Interview: Angelo Corti – Director, Division of Experimental Oncology, San Raffaele Scientific Institute (SRSI), Italy



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Professor Angelo Corti, Director of

the Experimental Oncology division of the SRSI, discusses approaches to oncology research and the institute´s significant contribution to the field in Italy.

What is the philosophy of the SRSI's oncology division towards oncology research?

The development of new strategies to improve cancer prevention, detection and treatment remains a primary aim for cancer research. This requires significant investments in basic, as well as in translational and clinical research. The investment in basic research is aimed at understanding the molecular and cellular mechanisms underlying this disease, whereas the investment in translational and clinical research is aimed at translating the basic knowledge into the development of new diagnostic or prognostic tools and therapeutic agents.

The research activities of this division follow these lines and are based on two fundamental concepts. The first is that cancer is not one disease; rather it is a collection of many different diseases that require specific diagnostic and therapeutic tools, specialized researchers and physicians. The second concept is that the development of novel therapeutics strategies requires multidisciplinary interactions among researchers and physicians. As such, our primary mission is to contribute to a better understanding of the pathogenic mechanisms of cancer and to develop new

diagnostic/prognostic tools and novel therapeutic strategies. I would like to reinforce the point that the collaboration between basic scientists and clinicians is crucial to achieve those goals, as this interaction helps the researchers to tailor the research projects to the medical need.

What position does the division occupy within the Italian and European scientific community for oncology?

The division is nationally and internationally renowned in the following areas: cancer immunology and immunotherapy; tumor microenvironment and angiogenesis; lymphoproliferative disorders; breast, lung, prostate and pancreatic cancers; surgical oncology (pancreas, digestive system, urinary system); diagnostic and therapeutic endoscopy. Indeed, our studies are published in leading journals such as the New England Journal of Medicine, Nature, and Natural Medicine, among others.

All the research units operating within the San Raffaele Scientific Institute can take advantage of several central facilities (DNA and protein core facilities, computer services, animal house, human and mouse histopathology service, mass spectrometry, proteomic and genomic analysis, microscopy analysis, imaging services). These central services are crucial for conducting competitive research.

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In addition, the location of the institute, the hospital and the university in the same place creates a unique environment for biomedical research. All of them are highly interconnected making this environment one of our strengths and, for sure, differentiating us from other institutes.

You mentioned the importance of the interaction between basic and clinical scientists. Indeed, it does not seem to be easy since they are different faces of the same coin. How do you manage?

Knowing that the interaction between basic scientists and clinicians is one of our operative underpinnings, the promotion of this collaboration has an important position in our agenda. To achieve this goal, we have some internal policies or processes that encourage this interaction and ensure a proper work environment.

Firstly, we schedule regular meetings (weekly seminars, progress reports, etc.) involving professionals from both areas in order to discuss key topics on unmet medical needs in cancer research fostering the integration of the different expertizes as a tool for novel research approaches. Secondly, we are trying to build research programs and internal networks that involve

basic and clinical scientists, with different expertise, from inside and outside the division or even from other institutes. The third action is providing “seeding” grants for translational projects coordinated by two principal investigators, one from basic and the other one from clinical research areas. All these efforts are then further supported through the creation and maintenance of crio-banks of biological material from patients (taking advantage of being also a hospital) enriched by databases with clinic-biological information. Finally, the integration between basic and translational/clinical scientist is also fostered through continuous education, training and mentoring activities (PhD programs, trainings of new physicians, etc.).

Prof. Corti, expanding on the organization, the division of oncology at the SRSI oversees more than 150 researchers split into approximately 30 research units. How do you organize this big team accordingly to division´s philosophy?

The division is organized in 33 groups classified in basic and clinical research groups depending on the type of research each performs. In particular, 12 groups, formed by 60 people, are in the field of basic research and 21 groups, formed by 120 people, are in the field of clinical research. In addition, we have five research groups that belong to the urological research institute (URI), an institute that conduct basic and clinical studies in the urological field. The latter is indeed a nice example of an organizational model where basic, preclinical and clinical research are highly integrated with basic scientists and clinicians working together in the same physical space of the URI.

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The different groups of the division are running several basic and translational research projects regarding the role of angiogenesis and microenvironment in solid and hematological malignancies, tumor immunology, functional genomics, as well as several clinical research projects in medical oncology, onco-hematology, urologic and gynecologic oncology, diagnostic and therapeutic endoscopy and surgical oncology.

Which would you consider the division’s main areas of excellence?

The division has two major areas of excellence: tumor microenvironment and cancer immunology/immunotherapy. To expand on the first area, knowing that tumors consist of cancer cells and other surrounding cells necessary for tumor growth, we are trying to identify, manipulate or destroy the elements present in the microenvironment as a way to eliminate the support for tumor expansion. This in contrast to most research in the past decades, when most studies have focused on drugs directly targeting the cancer cells, though reaching limited therapeutic efficacy.

In the field of cancer immunology/immunotherapy, our second area of expertise, we aim at understanding the mechanism through which cancer cells evade immunological control, with the goal being to discover ways to improve the immune systems ability to defend itself from cancer cells.

Could you share with us some of your projects that are currently in your pipeline?

We are trying to develop some intra-/inter-divisional research projects and networks that are related to our areas of expertise. For example, one main project that is aligned to this approach is the AIRC 5×1000 project, funded by the Italian Association of Cancer Research, with the funds collected through the “5×1000” procedure. This project, started five years ago, is aimed at harnessing the tumor cell/microenvironment cross-talk in order to treat mature B-cell tumors. About 200 papers have been published by more than 20 units within our division in relation to this project.

Another example is the NET-IMPACT project, a study aimed at understanding the complexity of prostate cancer and at developing novel therapies and prognostic markers.

Other inter-divisional projects put together experts from different fields such as immunology, cancer biology, medical oncology and onco-hematology in order to investigate fundamental aspects of tumor immunology and translate them into immunotherapy strategies. These projects are aimed at understanding the mechanisms underlying the tumor/immune system interactions and at developing new immunotherapeutic strategies for cancer treatment.

What we do to foster the interaction between units is to enroll them in different projects. So, one unit can be collaborating in several projects with other units coming form other divisions.

What have been the biggest achievements made in your division?

The results obtained in recent years by the basic research groups have laid the foundations for the development of new therapeutic strategies aimed at destroying cancer cells or blood vessels that feed them, and at manipulating the tumor microenvironment in order to facilitate the response to cancer drugs and immunotherapy. Some of these strategies are being tested in clinical trials in cancer patients by the clinical research groups.

The clinical research groups also carry out a variety of clinical trials in patients with solid tumors or hematological malignancies to assess the potential of new diagnostic tools, surgical procedures, and therapeutic approaches. In fact, more than 70 clinical trials were approved in 2014-2015 to evaluate the effectiveness of new drugs for the treatment of the most common solid tumors, such

as lung and breast cancer and the more frequent leukemias, rare tumors, or very aggressive tumors that require the development of new therapies (such as pancreatic cancer and mesothelioma) as well as leukemias and lymphomas (tumors of the lymphoid system).

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