BARCELONA, 6TH - 7TH MARCH 2017

ICREA-FIJC CONFERENCE

ACROSS TUMOR HETEROGENEITY AND EVOLUTION IN CANCER: FROM IN SILICO STUDIES TO CLINICAL IMPACT

AUDITORIUM, SCHOOL OF MEDICINE, UNIVERSITY OF BARCELONA, CASANOVA 143

ICREA-FIJC
Conference
Barcelona, 6-7 March 2017
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Josep Carreras
LEUKAEMIA FOUNDATION

Cancer remains a major cause of mortality worldwide, and despite the large amount of efforts and money invested in its understanding and treatment together with the large therapeutic arsenal available, complete responses are rare, and partial responses are limited in duration. Until recently, cancer pathogenesis and evolution was "equivocally" well-understood by both physicians and researchers as a clonal entity with a lineal evolution in which temporal accumulation of genetic instability was a hallmark. As a consequence, many academic and industry therapeutic efforts focus on killing the bulk tumor and, hopefully, the cancer-initiating cells responsible for fueling the tumor growth and underlying long-term relapses. However, recent cutting-edge advances in next-generation sequencing, bioinformatics and xenograft models have revealed an unprecedented and "scary" view of the cancer genome and its evolution.

Thanks to innovative cancer researchers and geneticists together with evolutionary biologists and computational biologists, it is nowadays well-accepted that cancer responds to an evolutionary process whereby, cancer affecting different tissues and ages evolves by a reiterative stepwise process of clonal expansion, genetic diversification and clonal selection within the adaptive landscapes of tissue ecosystems. The highly variable and dynamic patterns of genetic diversity results in a complex intratumor heterogeneity (ITH), suggestive of a branching clonal architecture for any tumor. Therapeutic intervention may destroy specific cancer clones while is likely to inadvertently provide a robust selective pressure for the expansion of other clones with a distinct genetic composite. Thus, this emerging complexity in intraclonal cancer evolution has been attributed to Darwinian evolutionary principles which may underlie the therapeutic failure through the ability of specific clones, even the ones carrying the oncogenic initiating event, to become refractory to therapy.

ITH and clonal evolution is expected to have a huge impact in cancer biology. Despite it still needs to be addressed, the clinical significance of ITH and its evolution and dynamics over time in response to cancer therapies is anticipated to become of upmost relevance for the way we diagnose, treat and follow-up cancer patients. Emerging questions are: i) Will we ever manage to achieve long-term complete responses using targeted monotherapies; or polytherapy will be necessary to cope with ITH-mediated malignancy? ii) Does it become crucial to identify the bona fide initiating/driver oncogenic event to develop therapeutic strategies targeting such an insult? iii) would cancer patient stratification at the time of diagnosis need to be revisited? iv) Should we apply this emerging knowledge to the way we measure minimal residual disease in follow-up studies?. The necessary tools are now available to prospectively determine whether clonal heterogeneity can be used as a biomarker of clinical outcome.

In this **ICREA-FIJC** conference we will discuss how studies relying on longitudinal tissue sampling, integrating both genomic and clinical data, may assist in the clinical practice by defining the breadth of genetic diversity in different tumor types, and its relevance to treatment failure, molecular follow-up, and eventually patient outcome. During two days, outstanding researchers and physicians will come together to revise current challenges in cancer treatment and therapy resistance and to discuss about future strategies and tools to dissect ITH at basic and clinical level.

The organizing committee is looking forward to welcoming you to this fascinating meeting in the stunning, multicultural and modern city of Barcelona. Hope to see you there to welcome the spring!

Day 1: **Monday 6th March 2017**

12.30 - 14.00 REGISTRATION AND LUNCH

14.00 - 14.10 WELCOME by Prof. PABLO MENENDEZ

14.15 - 15.45 SESSION 1:
AN EVOLUTIONARY PERSPECTIVE OF CANCER

Chairman: Prof. IGNACIO VARELA

Prof. DAVID POSADA – University of Vigo. Spain.
Tumor phylogeography

Prof. ANDREA SOTTORIVA – Institute of Cancer Research, London, UK.
Neutral evolution in cancer: distinguishing functional from nonfunctional intra-tumour heterogeneity

Prof. CHRISTINA CURTIS – Stanford University School of Medicine, California, USA. *Quantifying tumor evolutionary dynamics: from initiation to metastasis*

15.45 - 16.15 **Coffee Break**

16.15 - 17.45 SESSION 2:
MOLECULAR DIAGNOSIS OF INTRATUMORAL HETEROGENEITY

Chairman: Prof. PABLO MENÉNDEZ

Prof. DAVID KENT – University of Cambridge, UK.
Single cell biology identifies stem cell fate regulators in hematological malignancies

Prof. CAROLINE DIVE – CRUK Manchester, UK.
New patient relevant models to study SCLC evolution, response to treatment and mechanisms of resistance

Prof. NURIA LOPEZ-BIGAS – University Pompeu Fabra, Barcelona, Spain.
Cancer drivers and their therapeutic opportunities

17.45-18.30 KEYNOTE LECTURE.
Prof. CARLO MALEY - School of Life Science, Arizona State University, USA.

20.00 SPEAKERS DINNER

Day 2: **Tuesday 7th March 2017**

9.00 - 10.45 SESSION 3:

INTRATUMOUR HETEROGENEITY IN HEMATOPOIETIC MALIGNANCIES

Chairman: Dra. ALEJANDRA SANJUAN

Prof. JOHN E DICK – Sick Children Hospital. University of Toronto. Canada.
Identifying the cellular origins of relapse in acute leukaemia

Prof. ELLI PAPAEMMANUIL – Memorial Sloan Kettering Cancer Center, New York. USA.
Dissecting genetic and phenotypic heterogeneity in AML

Prof. XOSE S PUENTE – University of Oviedo, Spain.
Genomic architecture of chronic lymphocytic leukemia

10.45 - 11.15 **Coffee Break**

11.15 - 13.00 SESSION 4:

INTRATUMOUR HETEROGENEITY IN SOLID TUMOURS I

Chairman: Prof. JAUME MORA

Prof. MARIO L SUVÀ – Harvard Medical School. Boston, USA.
Single-cell analyses in human gliomas

Prof. CHRIS JONES – Institute of Cancer Research, London, UK.
Clonal co-operation in paediatric glioblastoma and DIPG

Prof. MARCO GERLINGER – Institute of Cancer Research, London, UK.
Reconstructing and forecasting solid tumour evolution

13.00 - 14.30 **Lunch**

14.30 - 16.30 SESSION 5:

INTRATUMOUR HETEROGENEITY IN SOLID TUMOURS II

Chairman: Prof. ALEIX PRAT

Prof. PETER DIRKS – Sick Children Hospital. University of Toronto. Canada.
Tipping the balance of self-renewal and differentiation in brain cancer

Prof. JOAN SEAONE – Vall d'Hebron Oncology Institute, Barcelona, Spain.
Genomic intratumor heterogeneity and cancer resistance to treatment

Prof. ALBERTO BARDELLI – Institute for Cancer Research and Treatment, Torino, Italy.
Cancer evolution as a therapeutic target

Prof. ERIC HOLLAND – Fred Hutch Hospital, Seattle, USA.
Visualization of the glioma landscape

16.30 - 17.00 **Coffee Break**

17.00 - 18.00 SESSION 6:

ROUND TABLE: DEALING WITH INTRATUMOUR HETEROGENEITY IN THE CLINICAL PRACTICE.

Chairman: Prof. ALEIX PRAT & Prof. PABLO MENÉNDEZ

Prof. NURIA LÓPEZ-BIGAS – UPF, Barcelona, Spain.

Prof. CAROLINE DIVE – CRUK Manchester, UK.

Prof. PETER DIRKS – Sick Children Hospital, Toronto, Canada.

Prof. ERIC HOLLAND – Fred Hutch Hospital, Seattle, USA.

Prof. JOSEP TABERNERO - Vall d'Hebron Oncology Institute, Barcelona, Spain.

Prof. ALBERTO BARDELLI – University of Torino, Italy.

18.00 - 18.10 CLOSING by Prof. TABERNERO
Vall d'Hebron Oncology Institute, Barcelona, Spain.

SCIENTIFIC COMMITTEE:

Nuria López-Bigas, PhD
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CONGRESOS

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