Cancer Core Europe Lecture

Presented by the Education & Training pillar

SPEAKER

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Exposomic epigenetic fingerprints of early-onset colorectal cancer

February 26, 2026 | 11:30 -12:30 CET

Link to Meeting

Colorectal cancer incidence is rising dramatically among individuals under 50 years of age. Epidemiological studies have identified exposome-related risk factors, including dietary patterns, smoking or alcohol consumption, as contributors to this trend. However, many environmental exposures remain unknow, largely due to the challenge of obtaining reliable historical exposure data. Recently, colibactin, a genotoxin produced by specific pks+ E. coli strains, has been implicated in early-onset colorectal cancer through its distinctive mutational signature in tumor DNA. Yet, mutational signatures can only detect mutagenic exposures, limiting their utility for investigating the full spectrum of carcinogens.

Here, we present a novel methodology that leverages tumor DNA methylation patterns to reconstruct patients' historical exposome, enabling identification of non-mutagenic environmental exposures. Applied to early-onset colorectal cancer cohorts, this approach uncovers both known and novel exposure signatures associated with early-onset colorectal cancer and identifies a specific pesticide as a potential risk factor for colorectal cancer development.

Jose A. Seoane coordinates the Cancer Computational Biology group at VHIO. Originally trained as a computer scientist, he transitioned to cancer genomics and epigenetics during his postdoc at the Christina Curtis lab at Stanford University. In 2021, after securing a Ramon y Cajal grant, he establishes his laboratory at VHIO. The primary focus of his lab is to identify biomarkers of drug response in solid tumors, elucidate the role of epigenetics in cancer initiation, progression and metastasis, and investigate the potential of chromatin machinery genes as therapeutic targets, using computational tools.

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