breast cancer now

Help support research into developing new surgical tools

Mr St John, Clinical Research Fellow & Breast Surgeon is working in a team at Imperial College developing a new tool called the intelligent knife (iKnife), to make breast conserving surgery more accurate. The iKnife aims to analyse breast tissue as it is being removed to make sure none of the tumour is left behind and thus prevent the need for further surgery.

The challenge

Almost one in four breast cancer patients who undergo breast conserving surgery may need a further operation as the tumour may not have been completely removed during the first procedure. Mr St John will investigate the use of a new surgical tool, the iKnife, which aims to improve the accuracy of surgery by distinguishing between healthy and cancerous tissue in real-time.

Aim:	To develop the iKnife, a surgical tool to distinguish between breast cancer tissue and healthy tissue	
Researcher:	Mr Edward St John, Imperial College London	
Funding:	Externally funded grant	
Tissue:	400 frozen breast cancer samples (mixed type, grade and receptor status) 200 frozen healthy breast tissue samples	

The science behind the project

During surgery, the breast tumour is removed in addition to a surrounding rim of healthy tissue. Unfortunately this method is not perfect, as surgeons can't distinguish the cancer tissue from the healthy tissue by sight. This may lead to some of the tumour being left behind, and the patient requiring further surgery.

Mr St John is aiming to increase the accuracy of surgery through the use of the iKnife, a tool that identifies the type of tissue being cut. Currently, an electrical tool is used to remove cancer tissue, generating a high heat that seals blood vessels and vaporises the tissue it cuts. The iKnife has been developed to capture the vapour produced by this process and analyse it; the surgeon receives this analysis in real-time to determine whether they are cutting healthy or cancerous tissue. This can then be used as a guide to make sure all of the tumour is removed.

Mr St John and the team at Imperial College London have found that the iKnife can successfully distinguish between breast cancer cells and healthy cells grown in the lab. They now want to use tissue samples from the Breast Cancer Now Tissue Bank to find out whether the iKnife can accurately tell the difference between breast cancer tissue and healthy breast tissue.

What difference will this project make?

The iKnife may enable surgeons to remove tumour with greater precision and reduce the need for further surgery – making a huge difference to patients' quality of life and a significant cost saving to the NHS - and potentially reduce the risk of patients' cancers

coming back. If use of the iKnife on breast cancer tissue samples proves to be successful, the technique can then be trialled in patients during surgery.