

## Exploring New Possibilities in Cancer Metabolism Research

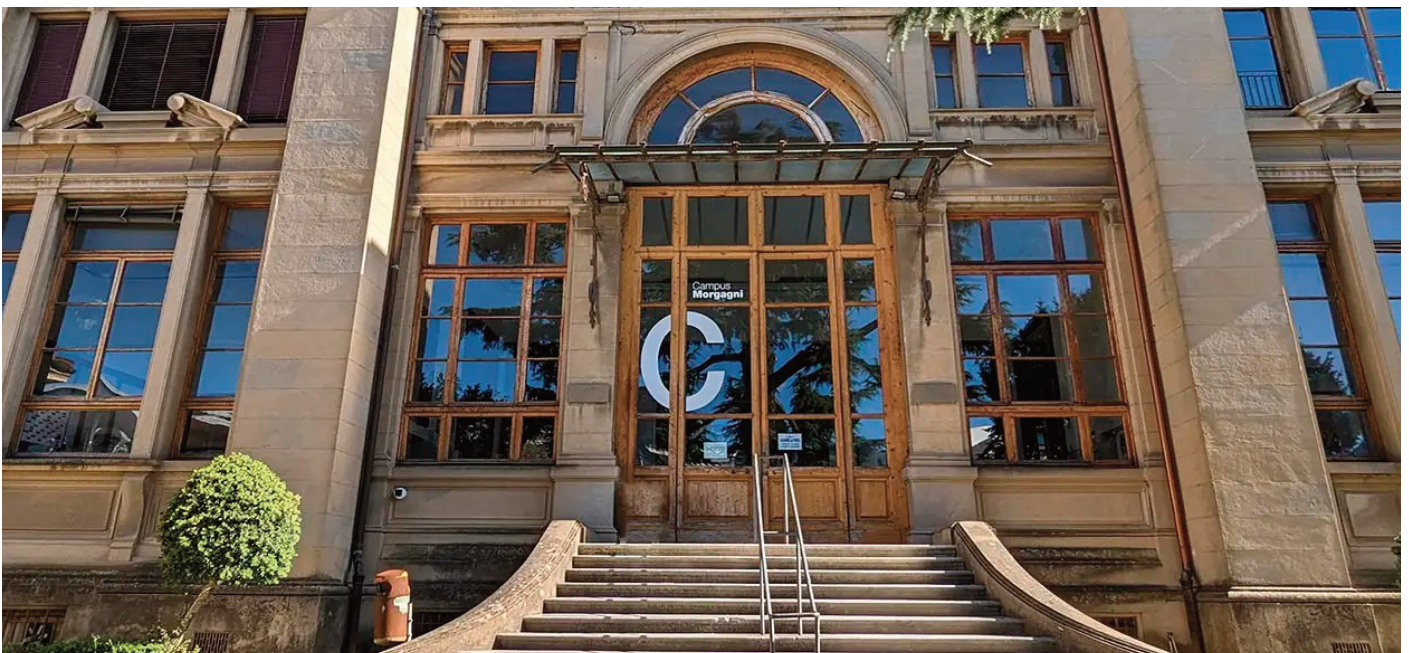
### LiCellMo, Live Cell Metabolic Analyzer

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**The University of Florence (Università degli Studi di Firenze) in Italy has an established track-record in ground-breaking research in medical, biomedical and clinical sciences. One particular area in which it has a strong team and leading reputation is in investigating cancer metabolism. Dr. Luigi Ippolito, researcher at the University of Florence, specializes in research in this emerging field that could help us find new ways to detect cancer and treat it. He explains how new tools, such as PHCbi's LiCellMo, can support these important studies.**

Cancer-associated metabolic reprogramming causes changes in intracellular and extracellular metabolites, providing an opportunity to identify and classify cancer, as well as direct treatment. Individual tumors exhibit specific metabolic hallmarks. Dr. Ippolito is at the forefront of research in this field and works on several cancer metabolism projects at the University of Florence's laboratory of Professor Paola Chiarugi. His current

research is especially focused on the metabolic communications occurring in tumor microenvironments. "My research is mainly focused on prostate cancer progression and the metabolic changes associated with prostate cancer," he remarked. "We are exploring the metabolic interaction between stromal cell populations and prostate cancer cells in primary tumors. And we study lactate because it has been found that lactate levels



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increase along with prostate cancer progression. Following this it is exploited by prostate cancer cells to become more aggressive.”

### Key metabolites

Lactate is an abundant oncometabolite in cancer metabolism. In prostate cancer, cancer-associated fibroblasts (CAF) are major contributors of secreted lactate, which can be taken up by cancer cells to sustain mitochondrial metabolism. However, many other factors, such as how lactate impacts transcriptional regulation in tumors, have yet to be fully determined.

“Lactate is not only a metabolic regulator of lipid metabolism in prostate cancer, but it is also an epigenetic driver because it changes the acetylation of histones (i.e. gene expression) in the prostate cancer cells, resulting in the transcriptional support for the metastatic progression

of cancer cells.” said Dr. Ippolito. “We first published a paper on lactate in Cancer Research journal a couple of years ago (PMID: 35135811). More recently, we have been studying the metastatic niches and the metabolites influencing the metastatic microenvironment,” continued Dr. Ippolito. “Our goal is to identify organ-specific metabolites and their impact on prostate cancer metastatization. We are also exploring the measurement of metabolite content in some tissues, such as lungs and bone from mouse and human models.

“The field of cancer metabolism has been revolutionized by new knowledge in the glycolytic field,” he continued. “So, measuring glucose and lactate is vitally important for our research because, for example, the levels of glycolytic activity can change with treatment or upon exposure with stromal cells. And there is a separate reaction that can be found in the tumor environment. Glucose and lactate measurements are important to give us an initial idea.”

### Well-equipped facilities

The University of Florence is well-equipped for metabolic analysis with large facilities that incorporate capabilities in chromatography, gas/liquid mass spectrometry instruments, a Seahorse analyser, and other special instruments (like Oroboros O2k). Previously, measurement of glucose and lactate was carried out by commercial kits initially and then with mass spectrometry.

*“LiCellMo probably could make our experimental setting more reliable in terms of lactate analysis particularly”*

However, using PHCbi’s new LiCellMo now brings many benefits, such as provision of a detailed online readout of the glucose and lactate over several days.

“It is good to measure in real-time for several days these two parameters to have an idea about changes that can occur within the tumor cells. It impacts on the short-term and long-term analysis,” said Dr. Ippolito. “It might impact on having an idea of the effectiveness of metabolic or



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non-metabolic drug targeting in our models and can be useful to transpose to murine models. For example, measurement of tumor metabolic labelling in mice can be done after a few days after establishment of the tumor, and can be repeated after a long time to compare changes previously observed in in vitro settings"

"The LiCellMo instrument is quite user friendly. It is very easy to handle. Particularly in the steps of preparation of the cell seeding onto the plate," he added. "The instrument is independent and straightforward."

### Valuable data

Dr. Ippolito and his team have found the data quality, the sensitivity, the resolution, and the accuracy of the LiCellMo good.

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"I am confident about the data. The data provided by the instrument and software are very good, very well explained in the raw data. And the raw data provided through the Excel format is useful for all the users. Even after the normalisation, the data the software provides are very reliable and helpful in terms of colours and graphs. I think they are very reliable data," he said. "The instrument probably could make our experimental setting more reliable in terms of lactate analysis particularly. And the measurement over several days could be



implemented in our experimental settings to measure the mean glycolytic parameters of cellular models."

### A compact research companion

The LiCellMo uses 24-well plates which Dr. Ippolito has found very useful.

"The 24-well plate format is good for my experimental settings, because there are a lot of wells that can be used for a lot of different conditions," he said. "I like the dimensions of the instruments. They are very small. The space that the LiCellMo occupies is very small, so it's not a problem in our laboratory. We can put the instrument in our cell culture room.

With the LiCellMo, we do not need a dedicated incubator."

Dr. Ippolito's department have recognized the LiCellMo could be a compact companion in their research.

## INFORMATION

PHC Europe

[www.phchd.com/eu/biomedical](http://www.phchd.com/eu/biomedical)



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