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**Novel Insights Into the prevention and Treatment of Invasive
Salmonella Dublin
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A paper presented at the 7th European Clinical Microbiology Congress. London, UK, 01 - 02 Nov 2018.

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Title: Novel Insights Into the prevention and Treatment of Invasive *Salmonella* Dublin

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Salmonellosis is one of the most common foodborne diseases worldwide that causes a huge burden of morbidity and mortality in humans. Although non-typhoidal *Salmonella* serovars including *Salmonella* Dublin are associated primarily with self-limiting gastrointestinal illness they have adapted to cause invasive disease and systemic illness in humans particularly children, elderly and immunocompromised people.

Salmonella enterica serovar Dublin is a zoonotic infection that can be transmitted from cattle to humans through consumption of contaminated milk and milk products. Outbreaks of human infections by *Salmonella* Dublin have been reported in several countries including high-income countries. The genetic basis of virulence and invasiveness of *Salmonella* Dublin is not well characterized. Whole genome sequencing of a large set of *Salmonella* Dublin isolates revealed several mobile genetic elements coding virulence genes that might contribute to bacterial ability to cause systemic illness in humans.

There is no vaccine against non-typhoidal *Salmonella* serovars including *Salmonella* Dublin furthermore, management is further complicated by the emergence of multidrug resistant strains. Our understanding of the molecular basis of virulence in invasive *Salmonella* Dublin will provide insights into the development of novel drugs and effective vaccine for high-risk groups.

Biography

Dr Manal Mohammed (BVSc, MVSc, PhD, FHEA) is a lecturer in Medical Microbiology at University of Westminster, UK. Her research is focused on application of next generation sequencing technologies and associated bioinformatics analyses tools in investigating the molecular basis of virulence of non-typhoidal salmonellosis in humans and understanding the complex dynamics of bacteria-phage interaction aiming to develop phage therapy as an alternative to antibiotics.

LIST OF PUBLICATIONS:

- **Manal Mohammed (2018):**

Who Fights Whom? Understanding the Complex Dynamics of Bacteria-Phage Interaction using Anderson Phage Typing System. *Journal of Infectious Diseases & Therapy*, 6(3), 367. DOI: 10.4172/2332-0877.1000368

- **Manal Mohammed (2017):**

Phage typing or CRISPR typing for epidemiological surveillance of *Salmonella* Typhimurium?. *BioMed Central Research Notes* **10(1): 578**. DOI: 10.1186/s13104-017-2878-0.

- **Manal Mohammed, Simon Le Hello; Pimlapas Leekitcharoenphon; Rene Hendriksen (2017):**

The invasome of *Salmonella* Dublin as revealed by whole genome sequencing. *BioMed Central Infectious Diseases* **17(1): 544**. DOI: 10.1186/s12879-017-2628-x.

- **Manal Mohammed and Martin Cormican (2016):**

Whole Genome Sequencing Provides Insights into the Genetic Determinants of Invasiveness in *Salmonella* Dublin. *Epidemiology and Infection* **144(11):2430-2439**. DOI: 10.1017/S0950268816000492.

- **Manal Mohammed and Martin Cormican (2015):**

Whole genome sequencing provides possible explanations for the difference in phage susceptibility among two *Salmonella* Typhimurium phage types (DT8 and DT30) associated with a single foodborne outbreak. *BioMed Central Research Notes* **27;8:728**. DOI: 10.1186/s13104-015-1687-6.

- **Manal Mohammed, Niall DeLappe, Jean O'Connor, Paul McKeown, Patricia Garvey and Martin Cormican (2015):**

Whole genome sequencing provides an unambiguous link between *Salmonella* Dublin outbreak strain and a historical isolate. *Epidemiology and Infection* **13:1-6**. DOI: 10.1017/S0950268815001636

- **Anne Marie Burns, Peadar G. Lawlor, Gillian E. Gardiner, Evonne M. McCabe, Des Walsh, Manal Mohammed, Jim Grant and Geraldine Duffy (2015):**

Salmonella occurrence and Enterobacteriaceae counts in pig feed ingredients and compound feed from feed mills in Ireland. *Preventive Veterinary Medicine* **121 (3-4):231-239**. DOI: 10.1016/j.prevetmed.2015.07.002.

- **Manal Mohammed, Sareen E. Galbraith, Alan D. Radford, Winifred Dove, Tomohiko Takasaki, Ichiro Kurane, Tom Solomon (2011):**

Molecular phylogenetic and evolutionary analyses of Muar strain of Japanese encephalitis virus reveal it is the missing fifth genotype. *Infection Genetics and Evolution* **11 (5), 855-862**. DOI: 10.1016/j.meegid.2011.01.020.

LIST OF PRESENTATIONS:

- **Manal Mohammed (14th June 2018):** Towards Treatment and Prevention of non-typhoidal *Salmonella*. **International Conference on Advanced Microbiology and Education**. Park Inn Hotel, London, UK.)
- **Manal Mohammed, Simon Le Hello; Pimlapas Leekitcharoenphon; Rene Hendriksen (22-26 April 2017):** Whole-genome sequencing reveals the secrets of the *Salmonella* Dublin invasome. **European Society of Clinical Microbiology and Infectious Diseases (ECCMID)** in Copenhagen, Denmark on 22– 26 April 2017.
- **Manal Mohammed (13 March 2017):** Why should Britain Care about *Salmonella* Dublin?. **STEM for BRITAN** (Biological and Biomedical Sciences Exhibition), at Attlee Suite, Portcullis House, House of Common, Westminster, London, UK. <https://www.westminster.ac.uk/news-and-events/2017/westminster-bioscientist-manal-mohammed-takes-her-research-to-parliament>
- **Manal Mohammed and Martin Cormican (17-19 June 2015):** Bacteriophage therapy: a promising alternative to evade bacterial resistance to antibiotics. **Society of General Microbiology (SGM)** Irish branch meeting 2015 at National University of Ireland Galway, Ireland.
- **Manal Mohammed and Martin Cormican (17-19 June 2015):** Microbial Whole Genome Sequencing Revolutionizing the Way We Investigate Foodborne Outbreaks. **Society of General Microbiology (SGM)** Irish branch meeting 2015 at National University of Ireland Galway, Ireland.
- **Manal Mohammed and Martin Cormican (17-19 June 2015):** Comparative Genomics Reveals the Genetic Basis of Invasiveness in *Salmonella* enterica serovar Dublin. **Society of General Microbiology (SGM)** Irish branch meeting 2015 at National University of Ireland Galway, Ireland
- **Manal Mohammed and Martin Cormican (17-19 June 2015):** Genomic Correlates of Failure of Aes Laboratorie *Salmonella* Agar Plate to Detect *Salmonella* Dublin. **Society of General Microbiology (SGM)** Irish branch meeting 2015 at National University of Ireland Galway, Ireland.
- **Manal Mohammed, Niall DeLappe, Jean O'Connor, Paul McKeown, Patricia Garvey and Martin Cormican (25-28 April 2015):** Rapid Whole-Genome Sequencing for Investigation of a *Salmonella* Dublin Gastroenteritis Outbreak in Ireland. **European Society of Clinical Microbiology and Infectious Diseases (ECCMID)** in Copenhagen, Denmark on 25 – 28 April 2015.
- **Manal Mohammed and Martin Cormican (4 October 2014):** Microbial Whole Genome Sequencing Reveals the Genetic Basis of Virulence and Host Adaptation in *Salmonella* Dublin and Proves to be a Powerful Laboratory Method for Investigating Foodborne Outbreaks. **Irish Society of Clinical Microbiologists Autumn (ISCM) meeting** 2014 at Davenport Hotel, Dublin 2, Ireland. (I was awarded First Prize sponsored by MSD Pharmaceuticals).

- **Manal Mohammed and Martin Cormican (21 August 2014):** Toward Investigating the Molecular Basis of *Salmonella* Typhimurium Phage Typing with Whole Genome Sequencing. **Society of General Microbiology (SGM)** Irish branch summer meeting 2014 (at University of Limerick, Ireland)- I was awarded First Prize , sponsored by Science Foundation Ireland ‘SFI’.
- **Manal Mohammed, Siritorn Butrapet, Sareen E. Galbraith, Ichiro Kurane, Alan Radford and Tom Solomon (27th April 2010):** Molecular Evolution of Japanese Encephalitis Virus, **University of Liverpool, School of Infection and Host Defence Away Day**, Ness Botanic Gardens Neston, Wirral. (I was awarded second prize in the Poster Presentations Competition).
- **Manal Mohammed, Siritorn Butrapet, Sareen E. Galbraith, Ichiro Kurane, Alan Radford and Tom Solomon (31st March 2010):** Molecular phylogenetic and evolutionary analyses of Muar strain of Japanese encephalitis virus: the missing 5th genotype. **Society of General Microbiology (SGM)** Spring 2010 Meeting, Edinburgh International Conference Centre. (Talk)
- **Manal Mohammed, Siritorn Butrapet, Tomohiko Takasaki, Ichiro Kurane, Sareen E. Galbraith and Tom Solomon (1st April 2009):** Phylogenetic analysis of Muar strain of Japanese encephalitis virus reveals a possible 5th Genotype, **Society of General Microbiology (SGM)** Spring 2009 Meeting, Harrogate International Centre. (Talk)

MEDIA:

- **Manal Mohammed (3 October 2018):** BBC Radio London: Dr Manal Mohammed talks about research finding 19 types of bacteria on cash and coins. <https://www.westminster.ac.uk/news-and-events/in-the-media/2018/atlas-of-science-old-school-wins-outbreak-investigation-of-foodborne-salmonellosis>
- **Manal Mohammed (5 September 2018):** BBC Radio London: Dr Manal Mohammed talks about spread of germs in public spaces. <https://www.westminster.ac.uk/news-and-events/in-the-media/2018/bbc-radio-london-dr-manal-mohammed-talks-about-spread-of-germs-in-public-space>
- **Manal Mohammed (23 October 2014):** *Salmonella* Dublin Outbreak in 2013. **The Medical Independent Newspaper**
http://www.medicalindependent.ie/55284/salmonella_dublin_outbreak_in_2013

