

MEDICAL STUDENT ESSAY PRIZE WINNER:  
**DR AWAD MAHALHAL**



## PROJECT: Influence of Iron Supplementation on Gut Microbiota and the Natural History of Inflammatory Bowel Disease

*'Winning Dr Falk Core Medical Student Prize is a golden step in my life as it is a useful addition to my CV, demonstrating both a commitment to clinical research career and achievement of excellence. I look forward to continuing my research into areas of gastroenterology alongside working in the clinical arena.'*

*Dr Mahalhal qualified as a doctor at the University of Benghazi, Libya in 2003 and since then has worked in clinical research and teaching. He has just completed a PhD in Gastroenterology at the University of Liverpool and is currently working on an extension of his project above. In September he will start to work on getting a place as a trainee gastroenterologist at the Royal Liverpool Hospital.*

'As a medical student and doctor I have worked in gastroenterology and I was always extremely interested in the wide variety of issues that this specialist covers. Especially when you consider that the basic symptoms you are presented with – diarrhoea, nausea, rectal bleeding - are all pretty much the same for every patient. Working in gastroenterology often means a lot of detective work which I really enjoy.

About one third of the patients we see with IBD are deficient in iron – they are anaemic - which can make them feel really weak, ill and can even affect their cognitive ability. Currently NICE recommends a low dose of iron for all IBD patients.

My project investigated whether treatment with oral iron supplementation may intensify inflammation and tissue damage both to the intestine and to the intestinal microbiota.

We investigated the influence of iron on acute colitis in mice, feeding separate groups low, normal and high iron supplements.

We found that the incidence of colitis increased in the low and high iron groups but not in the middle group.

In a separate study we investigated the gut microbiota of mice who were similarly given low, normal and high dose iron supplements. In this case we found that a high dose of iron affected the balance of the microbiota whereas low and normal supplement did not.

This led us to hypothesise that the best level of iron supplement for IBD patients may be a normal dose although of course more studies need to be done to establish this is the case in humans. We are currently working on a study to determine whether different types of iron supplement - rather than the standard ferrous sulphate supplement, may provide different results.'

### *Dr Mahalhal's Supervisor Prof Chris Probert comments:*

'Awad is a Libyan trained gastroenterologist who chose to undertake his doctoral studies at the University of Liverpool.

'As a medical graduate, Awad had to learn every lab technique from scratch: from applying for approval, molecular biology/genomic, bioinformatics, histology and ELISA. In addition to complex statistics!

'Awad has developed an impressive range of skills which he applied to the study of the influence of ferrous sulphate on the gut microbiome and the natural history of IBD. Awad has shown that changing the luminal concentration of ferrous iron exacerbates colitis: this happens when iron is decreased as well as when it is increased! He has shown that a mechanism is the influence of iron on the microbiome.

'Awad was awarded his PhD for this research in 2017 and is now undertaking further studies to understand how other forms of iron influence the microbiome.'