

Institute of Advanced Chemistry of Catalonia Seminars

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A 10.000 sample overview of cancer driver events

Date

11:30 h

November 19th 2018

Location

“Sala d’actes”

Institute of Advanced Chemistry of Catalonia (IQAC-CSIC)

C/Jordi Girona 18-26, 08034 Barcelona

Abstract

The Cancer Genome Atlas (TCGA) has catalyzed intensive investigations of the myriad of genetic alterations underlying human cancers and, at this historic junction marked by the completion of the project, we have completed a comprehensive genomic characterization for over 11,000 tumors from 33 cancer types. Here, we present a summary of the results about driver events from three analysis working groups.

We carefully integrated results from 27 different software packages to describe both gene- and mutation-level findings (299 cancer driver genes and 3,442 driver mutations) and provide experimental evidence validating their functional relevance to tumorigenesis [1]. We also identified groups of cancer driver genes shared across pan-squamous, pan-gynecological, and pan-gastrointestinal tumors. Compared to the previous TCGA PanCancer study, we identified 59 novel driver genes across different tissues. Next, we show the patterns of co-occurrence and mutual exclusivity among these 299 cancer driver genes and how these change according to the cancer type where they occur [2]. We have also identified groups of cancer driver genes that deregulate different transcriptional programs depending on whether they are affected by missense or truncating mutations. Finally, we show how cancer driver genes correlate with differences in the tumor’s immune infiltrate [3].

These results will set the basis for the analysis of many cancers across ethnic groups, rare and common types, primary and relapsed and will contribute to the ongoing efforts to establish genomic sequencing in the clinic.

REFERENCES

- [1] Bailey, M.*, Tokheim, C.*, Porta-Pardo, E*. et. al., Comprehensive Discovery and Characterization of Driver Genes and Mutations in Human Cancers, *Cell*, 173 (2), 371.
- [2] Ding, L.*, Bailey, M.*, Porta-Pardo, E*. et. al., Perspective on Central Oncogenic Processes at the End of the Beginning of Cancer Genomics, *Cell*, 173 (2), 305.
- [3] Thorsson, V. et. al., The Immune Landscape of Cancer, *Immunity*, *in press*