMENT

5. As a facility within an international research agency based in France, the IARC Biobank became compliant to the French national IBiSA programme (https://www.ibisa.net/), dedicated to French Biological Resources Centers, in December 2023. This allows participation in French national biological infrastructure initiatives, such as the creation of regional and national population cohorts to support future research activities on cancer.

6. The IBiSA label marked a real transition for the IARC Biobank in terms of quality management, made concrete by several actions and through the support of the Administration and Services (ASO) team:

- Trainings (international air transport regulation, implementation of ISO20387 standard, running of internal audits),
- Deployment of the existing temperature monitoring system to all cryogenic tanks for real-time temperature traceability of biological samples kept in liquid nitrogen,
- Site Acceptance Test for the liquid nitrogen storage installation,
- Improvement, review and reorganization of the biobank documentation and protocols, and
- Simulated audits by Centre Leon Berard and by an external auditor.

The next objective for the IARC Biobank, in line with the IARC MTS and because of its international status, is the attainment of the ISO20387 « Biotechnology & Biobanking », anticipated by the end of 2026. The ISO20387 standard requirements enable biobanks to demonstrate globally that they are competent and able to provide biological materials and associated data, of high quality for trusted, reproducible research and development.

7. The simulated audits of the IARC Biobank activities based on the ISO20387 requirements and performed in 2025 highlighted the following two major points:

- An essential non-conformity related to the digital sample life cycle traceability. The IARC Biobank uses an in-house informatics system implemented in 2015 (called SAMI) and customized over years, based on local users' needs. However, SAMI has reached its limits in terms of the volume of real-time sample management and interoperability with associated biobank equipment.
- The technical team works under pressure to meet the researchers' expectations due to the high number of samples processed compared to the number of FTE. An in-depth analysis showed that labelling and aliquoting are the most time-consuming activities, consuming respectively more than 26% and 14% of time spent on processed samples. In addition, these two activities, represent potential points of preanalytical errors during sample management.

8. Therefore, to improve on the above two aspects, a new biobanking LIMS and an automatic labelling and aliquoting system are required.

9. The annual maintenance costs of the requested equipment will be covered from extra-budgetary sources and invoicing for the IARC Biobank services.

A.1. Dedicated biobanking LIMS

10. The IARC Biobank system was developed and implemented in 2015 with a version 2.0 launched in 2020. However, the biobank uses numerous files (Excel files, electronic lab notebooks, work lists) which can feed, via pivot files (Excel templates), into SAMI database to manage samples. The international ISO20387 standard requires that procedures established for data transfer must document quality controls that ensure the consistency of information. To date, high-volume and iterative data imports in SAMI do not allow for appropriate quality checks.

11. We propose the acquisition of a dedicated biobanking LIMS system for an amount of €335 449. Such a system enables to effectively track and manage the entire workflow of sample processes within the IARC Biobank, ensuring that each step in the lifecycle is digitally monitored and documented.

A.2. Automated tube labelling and aliquoting system

12. Currently, the physical sample identification is performed via frost-resistant labels, including information related to the sample (alphanumeric identifier of the sample, nature, linear or 2D barcodes, etc.) printed and pasted on the tubes containing the sample. The tube labelling is carried out manually by laboratory technicians and is a time-consuming, basic repetitive activity which could be semi-automated, thus freeing up technicians' time to carry out more valuable tasks.

13. One of the other biobank activities that is always carried out manually and could be semi-automated is the aliquoting of fluids samples (e.g. serum, plasma). We propose the acquisition of an automated system for an amount of €230 950 capable of printing and labelling tubes necessary for all activities, reorganizing tubes, detecting sample volumes, and transferring liquids to carry out the tasks of aliquoting of samples. Automation would make it possible to combine tube labelling and aliquoting in a single operation while guaranteeing better traceability and reliability.

A.3. Laboratory Information Management System (LIMS) for Histopathology

14. The Histopathology Laboratory supports numerous IARC projects across research programmes and external partners. The projects served by the laboratory require precise and standardized documentation of sample processing, robust traceability from tissue block to digital slide, and secure sharing of pathology information with collaborating research teams. The increasing volume and complexity of tissue-based workflows further highlight the need for a dedicated digital system.

15. Despite its central role, the laboratory workflows are currently not supported by any digital system specifically designed to ensure traceability, standardization and coordinated management of laboratory steps. At present, pathology-related information is distributed across several systems. This limits traceability and results in inconsistencies across projects. Manual processes significantly hinder reproducibility and quality assurance and limit the efficiency of cross-project coordination.

16. Implementing a dedicated LIMS will support the Laboratory by providing:

- *full traceability of samples, slides and digital images;*
- *a centralized and standardized registry aligned with Standard Operating Procedures (SOPs);*
- *integration with digital slide workflows via eSlide Manager;*
- *secure user access and improved workflow visibility.*

A preliminary market assessment has been conducted. Only solutions adapted to research-oriented histopathology workflows and compatible with IARC infrastructure have been retained for further evaluation. An estimated cost amounting €103 401 is required for the purchase of a dedicated digital system.

A.4. Liquid Nitrogen (LN) tank

17. The centralization and cataloguing of the IARC Biobank under the Laboratory Services and Biobank Group (LSB) has provided the Agency with a central, focal point for coordinating the reception, storage and distribution of biological samples worldwide. This development, achieved over a ten-year period, transformed a previously dispersed and uncoordinated approach into an efficient, high-quality research platform.

18. The IARC Biobank currently stores over six million biological samples from studies conducted in collaboration with or coordinated by IARC scientists. The Biobank occupies over 1000 square meters of storage facilities with restricted access (~400 square meters for liquid nitrogen (LN2) storage, ~550 square meters for freezer storage and ~50 square meters for ambient temperature storage).

19. The state-of-the-art LN2 facility consists of 39 large modern tanks controlled and monitored through a smart cryogenic room management system (Desigo).

20. In May 2016, the Governing council approved the allocation of €492 000 from the Governing Council Special Funds for the purchase of essential cold storage equipment. From that budget, a semi-automated LN2 tank (B3C) was purchased at a cost of €116 151.24€.

21. Following the move to the new building in January 2023, this B3C unit began exhibiting repeated operational blockages in its automated arms. Although no single technical cause was identified by the manufacturer, the equipment has required frequent maintenance, which has been both costly and operationally disruptive.

22. Following the recommendation and approval of the IARC Biobank Steering Committee on 10 September 2024, the process to sell the B3C equipment was initiated and finalized in December 2025. The University of Luxembourg (LU) expressed strong interest in acquiring the unit to complement their existing fleet of B3Cs. After negotiations, and in full awareness of the equipment's service record, LU agreed to purchase the unit for €45 000, an amount consistent with the depreciation of the equipment and which was returned to the GCSF.

23. To maintain current operational capacity, the IARC Biobank requires one additional LN2 tank.

- Liquid nitrogen tank: one additional large (600-litre) LN2 tank with a capacity of 120 960 straws (0.5ml).
- Equipment for internal storage and temperature monitoring device: acquisition of appropriate racks, trays, canisters and temperature-monitoring device.
- Connection to Smart cryogenic room management system: the connection of the new LN2 tank to the existing smart cryogenic room management system (Desigo) to ensure automated monitoring and control.

24. The annual maintenance costs for the requested equipment will be integrated into the IARC Biobank budget and included within the existing contract for preventive maintenance of LN2 tanks. An estimated cost amounting €48 350 is required for the purchase of the above Liquid Nitrogen tank.

B. AUTOMATION SOFTWARE FOR IARC PUBLICATIONS

25. For the past 15 years, IARC has used eXtyles software, an add-in to Microsoft Word that aids in editorial preparation of publications and conversion of Word files to XML. eXtyles simplifies and automates the most time-consuming and error-prone aspects of document cleanup and formatting. eXtyles is used for reference verification and styling (it links bibliographic references by querying the PubMed and Crossref databases) and for tagging content (i.e. subheading structure and organization, tables, and figures). It also verifies URLs found in the Word document and applies rules for WHO/IARC style to the text. An important function is that eXtyles produces XML files that are used to produce book layouts and are provided as input to the National Library of Medicine (USA) Bookshelf, where IARC publications are made available in html format free of charge.

26. The eXtyles commercial product line is being discontinued. Development of and external support for eXtyles will end on 13 August 2026. After that date, no software updates or technical support to end users will be provided. Therefore, the current IARC eXtyles workflows will not be reliable after the support period ends, and a replacement is needed.

27. Without a replacement for eXtyles, the publications staff would have to create a new workflow and set of styles and do the following tasks manually: format files, impose consistent structure, style and tag each element of the content, match all citations, check and edit all references, check all links, format tables and lists, etc. Instead of taking hours to prepare documents, it would require weeks of extra work that would need to be done manually. Such work would be repetitive and error-prone and would increase production timelines significantly and lead to delays in publication of volumes of the various IARC publications series.

28. The IARC publication team have collectively estimated that using this software results in a 6-fold efficiency gain over manual processing for the many tasks it carries out. The length of time to publication would greatly increase without replacement software.

29. This software is used for publications across the Agency: the three flagship publications series in the ESC Branch (*IARC Monographs*, *IARC Handbooks*, and WHO Classification of Tumours) and the other IARC publications series coordinated by the Publishing, Library and PLW team (for which the content is produced by other research Branches, such as Cancer Surveillance, Early Detection, Prevention and Infections, and Environment and Lifestyle Epidemiology).

30. To fill the gap after eXtyles is discontinued, two vendors have been identified offering similar products to replace eXtyles and replicate its functionalities. However, the licence fees will be much higher than those for the current software (to maintain the five licences needed for IARC). In addition, the implementation and customization of the new software will have a large cost.

31. Therefore, based on estimates received from the two available software developers, we are requesting €70 000 from the GCSF to enable the implementation of the new software. These funds will be used to pay for required implementation and customization fees of the selected vendor, as well as internal costs related to the transition to and testing of the new software.

Requested budget

The Governing Council is requested to approve, at its 68th Session in May 2026, the allocation of €718 200 for the purchase of scientific equipment described under Section A1 to A4, as well as the allocation of €70 000 for an automation software for IARC publications.

	Approximate cost (€)
Dedicated biobanking LIMS system	€335 449
Automated tube labelling and aliquoting system	€230 950
Laboratory Information Management System (LIMS) for Histopathology	€103 401
Liquid Nitrogen (LN) tank and related costs	€48 350
Sub-total for equipment	€718 200
Automation software for IARC publications	
Sub-total for non-scientific equipment	€70 000
Total requested budget	**€788 200**