



## **SALMONELLA ENTERITIDIS ST183 IN HEDGEHOGS AND HUMANS: ENDEMIC INFECTION AND EMERGING TRENDS**

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The western European hedgehog (*Erinaceus europaeus*) population has undergone sharp decline in recent decades in Great Britain (GB). Whilst a multifactorial causation has been proposed, including diet limitation and habitat degradation, the extent to which disease is contributing requires further investigation. Hedgehogs are the most frequently admitted mammalian casualties to wildlife centres in GB. Opportunity therefore exists for close contact between hedgehogs and humans with potential for zoonotic and anthroponotic pathogen transmission. *Salmonella enterica* serovar Enteritidis is one of the major causes of human and animal *Salmonella* infections worldwide. Historically, *S. Enteritidis* phage type (PT)11 has been reported in hedgehogs from GB and continental Europe and this infection may be endemic in this species; however, there is a paucity of data to inform the implications of *Salmonella* infections in hedgehogs for wildlife and public health.

*Post-mortem* examinations (PMEs) were conducted on a convenience sample of 171 hedgehogs submitted from across GB, August 2012-December 2015. A standardised protocol supported by parasitological and histopathological examinations was employed. Microbiological examination was performed on liver and small intestinal contents, plus macroscopic lesions. Phage typing and whole genome sequencing (WGS) by Illumina HiSeq was conducted on all *Salmonella* sp. isolates. *Salmonella* Enteritidis multi-locus sequence type (ST)183 was isolated from 46/171 hedgehogs which comprised 28 *S. Enteritidis* PT11 and 18 of a novel PT66 biotype. PME demonstrated severe enlargement and/or abscessation of the mesenteric lymph nodes in all of the hedgehogs with PT66 infection; the bacterium was consistently recovered from these lesions. In contrast, PME revealed a more diverse range of macroscopic and microscopic findings in the hedgehogs with PT11 infection. WGS single nucleotide polymorphism phylogenetic analysis of the hedgehog isolates and of these biotypes available from humans in GB found that PT11 and PT66 form two distinct and divergent clades within ST183. PT66 was isolated from hedgehogs in southern and central Scotland only whilst PT11 was recovered from hedgehogs across England and Scotland. Hedgehog isolates were interspersed throughout the human isolates in the phylogeny. There was a strong geographical signal in the phylogenetic analysis with clustering of spatially proximate isolates. These results are consistent with the hedgehog acting as a local source of zoonotic infection with these ST183 biotypes. PT11 is considered likely to be an endemic infection of the British hedgehog population whilst PT66 is a recently identified, and potentially emerging, biotype.

A factsheet on hedgehog salmonellosis is available at the GWH website ([www.gardenwildlifehealth.org](http://www.gardenwildlifehealth.org)).

### References

LAWSON, B., FRANKLINOS, L. H. V., RODRIGUEZ-RAMOS FERNANDEZ, J., WEND-HANSEN, C., NAIR, S., MACGREGOR, S. K., JOHN, S. K., PIZZI, R., NUNEZ, A., ASHTON, P. M., CUNNINGHAM, A. A. & DE PINNA, E. M. *Salmonella* Enteritidis ST183: emerging and endemic biotypes affecting western European hedgehogs (*Erinaceus europaeus*) and people in Great Britain. In review.