Are we too clean for our own good?

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In July 2021, Science News published an article stating that, based on new evidence, the popular hygiene hypothesis should be discarded.[1]

The hygiene hypothesis states that exposure to particular pathogens in early life develops the immune system and protects against allergies.[1] BUT…

The hygiene hypothesis

Large family size, many infections	Small family size, few infections
High microbial exposure	Low microbial exposure
No allergy or autoimmune disease	Allergy or autoimmune disease

Graham Rook – Emeritus Professor of Medical Microbiology

"For more than 20 years there has been a public narrative that hand and domestic hygiene practices, that are essential for stopping exposure to disease-causing pathogens, are also blocking exposure to the beneficial organisms". [1]

The microbes found in our homes today are, to a large extent, not the ones needed for the development of the immune system, but rather microorganisms of the natural green environment, which are not affected by our personal and domestic cleanliness.[1]

Time to abandon the hygiene hypothesis: new perspectives on allergic disease, the human microbiome, infectious disease prevention and the role of targeted hygiene. [2]

Objective

- ❖ **To review the burden of allergic and infectious diseases and the evidence for a link to microbial exposure, the human microbiome and immune system.**

Methods

- ➢ **By using methodology based on the Delphi technique, six experts in infectious and allergic disease were surveyed and a consensus view regarding the aim of the study was derived.**

Results

- ✓ **Hygiene is still important in this age because it can limit the spread of infections, in turn reducing the need for antibiotics and thus preventing antibiotic resistance.**
- ✓ **The term 'hygiene hypothesis' is misleading, as there is no good evidence that cleanliness is responsible for altered microbial exposures.**
- ✓ **Modifications in lifestyle and environmental exposures, urbanization, dietary changes and antibiotic use have led to failure of immunotolerance and increased risk of allergic diseases.**

Science and society – communication barriers

Stakeholders	Challenge
Media	Mis-portrayal of concepts such as hygiene
Medical professionals	Inadequate response to misleading material in the media
Scientists	Failure to standardize terminology
Policy makers	Ineffective and mixed messages to the public
Lay public	Poor conceptualization of risk versus benefit

Our interpretation:

- **The public perception that hygiene and cleanliness is the main cause of the rise in allergic diseases is not substantiated by evidence.**
- **The rise in allergies is rather linked to lifestyle and environmental changes that reduce exposure to the natural environment where non-harmful microbes inhabit, diets low in fibre and polyphenols, and antibiotics use.**
- **Strategies that could help reduce the risk of allergic diseases include promoting natural childbirth and breastfeeding, increased outdoor activities, appropriate antibiotic use and dietary modification.**

1. University College London. Being clean and hygienic need not impair childhood immunity. ScienceDaily. 2021 July 5 https://www.sciencedaily.com/releases/2021/07/210705094709.htm
2. Bloomfield SF, Rook GAW, Scott EA, *et al*. Time to abandon the hygiene hypothesis: new perspectives on allergic disease, the human microbiome, infectious disease prevention and the role of targeted hygiene. Perspect Public Health. 2016 July;136(4):213-224. doi: 10.1177/1757913916650225