

New insights into why adolescents carry meningitis-causing bacteria

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University of York scientists have shed new light on why teenagers and young adults are particularly susceptible to meningitis and septicaemia.

The team from the University's Department of Biology has discovered a novel metabolic pathway in the bacterium *Neisseria meningitidis* that may explain why this age group is particularly at risk of infection.

The results of the research, which was supported by the Centre for Chronic Diseases and Disorders (C2D2), are reported in the journal *Molecular Microbiology*.

N. meningitidis is a major cause of meningitis and septicaemia, and a leading cause of infectious disease among teenagers and young adults. While it is well known that these bacteria are found in large numbers in the [upper respiratory tract](#) among adolescents, the reasons for this are unknown.

Lead author Dr James Moir, from York's Department of Biology, said: "We have found that *N. meningitidis* can supplement its growth via metabolism of the small fatty acid propionic acid. The propionic acid is generated by other, strictly anaerobic bacteria (bacteria that do not need oxygen to live) that become more prevalent in adolescents.

"Through our research, we identify the [metabolic pathway](#) responsible and show that there is a correlation between *N. meningitidis* and propionic acid generating anaerobic [bacteria](#) *Porphyromonas* and

Fusobacterium. The anaerobes are acquired gradually with age, peaking in adolescence."

Dr Maria-Chiara Catenazzi, from York's Department of Biology, said: "The capacity of *N. meningitidis* to colonise adolescents/[young adults](#) is important for its transmission and disease epidemiology. This increase in carriage in young adulthood is frequently attributed to increased social interaction and contact in this age group. While this is no doubt true, here we present for the first time a mechanistic explanation for why *N. meningitidis* carriage varies with age, based on the genetic properties of *N. meningitidis* and co-colonising microbes in the human host."

More information: "A large genomic island allows *Neisseria meningitidis* to utilize propionic acid, with implications for colonization of the human nasopharynx." Catenazzi MC, et al. *Mol Microbiol.* 2014 Jul;93(2):346-55. [DOI: 10.1111/mmi.12664](#). Epub 2014 Jun 27.

Provided by University of York

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