

## **Laser Capture Microdissection: Tissue-based translational research**

### *Abstract*

Current research focuses heavily on in vitro cell culture to understand the factors that are driving biomedical discovery and applications such as gene expression, protein-protein interaction, microRNA regulation of transcriptome and signaling that control cell functions. Whereas this approach is important to determine the mechanisms regulating the function of specific type of cells, a major and significant problem in translatability of laboratory finding is the lack of characterization of the cells in situations where these interactions occur. This lack of knowledge is a major impediment in effectively targeting diseased/abnormal cells in tissues or organs in the body. Translational research requires corroboration of animal or in vitro research results with human disease conditions. However this is not straightforward, as very often when human tissue samples are obtained there is no means enable the proper separation of specific cell types with acceptable purity and efficiency. **Therefore, examining cell functions in the context of their interactions in tissue (in situ) is imperative to obtain critical knowledge.** This problem has been solved by laser capture microdissection. Critical molecular information about specific cell types in the context of their spatial distribution **can only be done by the state-of-the art laser capture microdissection (LCM) equipment because it allows the researchers to probe deep into complex tissue structure and precisely get exactly, and only, what is desired for study even to the level of a single cell as well cells growing in a culture. No other equipment can do it.** This technique strengthened with the power of qRT-PCR or proteomic analysis will allow us to design critical experiments that is hitherto not possible. Furthermore, in addition to tissue, using the current model of (as requested here), investigators can grow cells on special culture dish and laser-dissect cells and carry-on subsequent high-resolution analyses. Therefore, LCM will increase the productivity many fold throughout the strategic research plan of UNMC by increasing research in a variety of fields. The availability of a state-of-the art LCM at UNMC core facility can dramatically improve our ability to design critical experiments, proceed into more exciting areas of research and be more competitive for increasingly rare research dollars. Therefore, we are requesting funds to purchase a Laser Capture Microdissection equipment (LMD7000) from Leica.