The farm-milk effect on trial

December 10 2018

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Erika von Mutius studies the impact of environmental factors in early childhood on allergy and asthma risk. She is now planning a large-scale trial of the beneficial role of unprocessed milk, which will involve thousands of children.

Erika von Mutius is a pediatrician and immunologist, but she has also become well versed in many aspects of food processing. She and others

have carried out a number of studies, which have shown that children who drink unprocessed cow's milk are less likely to develop allergies and asthma than children who are given the sort of sterilized milk one finds in supermarkets. To develop a means of verifying this observation in a controlled trial, von Mutius has delved into the details of industrial milk processing. "Direct consumption of raw milk as a precaution against allergies cannot be recommended, as untreated milk may contain pathogenic microorganisms," she points out. To bypass this complication, she persuaded a dairy cooperative to develop a gentler and more discriminating approach to milk processing, with the aim of preserving as many of its health-promoting properties as possible while removing potentially dangerous bacteria.

The effect of the new decontamination strategy will now be tested in a large-scale study named MARTHA (an acronym derived from its German title). Over 3000 babies over the age of 6 months will take part in the trial. The subjects will be randomly assigned to either the experimental or the control group. Those in the first group will receive milk processed by the new method, while the others will be given the conventionally heat-sterilized product available in supermarkets. The study will continue for seven years, and will be led by Erika von Mutius in cooperation with Dr. von Hauner's Children's Hospital in Munich and the Pediatric Hospital at Regensburg University. The main finance for the set-up of the MARTHA study, comes from "LONGFONDS | Accelerate", an international research programme of the Netherlands Lung Foundation, in which renowned scientists, doctors, lung patients and social partners work closely together.

Allergic disorders are among the most prevalent types of health impairments encountered in children and adolescents. According to a nationwide study of the state of health of children and adolescents carried out by the Robert Koch Institute, more than 25% of children in Germany have been diagnosed as having had a least one bout of one or

other of the three classical atopic – bronchial asthma, hay fever and neurodermitis.

"Allergies are complex pathologies, to which many factors may contribute. Not only environmental factors and innate genetic predispositions, but also nutrition can play a role, says von Mutius, Head of the Outpatient Department for Asthma and Allergies at Dr. von Hauner's Children's Hospital at the LMU Medical Center, and Director of the Institute for the Prevention of Asthma and Allergies at the Helmholtz Zentrum München. Her work first attracted wider public attention when she discovered what is now known as the farmyard effect. In a series of epidemiological studies, she showed that children who grew up on dairy farms were less likely to suffer from allergies and asthma than those who spent their early years in urban settings.

Her research, for which she won the coveted Leibniz Prize awarded by the German Research Association (Deutsche Forschungsgemeinschaft), has enhanced our understanding of the development of the immune system in the earliest years of life. For example, she showed that specific components of farmyard dust can prevent the emergence of allergies in children, and that the microbiomes of children with and without allergies differ from one another in characteristic ways. The term 'microbiome' refers to the community of microorganisms that lives in and on the human body, which is now known to play an important role in modulating the development of one's immune defenses. Moreover, it has emerged that the composition of the microbiome is influenced by lifestyles and nutritional factors. In light of these findings, it is not surprising that Erika von Mutius is now coordinating a new Research Focus at LMU's Center for Advanced Studies, which will illuminate the significance of the microbiome from an interdisciplinary perspective.

"For a long time, it was thought that the best way to ensure that a child did not develop an allergy was to avoid contact with potential allergens.

That idea has now been turned on its head. The new approach is to administer the allergen in controlled doses," von Mutius explains. This paradigm change was stimulated largely by the LEAP (Learning Early about Peanut Allergy) study led by Professor Gideon Lack of King's College London, in which babies were followed from the age of 4 months. The results, which were published in 2015, demonstrated that children who had been exposed to peanuts at an early age were less likely to have developed an allergy to peanut proteins at the age of 5 years.

"We already know from our studies on farms that consumption of fresh, untreated milk can confer protection against allergic disorders. And we now want to make practical use of this observation," she says. Meanwhile, she and her research group have tried to track down the constituents of raw milk responsible for its anti-allergic effects. Recently, the team found that unprocessed milk has a higher content of essential omega-3 fatty acids.

"Every child drinks milk. Very few children are lactose intolerant or develop a milk allergy, and the incidence of both conditions is even lower among children who grow up on farms. So we don't anticipate that we will see a rise in the frequency of milk allergies in the Martha study. On the contrary, we expect that there will be a fall in the overall rate of allergic disorders among the study population," says von Mutius. She hopes to find a sufficient number of parents who are willing to enroll their children in the study. One incentive to do so is that the milk used by both groups of children will be provided free of charge for the duration of the study. In return, parents agree to keep a record of the child's health and to bring their child to the study's outpatient department three times over the course of the trial. Members of the study team have already begun informing young parents in clinics in and around Munich about the purpose and the structure of the project.

Assuming that the study confirms that the consumption of raw milk

reduces the incidence of childhood allergies, it could trigger changes in the dairy sections of our supermarkets. "At the moment, grocery stores do all they can to extend the shelf life of milk, which is perfectly understandable from the practical point of view. But I believe that this is fundamentally misguided, as preservation measures do not appear to be particularly good for health. They can lead to the loss of all the protective agents present in fresh food. If our study confirms the positive effect of unprocessed milk, then things will have to change. Then it will be time to stop the conventional ultrahigh-temperature processing of fresh milk."

More information: MARTHA Study: www.martha-studie.de/

Provided by Ludwig Maximilian University of Munich