- AIRC -

Associazione Italiana per la Ricerca sul Cancro

CALL FOR PROPOSALS 2014

Investigator Grant (IG)

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Foreword

The Associazione Italiana per la Ricerca sul Cancro (AIRC) is inviting applications for Investigator Grants (IG) in the area of Cancer Research. These grants are intended to support the research of established and independent scientists, leading an existing research unit. The scientific activity must be carried out in a non-profit research institution located in Italy (university, hospital or other research center). Support will be provided for a period of three years, starting January 2nd 2015, provided that AIRC has available funds.

The Principal Investigators cannot have more than one active AIRC grant at the same time in the following categories: Investigator Grant, Start-Up Grant, My First AIRC Grant (MFAG) or Transforming Ideas in Oncological Research Award (TRIDEO). Nevertheless, they can apply to this Call if their active grant is in its final year.

Only one application, either IG, or MFAG or Start-Up or TRIDEO per applicant can be submitted within the 2014 Calls.

Eligibility criteria

Applicants. Applicants, henceforth defined Principal Investigators (PI), can be of any nationality. They should have achieved scientific independence and leadership and, by the submission deadline, they **must have a strong track record** as demonstrated by last-author primary research papers (no reviews) published in the last five years in high level peer-reviewed journals. However, we are aware that different disciplines may have different authorship conventions (*e.g.* clinicians directly involved in clinical practice usually appear as first authors when leading the research) therefore, please contact the AIRC Peer Review Office if working in a research area in which, traditionally, the principal contributor of a published work is not listed as last author.

Applicants with a total active Impact Factor (IF) lower than 20 (active IF is calculated as the sum of IFs of articles where the applicant is first, last or corresponding author) are discouraged to apply and, depending on their career stage and area of research, will be triaged out. In addition, please note that if the total IF of all papers published by a PI in the last five years is below 50, the probability of success are extremely low, as the level of productivity is taken into account in the review process. An analysis of the results of the past Calls showed that for these investigators the approval rate has been 2,7%.

AIRC reserves the right to reject proposals from PIs who, even if jointly affiliated to an Italian and a foreign institution, do not meet criteria for continuous presence in the Italian center for at least 50% of their time, regardless of the "Effort on project" indicated in the application (see "Personnel Involved in the Research" section). Supporting documentation will be requested from both institutions; if such documentation does not certify the presence of the PI in the Italian institution for 50% of his/her time for the entire duration of the grant, the application will not be sent out for review.

Hosting Institutions. Applicants must operate in a non-profit Italian Institution for the entire duration of the grant. The Hosting Institution must be a non-profit research institution (possible revenues must be reinvested in research activities), with the mission to conduct biomedical research and to disseminate its results. In the application, indicate the Institution where the research will be carried out.
Any change occurring in the relationship between applicant and the Hosting Institution (*e.g.* termination, retirement, leave of absence, sabbatical etc.) or in the Hosting Institution legal entity or organization (*e.g.* changes in Institution name, merging, Legal representative turn-over, changes in addresses) must be promptly notified to AIRC.

Hosting Institutions must provide proper working spaces, laboratories, equipment, qualified personnel and resources to allow the project execution. AIRC reserves the right to verify that these conditions are met.

Research plan. A proposal that has been rejected twice in the past cannot be resubmitted a third time. See "Resubmission of revised applications" for further details.

The research plan

All proposed research plans must have a clear and strong focus on cancer, and should fall into one of the following research areas:

1. Cancer genetics
2. Control of gene expression and epigenetics
3. DNA damage and repair
4. Cell cycle control and cell division
5. Cell death and apoptosis
6. Cancer stem cells
7. Signal transduction and intracellular trafficking
8. Cell adhesion, migration, invasion and metastasis
9. Tumor microenvironment
10. Tumor immunology
11. Angiogenesis
12. Metabolism
13. Epidemiology and prevention
14. Infection, inflammation and cancer
15. Imaging
16. Diagnosis
17. Prognosis
18. Radiobiology and radiotherapy
19. Chemotherapy
20. Hormone therapy
21. Immunotherapy
22. Targeted therapy and new therapeutics
23. Gene therapy
24. Resistance to therapy
25. Structural biology
26. Computational biology

In principle, AIRC believes that rigid guidelines on the research plan should not be provided for this type of grant since investigator-driven discovery is one of the most potent engines of scientific progress.

At the same time, AIRC feels that phenomenological, descriptive-at-best, proposals should be discouraged. The following kinds of proposals will receive **low priority** and have marginal chances of being funded:

- studies that are essentially confirmatory in nature or represent marginal "variations-on-the-theme" of well-established concepts in cancer research;
- studies contemplating descriptive screenings of molecules and/or phenotypes without mechanistic insights and/or elements of innovative discovery. These include purely descriptive microarray and proteomic profiling studies that are not associated with a strong strategy for

clinical application, or the generation of chemical compounds without validating their anti-tumor activities in pharmacological and biological studies;
- generation of reagents and/or optimization of technologies, or creation of services/technological facilities in the absence of a coherent and innovative research plan;
- chemical and/or viral carcinogenesis studies not embodied in the framework of mechanistic studies;
- requests for on-going routine collection of current statistics, such as cancer registry;
- descriptive epidemiology studies;
- health economics proposals;
- clinical studies that are clearly drug company-driven, in such a way that free exchange of reagents and information would be impaired, the PI or the Institution would be deprived of the intellectual property of the data, or the company could veto publications of results. This does not exclude collaborative studies with industry;
- clinical studies that do not contribute to build or expand an original and independent line of research.

As for clinical and epidemiological studies, AIRC has interest in the following type of studies:
a) proposals aimed at studying:
- interactions between environmental risk factors, genetic profiles and intermediate biomarkers;
- the natural history of cancer by linking different phases of the disease to specific biological/genetic profiles;
b) clinical studies of innovative procedures (*e.g.* molecular, imaging etc.), aimed at evaluating in clinical practice the efficacy of diagnostic and therapeutic approaches, in terms of outcome and quality of life;
c) pilot clinical studies of new therapeutic drugs, procedures or strategies;
d) proposals aimed at a critical evaluation of last generation drugs and at elucidating their activity by mechanistic insights;
e) clinical trials on types of cancer or treatment that generally receive low financial support from other funding agencies, such as studies on rare tumors and/or orphan drugs.

All proposals must contain appropriate provisions for study design, statistical analysis and sample size (whenever applicable), in particular for studies with human subjects (clinical and epidemiological). If such information is missing or insufficient, the research proposal will be rejected.

For clinical trials involving human subjects, and for studies with human biological samples, the approval of the local Ethics Committee/Institutional Review Board is mandatory; research proposals will not be funded in the absence of such documentation. See the "Bio-ethical requirements" section of the Guide to proposal preparation for further details on the documentation required. AIRC does not accept any liability for harm to participants in AIRC funded trials.

Proposals of clinical studies that are property of companies producing drugs or diagnostic tools and that receive economic support from such companies will not be accepted. Drug supply and economic support from companies do not preclude AIRC evaluation, provided that the PIs have the full property of data and results, and that companies have no right to veto the publication of results at any time. A statement that the management of the study, data acquisition and analysis and data property are completely independent of any company producing/marketing drugs or diagnostic tools or with any type of economic interest in the study must be included in the application (see the "Personnel involved in the research" section of the application form), together with the indication on whether the company provides its product(s) to the PI for free or not. Failure to provide such information will result in the rejection of the proposal.

Intellectual property

For inventions arising from an AIRC funded project, grant money can be used to cover the costs for filing a patent application within the European Union (EU), but not to extend a patent to non-EU countries. Intellectual property and patents resulting from research carried out with AIRC grants will be solely owned and managed by the grantee and the non-profit Hosting Institution.

Funding

Grants are for a three-year period, contingent upon the presentation of yearly renewal requests. Funded projects will officially start on January 2nd 2015 and terminate on January 1st 2018. Applicants must indicate the requested support in the budget section of the application, providing a detailed financial breakdown of the anticipated expenditures.

The following costs are permitted:
- **direct research costs**, inclusive of consumables and supplies, small bench instrumentation, services, maintenance contracts, publication costs, meetings/travel costs;
- **support for fellows (personnel costs)**. Support will be provided only for fellows at 100% of time on the project. Applicants should ascertain that their own Institution can take on fellows;
- **indirect costs.** These are generated by the research project, but cannot be attributed directly and quantitatively to a specific activity. For example, they may include core facilities, personnel of the research team not directly involved in research activities (*e.g.* secretaries and core-facilities personnel, etc.). Indirect costs are up to 15% of the direct research costs (personnel included);
- **overheads.** These are expenses that the Hosting Institution must cover so that the research can be carried out. They may include, for example, grant management costs, utilities, administrative costs etc. Overheads are up to 10% of the sum of direct (personnel included), and indirect costs.
Both indirect costs and overheads can be calculated by the Hosting Institution according to its own accounting standard criteria.

Once awarded, the grant is assigned to the PI to carry out the project described in the application. Funds will be made available to the Hosting Institution under terms and conditions that AIRC will provide once the application is approved. Funds must be at the grantee's disposal within 30 days from the time the Hosting Institution has access to them.

Transfer of grant money to other laboratories either in Italy or abroad is not allowed.

Renewal requests must be submitted yearly (see "Deadlines"), through appropriate online forms, and will be automatically approved for the second and third year, provided that AIRC has available funds.

At the end of the third and last year, a scientific final report will be required and will strongly impact on the evaluation of future AIRC grant applications**.** An administrative final report must be submitted within three months after the termination of the grant (see "Deadlines" section). Further information about the terms and conditions of the grant, including renewal requests, scientific and administrative final reports, will be provided once the application is approved.

For exceptionally competitive PIs (*e.g.* top scorers in the final AIRC ranking, well-established investigators who have demonstrated a long-term commitment to and success in cancer research with consistently outstanding track records and continuous AIRC funding), it will be possible to extend the grant by two additional years, provided that AIRC has funds available. Further details and instructions will be provided by the end of the second year of the grant.

Please note that AIRC reserves the right to audit the administrative management of the project at any time.

The Review Process

All applications undergo an initial administrative review by the staff of the AIRC Peer Review Office for compliance with guidelines and eligibility; those that do not conform will be triaged out. Applications that meet all eligibility requirements undergo a peer review process that ensures a fair, independent and expert evaluation of the scientific quality of the applications.
For the evaluation of IG applications AIRC relies on the expertise of internationally recognized Italian scientists members of the "Comitato Tecnico Scientifico" AIRC (CTS) and a panel of about 600 well-established international investigators working in institutions outside of Italy. Reviewer assignments are made in compliance with conflict of interest and appearance of conflict rules to ensure a review free from inappropriate influence (*e.g.* no application from a given research Institution is assigned to reviewers from the same Institution or the same city). Applicants may request to exclude up to two scientists as reviewers through the online application form.

IG applications are independently reviewed by three reviewers with expertise in the specific area of the research plan: two international reviewers and one member of the CTS. In case the needed expertise is not available within the CTS, a scientist with the appropriate expertise, operating in a research institution either in Italy or abroad, will be recruited to serve as third reviewer. When accepting to evaluate an application, reviewers and CTS members agree that they will maintain the confidentiality of applications and associated materials they have received.

The review criteria are:

a) significance and relevance to cancer;
b) innovation;
c) approach and feasibility;
d) leadership and independence, international standing of the investigator in cancer research, track record adequate to successfully complete this study;
e) environment and standing of the Hosting Institution at the international level (including an analysis of the resources in the Hosting Institution to determine if these are sufficient to grant success to the endeavour);
f) adequacy of the budget requested.

In case there are major discrepancies among the reviews of an application, an editor is appointed, in observance with conflict of interest rules. Editors do not provide their own review but instead serve as "*super partes* arbiters", assessing and balancing the three evaluations.

When all reviews have been completed, applications are discussed by all members of the CTS during study section meetings. Final Reports of proposals by previously funded applicants are also taken into account during these meetings as a measure of productivity and scientific accomplishments of the PIs. In the final plenary session, all applications are ranked in order of scientific merit (for each application, the scores received from all reviewers are added up to generate the application's global score, which is used to rank the applications). The final ranking and the financial availability of AIRC will determine the recommendation for funding, to be endorsed by the AIRC Board of Directors. All applicants will be notified of the final decision on their application with an official communication from AIRC (the notification date is reported in the "Deadlines" table), and they will have access to the reviewers' comments. The identity of the reviewers will not be disclosed. **The decision concerning the funding of an application cannot be appealed.**

To avoid conflicts of interests, IG applications submitted by members of the CTS will be reviewed by foreign reviewers only (at least three); the Scientific Director will make the funding decision following the indications received from the reviewers.

Please note that after the awarding of a grant, AIRC reserves the right to site-visit the PIs laboratories and Institutions, at any time.

Resubmission of revised applications

AIRC allows only one resubmission for applications that were not funded. The revised application must include a response to the reviewers' comments in the "Revision" section of the online form.
A revised application that has not been approved even after addressing all the issues raised by the reviewers is not considered competitive enough and therefore cannot be submitted a third time. Applicants who fail to receive funding after two submissions (*i.e.* the original and the revised application) **may submit a new application only if its research plan is fundamentally different in content and scope from the two that were previously considered not fundable**. More specifically:

• a new application should include substantial changes in all sections of the research plan;
• there should be fundamental changes in the questions being asked and/or the outcomes examined;
• changes to the research plan should produce a significant change in the direction and approach for the research project;
• rewording of the Title and Abstract does not constitute substantial changes in scope, direction or content.

An application submitted for the third time (by the same or other applicants) will not be sent out for review and will automatically be rejected, regardless of whether it was presented in the context of a different funding scheme. Example: an MFAG application that has not been funded twice cannot be resubmitted for the third time as an IG application, unless the research plan is fundamentally different.

Deadlines

DEADLINES ARE STRICTLY ENFORCED: applications submitted after the deadline will not be accepted.

Deadlines for applications (by 23:59, Central European Time, of the indicated dates).

New applications	online form release	February 5, 2014
	electronic submission deadline	March 18, 2014
	paper submission (postmark) deadline (*)	March 20, 2014
	notification of results	November 30, 2014
	start of grants	January 2, 2015

(*) Only the following pages are required in paper format and must be mailed by the indicated deadline:

• Title page, signed by the PI and the Institutional Legal representative;
• Abstract;
• Budget form, signed by the PI and the Institutional Legal representative;
• Bio-Ethical requirements page, signed by the PI;
• only if research in humans is planned: Clearance from the Ethics Committee.

Send all paper documentation to the following address:

AIRC
Direzione Scientifica
via San Vito 7
20123 Milano

***** Paper documentation marked with "draft" is not valid. Please print the requested pages only after completion of the online submission *****

If these documents are not sent by the indicated deadline, or if AIRC does not receive them, applications will not be sent out for review.

Deadlines for renewals and final reports (by 23:59, Central European Time, of the indicated dates).

Renewal for 2nd year of funding	online form release	April 15, 2015
	electronic submission deadline	June 4, 2015
Renewal for 3rd year of funding	online form release	April 13, 2016
	electronic submission deadline	June 7, 2016
Scientific final report	online form release	July 3, 2017
	electronic submission deadline	September 1, 2017
Administrative final report	online form release	January 10, 2018
	electronic submission deadline	March 31, 2018
	paper submission (postmark) deadline	April 2, 2018

The deadlines for renewal requests and final reports may be subjected to changes. In this case, PIs will be notified of the new deadlines by e-mail.

Guide to proposal preparation

To apply, click on the "Area Ricercatori" of the site www.airc.it

First-time applicants must register in our system: please click on "Register (for applicants only)" and provide the requested information, including your tax code (*codice fiscale*). The registration will be confirmed by e-mail and a username and password will be provided.

Log on in your AIRC account with your username and password.

To launch the application form for the first time: click on "Calls", select "Individual Grants", then click on "Apply" in the IG 2014 section. In the next window, click on "Access the application form". To access the application in progress: click on "Submissions" and then click on "Access the application form".

Below you will find a list of the general features of our online system:

- the system automatically launches the "Principal Investigator" form. All forms that must be filled out are listed on the left side of the page. Click on each one of them and fill in all the mandatory fields (in bold). **Make sure to click on "SAVE" after completing each form;**

- the forms can be filled out in different sessions and the work can be interrupted/resumed at any time;

- a number of forms must be submitted as PDF files. **Each file cannot exceed 2Mb**. Any file exceeding such a limit will be automatically rejected by the system. **Secure PDF files cannot be uploaded**. Documents submitted as PDF files must be written using an A4 format, single spaced, with margins not less than 2 cm and **a font not smaller than 12 point** (preferably Palatino, Times, Arial). **Do not exceed the page limit indicated for each section:** the system will not allow the upload of a number of pages beyond the limit;

- the status of each form is shown on the left: red cross for mandatory forms that are incomplete; yellow circle for not mandatory forms; green mark for completed forms. These same symbols are used in the "Summary" section;

- the "Summary" section (last title in the list of forms on the left) allows applicants to:
    a. check and see whether each form has been correctly filled out; for mandatory forms that are incomplete, the information that must be provided is listed;
    b. view and print the application in its incomplete/complete state. By clicking on "Create draft" and then on "Open submission draft" you can download the PDF draft generated by the system;
    c. submit the application. Once all mandatory forms are complete, please click on "Submit". Be aware that after clicking on "Submit" it will not be possible to make any further modifications;

- the complete proposal is automatically assembled as a single PDF file at the end of the online procedure;

- applicants may designate a **Grant Officer** from their Institution to assist in the preparation and submission of the application. However, the PI is fully responsible of the entire proposal content. See the "Research project" section for further details.

The application must be written entirely in English. **Applications that do not conform to all the requirements in these instructions will be rejected**.

Principal Investigator (PI)

The PI is the researcher who is primarily responsible for designing and directing the proposed research.
Please provide the PI's position in the Hosting Institution (examples: associate professor, staff scientist, etc.). All other fields are automatically filled out with information provided during the registration into the AIRC website; to modify the information in any of these fields, please click on the link "My personal data" at the bottom of the page and edit the information in the pop-up window. **Please note: to successfully complete this form, it is mandatory to provide the tax code (*codice fiscale*) of the PI through the "My personal area" section**.

Research project

Please fill in the requested fields, entering:
• the title of the proposal. The title must not exceed 120 characters, small cases, spaces included. It should be neither too specific (with abbreviations of molecules names such as "Role of PGCI in tumor progression"), nor too vague (such as "Analysis of tumor metastatization");
• the research area. Select one of the 26 Research areas provided in the menu and listed in "The research plan" section of this Call, based on the topic of the research activity that will be carried out with the grant;
• the Hosting Institution (*i.e.* the Italian research center where the PI will carry out the research activity). The system automatically lists the Institution(s) indicated by the PI in previous applications to AIRC, if any. In case it corresponds to the institution where the research supported with this grant will be carried out, please check the corresponding box, otherwise check the box "Other" and select the correct Hosting Institution from the drop-down menu. The "Address" field is automatically filled in by the system once the Hosting Institution and Department have been selected. If the Hosting Institution is not listed in the menu, please contact our offices (airc.direzione-scientifica@airc.it);
• the Department (optional): please select the Department, if applicable;
• the Laboratory (optional): please indicate the Laboratory, if applicable;
• Grant Officer (optional): applicants may designate a Grant Officer from their Institution to assist in the preparation and submission of the application. The name of the Grant Officer, if not already present in the form and selectable from the drop-down menu, must be communicated to AIRC by e-mail (airc.direzione-scientifica@airc.it). AIRC will create an account for the Grant Officer and send him/her the access codes to it. The name of the Grant Officer will then appear in the drop-down menu of the application form, allowing the PI to select the name. From their Personal Area the authorized Grant Officers will have access to the PI's application form and will have the possibility of completing and submitting it on behalf of the PI.

Legal representative

The Legal representative (*Legale rappresentante*) of the Hosting Institution will be responsible, along with the PI, of all the legal and administrative duties of the grant. The information regarding the Legal representative and the Scientific Director are provided automatically by the system based on the Hosting Institution selected in the "Research Project" section. Please make sure that all data are correct and up-to-date, and then click on "Save". If they aren't, please notify AIRC by e-mail (administrative.office@airc.it) and provide an official record (*e.g.* copy of Appointment Decree) as supporting documentation.

Project Keywords

Project keywords will be used by the AIRC Peer Review Office to assign each application to the most appropriate reviewers. Therefore, **a good choice of keywords is extremely important to ensure that reviewers with the most adequate expertise will evaluate the application**. Avoid keywords that are too generic or too similar with each other; pick a set of keywords that clearly define the key aspects of your research plan.

Keywords are listed at the end of this Call both in alphabetical order and by topic.

To enter the project keywords (at least one, maximum five) please click on the button "Enter/Edit Keywords". In the "Manage Project Keywords" pop-up window, keywords are grouped by their first letter: for example, by clicking on the letter "C" in the menu it is possible to visualize all keywords beginning with the letter C, and to select one. Alternatively, type in a specific keyword in the "Search a specific keyword" box and click on "Search". To select a keyword, click on it (the keyword box will turn from grey to blue) and then click on "Save". You will be automatically redirected in the main keywords page: click on "Save" at the bottom of this page to save the record. Repeat this process for each keyword. To exit the window, click on "Close".

Abstract

Extreme care must be placed on the Abstract preparation. The Abstract must provide an immediate understanding as to why the research plan is proposed, which approach will be undertaken and the potential relevance of the whole line of research. Avoid long introductions and do not include references.

The Abstract must be structured into the following sections: Background, Hypothesis, Aims, Experimental Design, and Expected Results. Either type in the text directly into each box, or use a Word processor and then cut and paste each section into the corresponding box. Please note: the system allows plain text only; special characters will be maintained but formatted text (*e.g.* bold, superscripts, etc.) will be automatically converted into plain text. **The total number of words for the entire abstract must not exceed 500**; for convenience, the total word count is provided at the bottom of the page and is updated in real time. When all sections have been filled out, click on "Save". All sections will be assembled automatically into one page in the PDF file of the application.

The Abstract of all research projects funded by AIRC may be made public on AIRC journals and websites.

Revision

Please check the appropriate box ("Yes" or "No") depending on whether the research project submitted within this application is a revision of a previously rejected proposal or not.

If it is a resubmission, please upload a document with a point-by-point reply to the criticisms and issues raised by the reviewers, explaining how they have been addressed and indicating all changes (additions, deletions, modifications) introduced in the research plan for this purpose. **Please do not exceed two pages (approx. 1000 words).**

The Peer Review Office will try to assign revised applications to the same reviewers that evaluated it in the previous Call. However, this is not always possible as some reviewers may not be available in every round of review. Therefore, please make sure to describe (or to report verbatim) all issues raised in the original evaluations, so that potentially new reviewers can understand how the application has been modified to address the criticisms. Exceptionally, and upon presentation of a cogent argument to be included in this section, applicants may request not to have their application reviewed again by one of the three previous reviewers. Refer to the "Reviewers to be excluded" section for further details.

An application submitted for the third time with the same research plan (by the same or other applicants) will not be sent out for review.

Proposal Main Body

This section should not exceed 10 pages (approximately 5000 words), including figures, preliminary data and references. The Proposal Main Body must be attached as a PDF file.

Describe in detail the proposed research, intended to have a duration of three years, according to the following guidelines:

- please provide the background and rationale of the proposed research, along with relevant literature references; avoid lengthy, paper-like, introductions. The bibliography should be limited to only those citations essential to the application. List all references together at the end of the proposal main body, **employing the format used by the journal Cancer Research: for any reference, give the title and all authors.** Example: Hanahan D, Weinberg RA. Hallmarks of cancer: the next generation. Cell 2011; 144:646-74. When available, we strongly encourage to include a paper identification code (PubMedID or doi);
- please describe the experimental design and the methodologies that will be employed. If the methodology is new or unusual, describe it in sufficient details for evaluation. Description of cumbersome experimental details and protocols, however, is not encouraged and generally detracts from the quality of the proposal.
  The research plan should be organized in *tasks*. Given existing difficulties in splitting clinical and epidemiological proposals into tasks, the task subdivision is mandatory only for proposals in laboratory research areas only. Proponents of clinical and epidemiological studies should use subdivision in *phases* whenever possible, since this facilitates the work of reviewers and, in general, results in a better appreciation of the real value of the proposal. When the description of the research can be subdivided in tasks/phases, each numbered item must describe a precise part of the project with its own experimental design and methodological approach.
  The objective (milestone) of each task/phase and the experimental design (including methods and time-frame) should be clearly identifiable and will be examined by the reviewers to evaluate the feasibility of the project;
- **make sure to include a section on potential pitfalls and caveats, discussing the potential difficulties and limitations of the proposed procedures, and suggesting alternative approaches to achieve the objectives;**
- please describe the feasibility of the project, by providing:
  - preliminary data. Pay particular attention to this point, as reviewers always evaluate whether enough preliminary data are provided to support the working hypotheses. Include figures (not just written descriptions) of relevant preliminary data;
  - power calculation. For clinical and epidemiological studies, and whenever appropriate, make sure to have adequate sample sizes to ensure meaningful and statistically significant results;
  - a description of the PI's expertise, qualification, past experience and accomplishments that are directly relevant to the projected success of the proposal;
  - a description of facilities and major equipment available for the research (this is particularly important as many international reviewers may not be familiar with Italian research institutions);
  - a description of the key expertise available in the research team (it is possible to provide this information in the "Description of the work for every unit of personnel" section).

Personnel Involved in the Research

This form must be filled out for all persons directly involved in the project, including the PI. Do not list secretaries and/or administrative staff, or personnel involved for less than 20% of their time. Please pay particular attention to the allocation of manpower: reviewers will determine whether it is reasonable for the amount and type of work proposed. PIs are expected to be involved for a significant fraction of their time.

The "core research team" is the research unit directed by the PI, comprising the PI and internal staff (fellows, technicians, collaborators working in the Hosting Institution). The term "External collaborations" is used for scientists affiliated with a different Institution and collaborating with the PI, and for companies involved in the project. Even though scientific collaborations are not discouraged, Investigator Grants are awarded to a single PI, who has full responsibility for directing the proposed research; they are not meant to support multi-unit projects conducted by a team of independent investigators. Also, please note that the term "collaboration" means a scientific collaboration, not a kind of labor contract.

Begin by completing the information relative to the PI: click on the name of the PI, fill in the indicated fields, then click on "Save".

Core team members

To insert a new member of the research unit, click on "Add new core team member" and fill in the fields in the pop-up window. In addition to their personal data (name, surname, date of birth, gender, tax code and Hosting Institution), the following information are required:

Role: please choose one from the available entries: fellow; technician; internal collaborator (for any personnel working in the same laboratory, Department or Institution as the PI, and working/collaborating with the PI on the proposed research plan).

To be defined (TBD): check this box if a fellow, technician or internal collaborator has not been identified yet, and enter the requested information. Add TBD personnel sparingly, since a high percentage might compromise the timely start of the work and/or negatively influence the assessment of the feasibility of the research plan. For each TBD personnel please upload one page containing a brief description of the qualifications/skills necessary for the project that the TBD should have.

Title: please choose one from the available entries: Doctor, Professor, Engineer, or leave blank if none applies.

Clinician: for each personnel, including the PI, choose "yes" only if directly involved in clinical practice (*i.e.* examining and treating patients). In general, fellowship support should not be awarded to clinical fellows, since it is quite rare that physicians taking care of patients may be involved on a specific research project at 100% of their time. Exceptions may be possible if thoroughly justified in the "Personnel costs justifications" section of the budget form.

Man/year effort: please indicate the percentage of time that will be devoted to the actual performance of the work. Fellows for whom a salary is requested must be at 100% of their time on the project. AIRC discourages the habit of listing many units of personnel at marginal fractions of their time: therefore, make sure to have a sizable number of units of personnel devoting at least 75% of their time to the project. PhD students (or equivalent) can be listed as 100%, as the time commitments to courses is not taken into account.

In general, **requests for fellowships should not exceed 50% of the total man/year effort**. Example: for a research unit where all personnel adds up to a total of 4 man/year effort, no more than two fellowships for two fellows at 100% of their time (= 2 man/year effort) can be requested.

Curriculum vitae: a short CV, **maximum one page**, **in English**, must be added for personnel working at more than 75% of their time, with the exclusion of technical staff. Upload the CV as PDF file. **The following format must be used for all CVs**:

- personal data (name, date and place of birth, citizenship, work address, phone number and e-mail address);
- education (list, in reverse chronological order, all degrees obtained);
- research experience (list, in reverse chronological order, all positions held, describing very briefly – two sentences maximum – the main focus of the research activity);
- technical skills and competences;
- awards;
- publications (please provide only a selection of the most relevant, with a maximum of five).

Financial support: indicate the amount of financial support (*e.g.* fellowship) requested; support will be provided only for **fellows at 100% of time** on the project. Financial support can be required, however, only for those fellows who do not have any other fellowship or equivalent source of income. Integration of the AIRC financial support by the Hosting Institution is permitted, but two salaries are not allowed. Applicants should ascertain that their own Institution can take on fellows under this provision. The general policy of AIRC is to not provide financial support for candidates over 35 years old; in addition, the financial support requested for fellows should be consistent with the gross amount provided to fellows awarded an AIRC/FIRC fellowship for Italy (€ 25.000/year or, in case the fellow relocates to the Hosting Institution from a different city or region, € 30.000/year).
In case an AIRC/FIRC fellowship is awarded to one of the unit of personnel for whom financial support has been requested in this grant application, the PI will be allowed to use the financial support for another unit of personnel, if needed. In case, the name of the new fellowship recipient must be provided when submitting the budget adjustment or the grant renewal request.

External collaborations
To insert a collaborating scientist external to the core team and/or not affiliated with the Hosting Institution, or a company involved in the project, click on "Add new external collaboration" and fill in the fields in the pop-up window. In both cases a formal letter of collaboration is required and must be uploaded as PDF file. In the letter of collaboration, the role on project, the expertise and/or reagents that will be provided should be described in detail. Also in this document, the external collaborators should indicate whether specific agreements have already been made with the PI in terms of: a) management of the resources; b) intellectual property rights; c) authorship in publications resulting from the collaborative effort. Letters of collaboration provided by companies should also state that: a) the PI has the full property of data and results; b) the company has no right to veto the publication of results at any time; c) the management of the study, data acquisition and analysis and data property are completely independent of any company producing/marketing drugs or diagnostic tools or of any type of economic interest. The letter should also indicate under what provision (free or not) the company provides its product(s) to the PI.

Description of the Work for each Unit of Personnel
Click on "Select" and upload a PDF file; please do not exceed 2 pages (1000 words).
Please divide this document into Tasks, reflecting the organization of the proposal main body, and indicate who will do what in each Task. Describe in a concise, but complete manner, the work that each unit of personnel (both core team members and external collaborators) will perform. If necessary, provide evidence of the skills of key team members citing a couple of significant papers that attest to their expertise. Please indicate the position held by each person (*e.g.* investigator, post-doc, staff scientist, technician, etc.). Do not list undergraduate students, secretaries and/or

administrative staff, but do include scientific personnel that might be involved for less than 20% of their time.

Budget Form

In the three columns, one for each year of support, insert the amount needed for each of the categories allowed.

Budget categories allowed:

Direct research costs (excluding personnel): The standard way of budget calculation, based on an itemized list of actual costs, must be employed. Enter the amount of money needed for research costs, divided into the following subcategories:

- consumables and supplies (examples: plasticware, reagents, chemicals, animals if applicable, etc.);
- small bench instrumentation (examples: electrophoresis power supplies, microcentrifuges, PCR machines etc.);
- services (examples: sequencing, microarray, histology, patent filing costs, etc.);
- maintenance contracts (examples: service contracts for large instruments; animal facilities contracts if outside the research institution);
- publication costs (most likely none in the first year of the project, as it takes time to obtain publishable data);
- meetings and travel costs.

Personnel costs: the amount requested for the first year is automatically entered by the system in this field if one or more fellowships have been requested in the "Personnel involved in the Research" section. If fellowships are requested also for the second and third year of support, please fill out the relevant fields.

Indirect costs: as defined in the "Funding" section of this Call, indirect costs will be supported up to 15% of the direct research costs (personnel included). Please enter the percentage charged by the Institution (from 0 to 15; 0,1 decimals are allowed); the system will automatically calculate the corresponding amount.

Overheads: as defined in the "Funding" section of this Call, overheads will be supported up to 10% of the sum of direct (personnel included), and indirect costs. Please enter the percentage charged by the Institution (from 0 to 10; 0,1 decimals are allowed); the system will automatically calculate the corresponding amount.

For each budget category please provide a description/justification of the amounts requested using the "Insert/Edit Notes" boxes. More specifically:

- for each section of the "Direct research cost", provide a financial breakdown, on an item basis;
- for "Personnel costs": describe under what type of provision (*e.g.* fellowship, contract etc.) the fellows for whom financial support is sought will be hired. Use this section to justify exceptions for requesting financial support for clinicians (see the section "Personnel involved in the research").

The "Insert/Edit notes" boxes are mandatory sections and must be completed: write n/a if no expenses are foreseen for any particular category of costs.

In the "Institutional Letter of Indirect Costs/Overhead" section at the bottom of the form please upload a letter, in PDF file format, indicating the percentage rate(s) of indirect costs and/or overheads charged by the Institution, even if the rate is zero. The letter must be dated and signed by

the Legal representative. Please note: the rate indicated in the letter must be consistent with the rate indicated in the budget form.

Existing/Pending Support

If the PI is receiving or is expecting to obtain grants from any funding agency during the period of support with the AIRC grant, please list them, regardless of whether they overlap with the current proposal or not. For each grant, indicate: the funding agency, project title, duration, total amount of funding (in Euros) and degree of overlap (in terms of research plan) with the project presented with this IG application. In case already funded research projects overlap or are very similar to the current proposal, provide a justification for requesting additional support from AIRC in the apposite box; also, please provide name and percentage of time committed of all personnel listed in the current application (including the PI) that are also involved in the other grant. A single unit of personnel cannot be allocated for more than 100% of the time. This applies to the sum of all grants, including those from agencies other than AIRC.

Education and Training of the PI

Click on "Add new record" and list degrees and post-doctoral trainings of the PI. For each entry, please indicate the Institution, City, Field of research, time frame and name of the supervisor, then click on "Save".

Research and Professional Experience of the PI

Click on "Add new record" and list all positions held by the PI. For each entry, please indicate the Institution, City, Country, time frame and the position held, then click on "Save".

Narrative biosketch

Please identify up to five major scientific accomplishments of the PI (but no more than five!) and explain how they helped advance the scientific knowledge in oncology. They may be seminal publications, patents, awards, significant teaching/mentoring activities, proprietary software and datasets, authored books. The goal is not to have a long list of achievements, but rather to focus on those that have impacted most on the field. Upload the document as PDF file (maximum 1 page, approx. 500 words).

Research Interruptions and Justifications

This section should be completed in case the applicant's research activity has been interrupted for at least 5 months between 2009 and 2014 due to parental leave, children care, illness or other personal issues. This section allows applicants to report prolonged periods of absence from work that may have had a negative impact on their track record. Reviewers are instructed to take this information into account when assessing the scientific productivity of an applicant.

Publications

The PI must provide the list of papers published in the last five years. To do so, a number of options is available; click on any that applies.

Add PubMed publications

Within this interface the system launches a PubMed search and provides a list of PubMed-recorded publications spanning from 2009 to 2014. Enter the PI's first and middle initials, and click on

"Find". If the applicant has published with a different last name than that used to register into the AIRC account (*e.g.* married *vs* maiden name), check the "Change surname" box, and then click on "Find". Alternatively, search for a specific article by entering its PubMed ID in the corresponding box. Once the list of all PubMed publications has been generated, please follow these steps:

a. *Select papers to be included in the application*
   From the list of all PubMed publications, select the papers published by the applicant and that the applicant wants to include in the proposal by clicking on the box at the left side of each article. Pay special attention to potential homonyms. Do not include abstracts, conference papers, letters to the editor, book chapters and papers published in journals without IF, unless they are new journals.

b. *Indicate acknowledgement to AIRC and relevance to cancer research*
   For each publication, please indicate whether it has an acknowledgement to AIRC and whether it is relevant for cancer research by checking either "YES" or "NO" (the default is "NO" for both).

c. *Certify accuracy of flags, and save records*
   Once all selected publications have been flagged, scroll down to the bottom of the page and check the certification box ("I, the undersigned, certify that all publications have been carefully checked and correctly flagged for authorship. I am aware that any mistake or inaccuracy may impact the evaluation of my track record"). The system automatically recognizes the position of the applicant in the list of authors in each publication (if not, the box "not assignable" will be checked). It is possible to amend this information, if incorrect, by providing supporting documentation from the main page of the Publications (see below). Click on "Add selected publications" and then on "Close" to complete the process.

Add Web of Science® publications
From this section it is possible to enter articles that are included in Web of Science® but not in PubMed (most journals are present in both databases, but there are few exceptions; the drop-down menu does not list PubMed journals). For each record, please provide the title, list of authors, journal, year and month of publication, volume, pages. Select the journal from the drop-down menu, which provides all journals listed in Web of Science®. Mark each paper for authorship, acknowledgement to AIRC, and relevance to cancer research. Please upload the page of the article where the role of the author in the published work is certified (not the entire manuscript). Finally, check the certification box and click on "Save" to complete the process.

Add papers in press
Use this section to submit articles already accepted for publication but not yet available online. For each record, please provide the title, list of authors, journal, year. Select the journal from the drop-down menu, which lists all Web of Science® indexed journals. Mark each paper for authorship, acknowledgement to AIRC, and relevance to cancer research. Please upload a PDF file with the letter of acceptance from the journal. **Do not attach the entire manuscript**, unless it is relevant for the proposed research (*e.g.* it contains important preliminary data mentioned in the proposal main body). Finally, check the certification box and click on "Save" to complete the process. The IF of papers in press will not be included in the publications table.

Add from MyPub
This interface lists all publications previously entered into the system (either when submitting an application, or when submitting a grant renewal request, or directly into the MyPub section of the Personal Area). By selecting some or all of these publications, they will be uploaded in the current application; please make sure the flags are correct.

All publications entered from any of the above sections will be listed in the "Publications" main page. From here, it is possible to edit the information relative to each paper by clicking on the title of the publication. Once in the "Edit publication flags" window, please check the appropriate authorship box and, if different from the default provided by the system, upload the page of the article where the role of the author in the published work is certified (*e.g.* for a second or third author who is in fact a co-first author, please upload the PDF file of the page where it is stated that the PI "equally contributed to this work"). To complete the process, click on the certification box and click on "Save" to complete the process.

The system will automatically process all publications data to generate the complete **list of publications** reporting the IF and the PI's **track record summary** in the PDF file of the application. The PI track record summary is intended as a quick assessment of the **productivity in the last five years** and of the international standing of the PI, in order to facilitate the work of reviewers. Please note: papers in press are not included in the track record summary.

Even though the Impact Factor is internationally acknowledged as an important objective criterion that allows for an estimate of peer-recognition of the work of a given investigator, AIRC is aware that it is not an absolute standard to evaluate scientific productivity. Indeed, several circumstances mitigate the relevance of the IF; for example, some important, recently established journals may not be impacted yet or have "artificially low" IF due to their young age. Also, for some research areas with very specialized, limited readership (*e.g.* medicinal chemistry) the best journals have low IF compared to others in more popular research arenas. **Reviewers are carefully instructed by AIRC to give due consideration to all caveats associated with the IF when assessing an applicant's track record and scientific productivity.**

In case additional papers are published or accepted for publication after the submission deadline, the PI may request permission from the AIRC Peer Review Office to add this supplementary information to his/her application. Please prepare a **single PDF file** containing a copy of the acceptance letter and a copy of the manuscript, and e-mail it to: airc.direzione-scientifica@airc.it
All communications made in this regard **by May 1st 2014** (23:59 Central European Time) will be forwarded to all reviewers evaluating the proposal; communications received after May 1st 2014 but **before September 1st 2014** will be made available only to the members of the CTS, during the study section meetings. Any communication received after September 1st 2014 (23:59 Central European Time) will not be taken into consideration.

Reviewers to be excluded

Please note: this section is not mandatory. Applicants may indicate investigators they would like to exclude as potential reviewers (no more than two are allowed). Click on "Add reviewer" and enter the requested information, then click on "Save".
In case of a revised application, it is possible to request not to send the proposal to one of the reviewers who evaluated the original application. To do so, click on "Add original application reviewer" and from the "Application" field select the previous, non-approved submission (*e.g.* IG 2013). For each reviewer, the system will provide a statement taken from the "Overall" section of the evaluation form: check the statement by the reviewer you want to exclude, then click on "Save". Applicants are requested to thoroughly justify the request to exclude this reviewer in the "Revision" section of the application.

Bio-Ethical Requirements

Check boxes as applicable for human and animal experimentation.

Research on humans

Please note that human experimentation is not limited to clinical studies with healthy volunteers and/or patients. It includes use of human biological samples (commercially available human cell lines *e.g.* from ATCC are exempt), human genetic material and human data collection (*e.g.* genetic information, health, etc.).

For clinical trials involving human subjects, and for studies with human biological samples, the approval of the local Ethics Committee/Institutional Review Board (IRB) together with a copy of the informed consent (if requested by the Ethics Committee) is mandatory. If available at the time of submission, the documentation must be included in the application as PDF file by clicking on "Select" under the "Research on humans: clearance from Ethics Committee" header.

The approval document issued by the Ethics Committee MUST indicate:

- the date when the IRB meeting was held: **approvals obtained more than 3 years ago (*i.e.* prior to 2011) are NOT acceptable**;
- the name of the applicant or of a unit of personnel included in the application;
- a clear reference to the studies described in the proposal (*e.g.* the title of the application).

In case biospecimens have been obtained by external sources/collaborators, the clearance documents must be provided by the collaborator's research center.

In any case, if the research deals with human biological samples, genetic materials or data collection, the research proposal should include information about:

- how the samples, materials or data are collected;
- whether the samples, materials or data are collected specifically for the proposed research project;
- how the samples, materials or data are dismissed.

If the approval from the Ethics Committee is not available by the submission deadline, the PI must obtain it **by November 15th 2014** and either upload it as PDF file in the "Personal Area" or send it to the AIRC Peer Review Office by e-mail (airc.direzione-scientifica@airc.it) and in paper (Via San Vito 7, 20123 Milano).

Research on animals

Animal experimentation must conform to all regulations protecting animals used for research purposes according to current international and national rules. If the research plan involves animal experimentation, the applicant must select one of the available options in the online form:

• I have obtained the clearance from the competent animal research ethics committee to carry out the described animal experimentation, and I am attaching it to the application;

• I have not obtained the clearance from the competent animal research ethics committee yet, but I have requested it and will send it to the AIRC Peer Review Office by November 15th 2014;

• there is not an active ethical committee for animal research at my Institute, but the procedures related to animal use have been communicated to the Italian Ministry of Health and a copy of this communication is attached to the current application;

• there is not an active animal research ethics committee in my Institute; I have yet to communicate the procedures related to animal use to the Italian Ministry of Health but I will do so and I will send a copy of this communication to the AIRC Peer Review Office by November 15th 2014.

Selection of the first or third option enables the "Research on animals: clearance from Ethics Committee" button that allows the upload of the document. The clearance must be valid for the entire duration of the grant; for studies that require a special authorization by the Italian Ministry of Health ("*Decreto autorizzativo in regime di deroga*"), please include such authorization along with the other documents.

The clearance for animal experimentation, if not available by the submission deadline, must be sent to AIRC by e-mail (airc.direzione-scientifica@airc.it) or directly uploaded in the PI's Personal Area **by November 15th 2014**. No paper copy of this documentation is required.

Research supported by AIRC that involves animal experimentation must also comply with the principle of the Three Rs (3Rs) to Replace, Reduce and Refine the use of animals in research, in alignment with the Directive 2010/63/EU of the European Union, available at:
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:276:0033:0079:EN:PDF
By the application submission deadline, it is mandatory to upload a document in the "Research on animals: Principles of the 3Rs" section, describing how the three Rs have been implemented in the research plan (*e.g.* explain why the anticipated results and benefits of the proposed research justify the use of animals, and why methods avoiding the use of living animals cannot be used; provide details and justification on the number of animals proposed for the research plan; describe all actions that will be taken to avoid or minimize pain and distress; indicate what humane endpoints, in terms of recognizable clinical signs, will be implemented; etc.).

In any case, by signing the Bio-Ethical requirements page in the PDF file of the application, the applicant declares that the research studies are accurately described in the proposal and conform to all regulations protecting animals used for research purposes, including those of the DL 116/92. The experiments described in the proposal will be performed following the guidelines described in: Workman P. et al.: "Guidelines for the welfare and use of animals in cancer research". Br. J. Cancer (2010) 102: 1555-1577.

Please note: Ethics Committee(s) approval(s) for human and/or animal research are not necessary for the assessment of the scientific merit of an application, during the review; however, **if the application is approved, funds will be granted only if the required Ethical Committee certifications have been sent to AIRC.** AIRC is not responsible for any inaccuracy in the ethical documentation provided and does not accept any liability for harm to participants in AIRC funded trials.

Proposal PDF Draft

At any time during the application process a PDF draft file of the proposal can be generated and checked: go to "Summary" (on the lower left of the main page), click on "Create draft" and then on "Open submission draft". It is strongly suggested that after all forms have been correctly filled out, and prior to proceeding with the final submission, the PDF Draft and its content are carefully read, controlled and verified.

Final Full Proposal Submission (online and by regular mail)

Online submission

To submit the application, go to "Summary" (on the lower left of the main page). All mandatory sections of the application form must be completed and must have the green flags before finalizing the submission.

Only after having ascertained that all data are correctly reported in the PDF Draft of the proposal, please proceed to proposal submission by clicking on "submit".

Please note: applicants will NOT receive a confirmation of the submission by e-mail. The final PDF file will be available on the "My submissions archive" section in of the Personal Area, and a copy should be saved for future reference.

Paper submission

For paper submission, please print only these pages:

- Title page;
- Abstract;
- Budget form;
- Bio-Ethical requirements page;
- only if research in humans is planned: Clearance from the Ethics Committee.

Sign in the appropriate spaces: the signatures of the PI and of the Legal representative are both required in the Title page and the Budget form: **by signing the Title page, the PI and the Legal representative acknowledge and agree to all terms and conditions of this Call.** The applicant's signature is required in the Bio-Ethical requirements page as well. Paper documentation marked with "draft" is not valid. Please print the requested pages only after completion of the submission online.

Please send all paper documentation required to the following address:

AIRC, Direzione Scientifica, via San Vito 7, 20123 Milano.

If these documents are not sent by the indicated deadline, or if AIRC does not receive them, applications will not be reviewed.

KEYWORDS IN ALPHABETICAL ORDER

Adenovirus
Adhesion dynamics
Adjuvant therapy
Aging
AIDS/HIV/Kaposi
ALL
AML
Androgen and/or receptors
Aneuploidy
Angiogenesis and/or vasculogenesis
Animal models
Anti-angiogenic therapy
Antibody/mAb therapy
Apoptosis
Aromatase and/or inhibitors
ATM pathway
ATR pathway
Autoimmunity/Autoantibodies
Autophagy
B cells
bcl2 family
BCR-Abl/Abl
Beta-catenin/Wnt pathway
Biochemistry
Bioinformatics
Biomarkers
Biomolecular modelling
Biophysics
Bladder tumor
Body mass index (BMI) and/or obesity
Bone disease
Bone morphogenetic protein (BMP)
BRAF/RAF kinases
Brain and/or nervous system tumors
BRCA
Breast ca.
Burkitt lymphoma
C.elegans
Cachexia
Cadherins
Cancer stem cells
Carcinogenesis
Caspases
Caveolin
CD133/Stem cell markers
Cell adhesion and/or cell adhesion molecules
Cell cycle
Cell cycle checkpoint G1/S
Cell cycle checkpoint G2/M
Cell differentiation and/or differentiation therapy
Cell migration, motility and/or invasion
Cell polarity
Cell signaling
Centrosome
Cervix or endometrial ca.
Chemistry
Chemokines
Chemotherapy and/or chemotherapic drugs
Chromatin remodeling
Circulating tumor cells
Clinical practice guidelines
Clinical trials
CLL
CML
Colorectal and/or Intestinal ca.
Combination therapy
Comparative genomics hybridization (CGH)
Computational biology
Computer Tomography (CT Scan)
Costimulatory molecules
COX2
Crosstalk
Crystallography
CTL
Cyclic AMP
Cyclins and/or inhibitors
Cytogenetics and/or chromosome alterations
Cytokines/Interleukins
Cytokinesis
Cytoskeleton
Dendritic cells
Diagnosis
Diet
DNA damage
DNA double strand break repair (DSBR)
DNA methylation

KEYWORDS IN ALPHABETICAL ORDER

DNA recombination
DNA repair
DNA replication
DNA single strand break repair (SSBR)
Docking
Drosophila
Drug delivery
Drug discovery and/or development
Drug response and/or resistance
Drug screening
Drug toxicity
EGF and/or receptors
Embryonic development
Endocrinology
Endocytosis
Endoplasmic reticulum (ER)
Endothelial cells
Epidemiology
Epigenetics
Epithelial mesenchyme transition (EMT)
Epstein-Barr Virus (EBV)
Estrogens and/or receptors
Exosomes and/or endogenous microvescicles
Extracellular Matrix (ECM)/Stroma
Fas and/or FasL
FGF and/or receptor
Flow cytometry
Fluorescence in situ hybridization (FISH)
Fluorescence resonance energy transfer (FRET)
Focal Adhesion/FAK
Folate and/or receptor
Functional genomics
Functional validation of target genes
Fusion genes
Gastric ca.
Gene alteration/gain or loss
Gene expression and/or profile
Gene regulation
Gene therapy
Genetics
Genome wide screening/GWAS
Genomic imprinting
Genomic/Genetic instability
Genomics
Genotoxicity
Glioma and/or glioblastoma
Glucocorticoids and/or receptors
Glucose metabolism and/or Warburg effect
Glycoproteins and/or glycosylation
Golgi
G-proteins and/or GPCR
Granulocytes
Growth factors and/or receptors
Growth induction and/or growth arrest
GVDH and/or Graft versus Tumor
Gynecological tumors
Head and neck ca.
Heat shock proteins (HSP)
Hedgehog pathway
Hematologic malignancies
Hematopoiesis
Hematopoietic stem cells
Hepatitis B virus (HBV)
Hepatitis C virus (HCV)
Hepatocellular carcinoma (HCC)
HER1-2-3-4
Hereditary DNA repair disorders
Hereditary tumors
Herpes virus
High Mobility Group Proteins (HMG)
Hippo pathway
Histone modifications
HLA/Major Histocompatibility Complex (MHC)
Hodgkin's lymphoma
Homologous recombination
Hormones
Human Papilloma Virus (HPV)
Hypoxia/Hypoxia-inducibile Factors (HIF-1)
Immune escape
Immunization
Immuno-editing
Immunohistochemistry
Immunosuppression and/or suppressor cells
Immunotherapy
In vitro imaging and/or live cell imaging
In vivo imaging

KEYWORDS IN ALPHABETICAL ORDER

Infection
Inflammation and/or inflammatory cytokines
Inhibitor of apoptosis proteins (IAPs)
Innate immunity
Insulin
Insulin-like growth factor (IGF) and/or receptors
Integrins and/or Integrin-linked kinase (ILK)
Interferons
Ion channels
Jak/Stat pathway
Kidney ca.
Kinase/Kinome
Lentivirus
Leukaemia
Lipid metabolism
Liver development and/or regeneration
Loss of heterozygosity (LOH)
Lung ca.
Lymphatics and/or lymphangiogenesis
Lymphocyte differentation
Lymphomas
Macrophages and/or monocytes
Magnetic resonance imaging (MRI)
MAP Kinases
Mass spectrometry
Mathematical modeling
Matrix metalloproteases (MMP) and/or inhibitors
MDM2
Medulloblastoma
Melanoma
Membrane biology
Mesothelioma
MET/HGF
Metabolism/Metabolomics
Metallo-drugs
Metastasis
Microarrays
Microenvironment
microRNA
Microscopy
Minimal Residual Disease (MRD)
Mitochondria
Mitosis
Monoclonal antibodies (mAbs) and/or immunoconjugates
Mouse models
mRNA processing
mRNA translation
Multidrug resistance (MDR)
Mutation (somatic and/or germline)
Myc
Myeloma
Nanotechnology/Nanoparticles
Netrin receptors
Neuroblastoma
Neuroendocrine tumors
Next generation sequencing
NF-kB family
Nitric oxide
NK and/or NKT cells
NMR spectroscopy
Non apoptotic cell death
Non melanoma skin tumors
Normal stem cells
Notch pathway
Nuclear medicine
Nuclear receptor
Nuclear structures
Oncogenes
Oncogenic virus/Viral oncology
Organic compounds
Osteopontin
Osteosarcoma
Ovarian ca.
Oxidative stress and/or Reactive Oxygen Species (ROS)
p21 - activated kinases (PAK)
p53, p63, p73
Palliative care
Pancreas ca.
PDGF and/or receptors
Pediatric tumors
Peptides as drugs
PET and/or PET-CT
Phage display
Phagocytes and/or phagocytosis
Pharmacogenetics/Pharmacogenomics
Pharmacokinetics

KEYWORDS IN ALPHABETICAL ORDER

Pharmacology
Phosphatases
Phospholipids
Phosphorylation
PI3K/Akt/PTEN/mTOR pathway
Poly-ADP-ribose polymerase (PARP)
Polymorphisms/SNPs
Post-translational modification
Precancerous lesions
Preclinical studies
Prevention and/or chemoprevention
Prognosis
Prostaglandins
Prostate ca.
Proteasome
Protein microarrays
Proteomics
Radionuclide therapy
Radiosensitivity and/or resistance
Radiotherapy
Radiotoxicity
RAS/RAS inhibitors
Rb/Rb family
Response and/or resistance to therapy
RET
Retinoic acid and/or receptors
Retrospective studies
Rho GTPases family
Risk factors
RNA binding proteins
RNA splicing
Sarcoma
Screening
Senescence
Signal transduction inhibitors
siRNA and/or non coding RNA
Small molecule inhibitors
Smoking
Soft tissue tumors
Solid tumors
SPECT
Spheroids/3D cultures
Src family
Staging
Statistics
Stress response
SUMO and/or sumoylation
Surgery
Survival analysis
Synthetic lethality
Systems biology
T cells/TCR
T helpers
Target therapy
Telomere and/or telomerase
Testis ca.
TGF and/or receptors
Thymoma
Thyroid ca.
Thyroid hormone
Tissue microarrays (TMA)
TNF and/or receptors
Tolerance
Toll-like receptors (TLR)
Topoisomerase
TRAIL
Transcription
Transcription factors
Transformation assays
Transgenic mice
Translesion synthesis
Translocation
Transplantation
Treg cells
Triple negative breast ca.
Tumor antigen
Tumor dormancy
Tumor suppressor genes
Tumor-stroma interaction
Tyrosine kinase receptors (TKR) and/or inhibitors
Ubiquitin and/or ubiquitination
Ultrasound
Urokinase-Plasminogen System (uPA, uPAR, PAI)
Vaccine
VEGF and/or receptor
Virology

KEYWORDS IN ALPHABETICAL ORDER

Von Hippel-Lindau (VHL)
Wilms' Tumor Gene (WT1)
Xenopus
Yeast
Zebrafish

KEYWORDS BY TOPIC

Adhesion and stroma

Adhesion dynamics

Cadherins

Caveolin

Cell adhesion and/or cell adhesion molecules

Cell migration, motility and/or invasion

Cell polarity

Cytoskeleton

Extracellular Matrix (ECM)/Stroma

Focal Adhesion/FAK

Integrins and/or Integrin-linked kinase (ILK)

Matrix metalloproteases (MMP) and/or inhibitors

Microenvironment

Osteopontin

Tumor-stroma interaction

Urokinase-Plasminogen System (uPA, uPAR, PAI)

Angiogenesis

Angiogenesis and/or vasculogenesis

Endothelial cells

Hypoxia/Hypoxia-inducibile Factors (HIF-1)

Lymphatics and/or lymphangiogenesis

VEGF and/or receptor

Von Hippel-Lindau (VHL)

KEYWORDS BY TOPIC

Cell death and apoptosis

Apoptosis

Autophagy

bcl2 family

Caspases

Fas and/or FasL

Inhibitor of apoptosis proteins (IAPs)

Mitochondria

Non apoptotic cell death

p53, p63, p73

Senescence

TRAIL

Clinical topics

Cachexia

Computer Tomography (CT Scan)

Diagnosis

Drug toxicity

Endocrinology

GVHD and/or Graft versus Tumor

Magnetic resonance imaging (MRI)

Metastasis

Minimal Residual Disease (MRD)

Nuclear medicine

Palliative care

PET and/or PET-CT

Prognosis

Retrospective studies

SPECT

Staging

Survival analysis

Ultrasound

Transplantation

KEYWORDS BY TOPIC

Genes, proteins and miscellanea

ATM pathway
ATR pathway
BCR-Abl/Abl
Bone morphogenetic protein (BMP)
BRAF/RAF kinases
BRCA
Embryonic development
Endocytosis
Endoplasmic reticulum (ER)
Epigenetics
Epithelial mesenchyme transition (EMT)
Exosomes and/or endogenous microvescicles
FGF and/or receptor
Glucocorticoids and/or receptors
Glucose metabolism and/or Warburg effect
Glycoproteins and/or glycosylation
Golgi
Heat shock proteins (HSP)
High Mobility Group Proteins (HMG)
Ion channels
Lipid metabolism
Liver development and/or regeneration
MDM2
Membrane biology
Myc
Netrin receptors
Nitric oxide
Oncogenes
p21 - activated kinases (PAK)
Phosphatases
Phospholipids
Poly-ADP-ribose polymerase (PARP)
Proteasome
RNA binding proteins
Stress response
SUMO and/or sumoylation
Telomere and/or telomerase
Topoisomerase
Ubiquitin and/or ubiquitination
Wilms' Tumor Gene (WT1)

KEYWORDS BY TOPIC

Genetics

Aneuploidy
Centrosome
Chromatin remodeling
Cytogenetics and/or chromosome alterations
DNA damage
DNA double strand break repair (DSBR)
DNA methylation
DNA recombination
DNA repair
DNA replication
DNA single strand break repair (SSBR)
Functional genomics
Fusion genes
Gene alteration/gain or loss
Gene expression and/or profile
Gene regulation
Genetics
Genome wide screening/GWAS
Genomic imprinting
Genomic/Genetic instability
Genomics
Hereditary DNA repair disorders
Histone modifications
Homologous recombination
Loss of heterozygosity (LOH)
microRNA
Mitosis
mRNA processing
mRNA translation
Mutation (somatic and/or germline)
Nuclear structures
Pharmacogenetics/Pharmacogenomics
Polymorphisms/SNPs
Post-translational modification
RNA splicing
siRNA and/or non coding RNA
Synthetic lethality
Transcription
Transcription factors
Transformation assays
Translesion synthesis
Translocation
Tumor suppressor genes

KEYWORDS BY TOPIC

Immunology

Autoimmunity/Autoantibodies
B cells
Chemokines
Costimulatory molecules
COX2
CTL
Cytokines/Interleukins
Dendritic cells
Granulocytes
Hematopoiesis
HLA/Major Histocompatibility Complex (MHC)
Immune escape
Immunization
Immuno-editing
Immunosuppression and/or suppressor cells
Immunotherapy
Infection
Inflammation and/or inflammatory cytokines
Innate immunity
Interferons
Lymphocyte differentation
Macrophages and/or monocytes
Monoclonal antibodies (mAbs) and/or immunoconjugates
NF-kB family
NK and/or NKT cells
Phagocytes and/or phagocytosis
Prostaglandins
T cells/TCR
T helpers
TNF and/or receptors
Tolerance
Toll-like receptors (TLR)
Treg cells
Tumor antigen
Tumor dormancy
Vaccine

KEYWORDS BY TOPIC

Methods

Animal models
Biochemistry
Bioinformatics
Biomolecular modelling
Biophysics
C.elegans
Chemistry
Comparative genomics hybridization (CGH)
Computational biology
Crystallography
Docking
Drosophila
Epidemiology
Flow cytometry
Fluorescence in situ hybridization (FISH)
Fluorescence resonance energy transfer (FRET)
Functional validation of target genes
Immunohistochemistry
In vitro imaging and/or live cell imaging
In vivo imaging
Mass spectrometry
Mathematical modeling
Microarrays
Microscopy
Mouse models
Nanotechnology/Nanoparticles
Next generation sequencing
NMR spectroscopy
Phage display
Protein microarrays
Proteomics
Spheroids/3D cultures
Statistics
Systems biology
Tissue microarrays (TMA)
Transgenic mice
Xenopus
Yeast
Zebrafish

Risk factors

Aging
Biomarkers
Body mass index (BMI) and/or obesity
Carcinogenesis
Diet
Genotoxicity
Metabolism/Metabolomics
Organic compounds
Oxidative stress and/or Reactive Oxygen Species (ROS)
Precancerous lesions
Prevention and/or chemoprevention
Risk factors
Screening
Smoking

KEYWORDS BY TOPIC

Signaling and cell cycle

Androgen and/or receptors
Beta-catenin/Wnt pathway
Cell cycle
Cell cycle checkpoint G1/S
Cell cycle checkpoint G2/M
Cell differentiation and/or differentiation therapy
Cell signaling
Crosstalk
Cyclic AMP
Cyclins and/or inhibitors
Cytokinesis
EGF and/or receptors
Estrogens and/or receptors
Folate and/or receptor
G-proteins and/or GPCR
Growth factors and/or receptors
Growth induction and/or growth arrest
Hedgehog pathway
HER1-2-3-4
Hippo pathway
Hormones
Insulin
Insulin-like growth factor (IGF) and/or receptors
Jak/Stat pathway
Kinase/Kinome
MAP Kinases
MET/HGF
Notch pathway
Nuclear receptor
PDGF and/or receptors
Phosphorylation
PI3K/Akt/PTEN/mTOR pathway
RAS/RAS inhibitors
Rb/Rb family
RET
Retinoic acid and/or receptors
Rho GTPases family
Src family
TGF and/or receptors
Thyroid hormone
Tyrosine kinase receptors (TKR) and/or inhibitors

Stem cells

Cancer stem cells
CD133/Stem cell markers
Circulating tumor cells
Hematopoietic stem cells
Normal stem cells

KEYWORDS BY TOPIC

Types of tumors

ALL
AML
Bladder tumor
Bone disease
Brain and/or nervous system tumors
Breast ca.
Burkitt lymphoma
Cervix or endometrial ca.
CLL
CML
Colorectal and/or Intestinal ca.
Gastric ca.
Glioma and/or glioblastoma
Gynecological tumors
Head and neck ca.
Hematologic malignancies
Hepatocellular carcinoma (HCC)
Hereditary tumors
Hodgkin's lymphoma
Kidney ca.
Leukaemia
Lung ca.
Lymphomas
Medulloblastoma
Melanoma
Mesothelioma
Myeloma
Neuroblastoma
Neuroendocrine tumors
Non melanoma skin tumors
Osteosarcoma
Ovarian ca.
Pancreas ca.
Pediatric tumors
Prostate ca.
Sarcoma
Soft tissue tumors
Solid tumors
Testis ca.
Thymoma
Thyroid ca.
Triple negative breast ca.

Therapies

Adjuvant therapy
Anti-angiogenic therapy
Antibody/mAb therapy
Aromatase and/or inhibitors
Chemotherapy and/or chemotherapic drugs
Clinical practice guidelines
Clinical trials
Combination therapy
Drug delivery
Drug discovery and/or development
Drug response and/or resistance
Drug screening
Gene therapy
Metallo-drugs
Multidrug resistance (MDR)
Peptides as drugs
Pharmacokinetics
Pharmacology
Preclinical studies
Radionuclide therapy
Radiosensitivity and/or resistance
Radiotherapy
Radiotoxicity
Response and/or resistance to therapy
Signal transduction inhibitors
Small molecule inhibitors
Surgery
Target therapy

KEYWORDS BY TOPIC

Viruses

Adenovirus

AIDS/HIV/Kaposi

Epstein-Barr Virus (EBV)

Hepatitis B virus (HBV)

Hepatitis C virus (HCV)

Herpes virus

Human Papilloma Virus (HPV)

Lentivirus

Oncogenic virus/Viral oncology

Virology