For almost twenty years, Professor Ince and his colleagues have been researching ways to efficiently grow cancer cells so they can be examined and studied, in the hopes of finding new and improved therapies for this most terrifying of diseases.
Normal breast-epithelial cells exist in four novel hormonal differentiation states and almost all human breast tumours fall under one of these hormonal differentiation states. This can have significant survival differences, since you can tailor therapy to include, say, oestrogen receptor drugs or androgen receptor drugs. This real-life classification scheme can provide rational treatment guidance and an alternative approach for understanding tumour physiology and tumour classification. And Professor Ince means to follow his classification theory even to the deep molecular level.

Hot off the presses in the journal Oncogene, for example, Professor Ince’s team reported a study of histone deacetylases (HDAC) in breast and ovarian cancer specimens. HDAC are enzymes that help regulate DNA expression by modifying histones, molecules that wrap around and control DNA activity. What he found was that two specific types, HDAC1 and HDAC7, are vital to the function of cancer stem cells, those cancer cells that allow tumours to grow and spread. This means that already existing drugs that inhibit HDAC can rationally be tried on these tumours. Again, classifying tumours by HDAC content can lead to more specific therapeutic choices. In this work Professor Ince has revealed another bit of information on the alien invaders to help in our fight against them!

The epitome of Professor Ince’s research would be his proposal of a stepwise classification system that puts tumours into diagnostic categories based on their distinct tissue of origin, cell-of-origin and differentiation lineage – what he calls ‘lineage-based classifications’. After defining uniform lineage-based classes, he proposes to use molecular and genetic classifiers – like the presence of HDAC1 and HDAC7 – to distinguish prognostic subsets within each lineage. In other words, in the future he plans to narrow the classifications down so much that if you have this or that cancer, there will be a classification relative to your tumour – we could have a therapy for you...

Professor Ince recently suggested a new approach to classification of breast cancer, based on his vast experience with specific cell lines developed from specific tumours and related to specific parent cell types.

While current classification systems for breast cancer are based on expression of prognostic and predictive biomarkers, Professor Ince proposes a hypothesis-based ontological breast cancer classification modelled upon the taxonomy of species as the evolutionary biologist sees it. His approach takes the normal breast-epithelial cell types and differentiation lineages as the gold standard to classify tumours arising from breast tissue. In other words, relate the malignant cell type with the normal cell type that presumably parented it. Professor Ince took his prior research – demonstrating at least eleven previously undefined normal cell types in human breast epithelium and molecular and genetic classifiers – like the presence of HDAC1 and HDAC7, in breast and ovarian cancer, Oncogene, 2016. DOI: 10.1038/onc.2016.337


Professor Ince’s research interests include the role of normal cell-of-origin in determining tumour phenotype and development of culture systems for in vitro culture of primary human tissues and tumours. He has authored or co-authored over 60 articles published in peer-reviewed journals and other professional proceedings. He is also licensed by the states of Florida, Massachusetts and Indiana and certified in Anatomic Pathology by the American Board of Pathology.

PROFESSOR INCE'S RESEARCH

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