

PURCHASE OF SCIENTIFIC EQUIPMENT

1. The Director would like to approach the Governing Council at its 53rd session in May 2011, to request a contribution of 240 000€ from the Governing Council Special Fund for essential scientific equipment. This approach is first submitted to the Scientific Council for its consideration. The items included in this request are intended to be used primarily as shared resources, rather than specific to the activities of one or two research groups, thus benefiting the work of laboratory groups across the Agency.
2. In line with the IARC Medium-Term Strategy (2010–2014), which highlighted the paramount importance of performing interdisciplinary research, efforts have been made in the last two years to reinforce the interaction between laboratory-based and epidemiology research.
3. Constant upgrade, update and increase of the number of scientific instruments are essential to support this strategy. In 2009 the Agency was able to invest in a fluorescent microscope, Luminex apparatus and a flow cytometer using savings from the Director's regular budget allocation, due to changes in research priorities. In addition, investments from the Governing Council Special Fund were obtained in 2010 to establish key platforms at IARC, i.e. next-generation DNA sequencing (NGS) instrument, gas chromatograph and HPLC/MS/MS.
4. Due to these initiatives it has been possible to establish several central laboratory facilities. For instance, the acquisition of the Luminex apparatus allowed the development of several high-throughput assays for the detection of oncogenic viruses that are routinely used in large scale epidemiological studies. The establishment of the NGS and HPLC/MS/MS platforms will be completed in 2011, and it is expected that these two facilities will considerably contribute to the development of a large number of novel IARC research programmes on biomarkers, genetics, mechanisms of carcinogenesis and infections.
5. Despite these investments, ongoing support is required to maintain and improve the IARC laboratory facilities. Several basic and essential items, e.g. real-time PCR machines, are now obsolete and need to be replaced. In addition, the purchase of other items, such as robot for DNA aliquoting, is essential to increase the capacity of the existing IARC platforms, e.g. Laboratory Services and Biobank. Finally, the purchase of some relatively small items, such as a multi-well plate reader or a DNA-quantification system, in combination with key larger items of equipment is necessary in order to make full use of the capabilities of the latter.

6. The Scientific Council is requested to advise the Director and the Governing Council on the proposed request to use funds from the Governing Council Special Fund to purchase the scientific equipment listed below:

- a) DNA aliquoting robotic apparatus and multi-well plate reader
- b) Solid phase extraction robot
- c) Real-Time PCR detection system and DNA-quantification system
- d) High performance sonicator

7. It should be noted that whilst specific makes of instrument are listed below for the purposes of discussion, all purchases of single items of a value between 11 025€ and 51 450€¹ (or equivalent – VAT excluded) require the submission of three written quotations and the preparation of an adjudication report; these are reviewed by the Director of Administration and Finance and/or the Contract Review Committee, which in turn make a recommendation to the Director for his approval.

a) DNA aliquoting robotic apparatus and multi-well plate reader

8. The production of good quality pre-analytical samples for molecular diagnostics platforms for genomics and proteomics is an important strength of the Agency's contribution to research on cancer. Automation of liquid handling steps in the processing of samples ensures precision and optimization of these techniques. Two liquid handling robots are available at IARC that were purchased in 2004 (TECAN Genesis instruments); they are flexible and reliable, and considerably improved the efficiency and safety of the laboratory workflow. However, an upgrade of the platform is necessary as they will soon become obsolete; TECAN will no longer support the Genesis apparatus after December 2011, so the availability of spare parts will no longer be assured and the maintenance contract will not be extended beyond this date. Therefore, we propose to replace both instruments with the new generation Freedom EVO platform; these new instruments will be serviced by TECAN for at least another 10 years. The EVO has the additional advantage of two multichannel arms that brings higher productivity to genomic applications and enables diverse applications in protein purification, identification and characterization. This purchase will provide access to an instrument that will be frequently used by different research groups in the Agency.

9. The use of the above robot will also significantly increase the throughput of several assays routinely performed by IARC researchers (e.g. ELISA), since it can be used to aliquot specific reagents in multi-well plates. In this context, the purchasing of a multi-well plate reader is considered of high priority to complement the advantages offered by the liquid handling robot. We propose to purchase the Luminoskan Ascent[®] (Thermo Scientific) multi-well plate reader.

¹ Equivalent to "between US\$ 15 000 and US\$ 70 000" applying the UN exchange rate of October 2010, i.e. 0.735€/US\$.

b) Solid phase extraction robot

10. This robot is a liquid handling system that can automatically perform the extraction and purification of samples (urine, serum, plasma samples), which is an essential step to perform valid and reliable chromatographic analyses of biomarkers either by gas chromatography, gas chromatography-mass spectrometry (MS) and high performance liquid chromatography/MS/MS. These purifications are often performed using pre-prepared commercially available Sep-Pak columns, and are currently executed manually by laboratory technicians. However, this step can easily become a bottleneck when large numbers of samples have to be prepared for analyses, as in epidemiological studies. Furthermore, the purchase of this robot would allow very reproducible and reliable extractions of large series of samples, an aspect of paramount importance in metabolomics studies being developed at IARC for biomarker discovery. Thus, the purchase of this item represents a new capacity in line with major research directions at the Agency.

c) Real-Time PCR detection system and DNA-quantification system

11. Three Real-Time PCR machines are available at IARC, one (Roche) was purchased in 1999 while the other two (Stratagene) were bought in 2004. The Roche apparatus is obsolete and presents several limitations, including its incompatibility with multi-well plates. The two Stratagene machines are currently running; however, due to their intensive use by a large number of IARC researchers, they are constantly fully booked. Based on the high internal demand, it will be essential to purchase two additional Real-Time PCR machines (e.g. CFX96 System, Roche). This apparatus offers high versatility and reproducibility, allows the analyses to be conducted in a short time period, and minimizes sample and reagent use.

12. The ideal functionality of this platform will also require the use of a reliable DNA quantification apparatus that minimizes the use of samples, often extracted from human specimens. The spectrophotometer Nanodrop 2000 (Fisher Scientific) appears to be well suited for this application.

d) High performance sonicator

13. A sonicator is a fundamental piece of equipment that is used for a broad spectrum of experiments. One basic and old generation sonicator is available at IARC, purchased in 2001. The apparatus has several limitations, including the processing of one sample at a time. Due to the frequent use of this instrument, it is essential to purchase a novel high performance sonicator, e.g. Covaris S2 (KBioscience). In addition, the Covaris S2 system provides a versatile tool for quantitative and standardized sample preparation, and gives better results than a simple sonicator. It can simultaneously process up to 96 samples. Together, these features significantly improve performance and reproducibility. This equipment has a broad range of applications in genomics, proteomics and cell biology that will benefit all IARC laboratories.

Specific applications include:

- Controlled DNA shearing for library construction;
- RNA extraction from various biological fluids and tissues;
- Protein digestion in various substrates;
- Tissue disruption and homogenization;
- Cell lysis;
- Plasma Preparation/Extraction.

14. Moreover, the technology is non-contact and is therefore ideal for a shared environment as there is no need for clean-up, and no chance of cross-contamination.

Requested budget

Equipments	Approx. Price (€)	Quantity	Total (€)
DNA aliquoting robotic apparatus	34 000	2	68 000
Multi-well plate reader	20 000	1	20 000
Solid phase extraction robot	40 000	1	40 000
Real-Time PCR detection system	27 000	2	54 000
DNA-quantification system	10 000	1	10 000
High performance sonicator	48 000	1	48 000
Total (€)			240 000