MEDICAL STUDENT ESSAY WINNER:

SAM KLEEMAN

Project: Application of a miRNA signature to the non-invasive diagnosis of Barrett's Oesophagus

'I am extremely grateful to Core and Dr Falk to be awarded this essay prize and would like to thank my supervisors Rebecca Fitzgerald and Xiaodun Li for all their help throughout the project. To be recognised in this way has focussed my efforts on pursuing a career in academic medicine within gastroenterology. Writing up my project as an essay has given me useful skills that I hope to take forward into the future'.

Sam Kleeman is shortly to begin his fifth year at the University of Oxford Medical School. He has just completed an intercalated BSc (BA) in Pathology at the Medical Research Council Cancer Unit, Cambridge.

'During my third year at the University of Cambridge, I was fortunate to be able to undertake a cancer screening project at the MRC Cancer Unit, Cambridge. For several years, I have taken a keen interest in better understanding how cancers develop and how we can better treat them. Cancer of the oesophagus has a very poor prognosis with less than 1 in 5 of the 9000 patients diagnosed every year surviving 5 years. The most common type of oesophageal cancer, known as oesophageal adenocarcinoma, is always preceded by a precursor stage known as Barrett's oesophagus (BE) where the cells lining the oesophagus become more like the cells lining the intestine. Once diagnosed, treatments exist that can destroy the abnormal cells to prevent them developing into cancer.

'Currently, only a small proportion of people with BE know they have the condition – there is a need to develop simple diagnostic tests that can be used to screen people for BE. Therefore, the aim of my project was to see whether measuring a type of small nucleic acid known as micro RNA (miRNA) could determine whether a given tissue sample contained BE or not. Rather than using tissue samples collected by endoscopy, we used samples collected by swallowing a pill-on-a-string known as the 'Cytosponge'.

'We found three miRNAs that were highly expressed in BE but not normal tissue samples – these can be used to accurately diagnose BE in patients who have swallowed the 'Cytosponge'. As a result, this test could be used as the basis of a novel screening programme in which patients at high risk of BE (for example, male patients with reflux) could swallow the 'Cytosponge' at their GP to find out whether they have the disease. I have found the results of this project fascinating for two reasons. Firstly, current approaches for BE diagnosis such as histopathology are highly resource-intensive while our miRNA-based test could be completely automated and so would be cheap to perform. Secondly, the three miRNAs we identified as being elevated in BE tissues may well be elevated because they play a role in how BE develops - this is something we hope to investigate further. Overall by diagnosing more cases of BE, more patients could be referred to receive treatment and so fewer patients would ever progress to oesophageal cancer.

Mr Kleemans Supervisor Professor Rebecca Fitgerald comments:

Sam has impressed me as being an independent thinker and conscientious worker. He embraced the project from the outset and read widely. He was quickly able to perform experiments independently and he challenged the study design and interpretation of data intelligently and thoughtfully. He achieved a remarkable amount in the time available. It is vital that we attract individuals like Sam Kleeman into Gastroenterology and academic medicine more generally. The Dr Falk Pharma/CORE awards are an excellent way to do this.