Journal of Cellular and Molecular Pharmacology

Liu, J Cell Mol Pharmacol 2022, 6:6

Editorial Open Access

Using High-Resolution Imaging Techniques Preparation of Traditional Chinese Herbal Medicine

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Editorial

Traditional Chinese medicine (TCM) has been utilized to treat and prevent human ailments in China and other Asian nations for thousands of years. One of the most significant components of TCM is Chinese herbal medicine, which has a unique diversity of chemical components and hence results in a wide variety of biological activities. The pharmaceutical sector, on the other hand, is confronting a big problem in developing a large population of unique natural products and medications, and despite significant efforts, high-volume innovative drug discovery and productivity have yet to be achieved. At the moment, there is a growing focus on modernizing Chinese herb therapy in conjunction with cutting-edge drug discovery technology, particularly high throughput selection [1].

High content imaging is an image-based high throughput screening method that use automated microscopy and image analysis software to record and analyse phenotypes on a large scale in order to investigate several biological characteristics of a biological complex at the same time. We highlighted the present obstacles and future opportunities for the development of high throughput image-based screening technology in innovative drug research and discovery, as well as the uses of high content imaging technology in drug discovery from traditional Chinese herbal medicine [2].

For physiological homeostasis and the production of proteins and organelles, nuclear-cytoplasm transfer is essential. A loss of nuclear envelope integrity and interruption of nucleocytoplasmic transport has been related to a variety of illnesses. Many transcription factors govern gene translocation to the nucleus to start gene transcription and activate downstream signal transduction pathways, including eIF4E, NF-B, NFATc1, TEFB, and -catenin. Bioactive compounds in Chinese herbal medicine can thus be used to identify transcription activation signals using nuclear transcription factors. In 549 lung cancer cells, for example panduratin has been discovered to be an NF-B inhibitor. A curcumin derivative known as C1 has been discovered as a TFEB activator in stable HeLa cells overexpressing TFEB. High content imaging refers to image-based high-through put screening TFEB [3].

Apoptosis, also known as programmed cell death, is a unique morphological feature and an energy-dependent cell death mechanism. The study of cell death has become crucial in the search for new drugs. There are several high-quality studies that show how chemicals or formulae from Chinese herbal medicine work via apoptotic pathways. Radix Ophiopogon Japonicus (Ophiopogon japonicus (L.f) Ker-Gawl.) has been shown to trigger cell death in both NCI–H157 and NCI–H460 non-small cell lung cancer (NSCLC) cell lines. 38 Salvianolic acid B from Radix Salviae miltiorrhizae (Salvia miltiorrhizae Bge.) has A hepatoprotective drug has been discovered that operates by regulating death receptor mediators involved in mitochondrial respiration. For physiological homeostasis and the production of proteins and organelles, nuclear-cytoplasm transfer is essential. Nuclear encapsulation has been compromised. pathways. Tetramethylpyrazine inhibits cell proliferation and induces apoptosis in HepG2 cells. The anti-cancer chemical koenimbin has been discovered to trigger apoptosis in MCF7 cancer cells. Compounds from Chinese herbal medicine have been shown to act as inducers or inhibitors of the apoptotic machinery, making them useful tools for investigating mechanisms, screening candidates, and identifying targets. Apoptosis, also known as programmed cell death, is a unique morphological feature and an energy-dependent cell death mechanism. The study of cell death has become crucial in the search for new drugs. There are several high-quality resources available [4].

Current hardware and software limits must be solved in order to operate with the high content imaging system in live cells. Use fluorescence resonance energy transfer (FRET) or fluorescence resonance energy transfer (FRAP) to scan quantitative protein-protein interactions or fluorescent protein turnover in cellular organelles. Although these methods have been successfully used in conventional fluorescence microscopy for a small population of cells, their usability in high-content imaging systems has to be enhanced further In order to capture dynamic processes with sufficient time resolution, high content imaging systems require extensive parallelization of a large scale picture collection process. Nonetheless, this problem might be effectively addressed by including emission fingerprinting, a method for deciphering various spectral fingerprints into a high-content imaging system [5].

Over the last few decades, combining TCM with current drug discovery technology to create new medications has yielded incredible results. With its remarkable throughput and optimised procedures, high content imaging and analysis technology offers scalability and supports a wide range of drug discovery applications. However, drug discovery from traditional Chinese herbal medicine continues to pose significant hurdles, and novel methodologies are required to accommodate content-rich screening and identification. Despite these challenges, there is growing interest in employing the high content imaging platform to screen and identify vast chemical inventories from traditional Chinese herbal medicine.

Acknowledgement

None

Conflict of Interest

None

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Received: 03-Dec-2022, Manuscript No JCMP-22-59895; **Editor assigned:** 05-Dec-2022, PreQC No. JCMP-22-59895 (PQ); **Reviewed:** 19-Dec-2022, QC No. JCMP-22-59895; **Revised:** 23-Dec-2022, Manuscript No. JCMP-22-59895 (R); **Published:** 30-Dec-2022; DOI: 10.4172/jcmp.1000140

Citation: Liu Y (2022) Using High-Resolution Imaging Techniques Preparation of Traditional Chinese Herbal Medicine. J Cell Mol Pharmacol 6: 140.

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