**High Content Screening as a Drug Discovery Platform**

Marta Martínez-García, Carmen Ramos, Thomas A. Mackenzie and Rosario Fernández-Godino.

Fundación MEDINA, Parque Tecnológico de Ciencias de la Salud, Avda. del Conocimiento 34, 18016 Granada, Spain.

High-Content Screening (HCS) technology has revolutionized the early drug discovery field in the last years. HCS combines cell biology and molecular tools with automated high resolution [microscopy](https://en.wikipedia.org/wiki/Microscopy) and robotic handling. This new type of cellular phenotypic screening enables the identification of lead compounds across multiple drug classes through the automatized acquisition of confocal fluorescent images. HCS facilitates the characterization of cellular phenotypes altered by the test compounds, which allows a more profound understanding of drug effects and a better integration of disease-relevant screens.

MEDINA is a private non-profit Research Organization with a major focus on the discovery of novel molecules with relevant biochemical properties that can be applied to the development of new drugs. Our principal scope is the identification of novel compounds with therapeutic properties, with a special interest in cancer and neurodegenerative and rare diseases. Although MEDINA´s high throughput screening platforms cover diverse approaches, including agriculture, cosmetics, or industrial exploitation.

Here, we present a proof of concept for the use of the HCS technology in the discovery of compounds with antioxidant, antiapoptotic and cytotoxic effects. For that, we have developed relevant 2D and 3D cell culture models compatible with this technology. In this study, we show the HCS-based methodology implemented to assess caspase activity, cell and reactive oxygen species in 2D culture cells. We also introduce the methodology for the efficient establishment, acquisition, and analysis of 3D culture models (spheroids) in five different cancer cell lines: MCF7, A2058, HepG2, MIAPaCa-2 and A549.