

Fine particulate matter from traffic may influence birth weight

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After the scientists had investigated the effects of the exposure of adults and children to particulate matter in the past, they are now first focussing on the risks to unborn life in this recent study. This is the continuation of the GSF's successful cooperation with the internationally renowned French research institution, with the common objective of tracing the causes of environment-related health disorders.

For the study which has now been published online, data from the cohort study LISA were used, in which the influence of living conditions and behaviours on the development of the immune system and allergies is studied.

1016 mothers and their children born in Munich between 1998 and 1999 were studied. All women included in the study had not moved out during the pregnancy. On the basis of a measuring campaign at 40 locations in the city of Munich, the concentrations of traffic-related atmospheric pollutants during pregnancy, including fine particulate matter (those with a diameter of less than 2.5 micrometers, PM_{2,5}), could be modelled at the home address of the pregnant women. The model took into account the distance of each home from streets, the population density near the home as well as the fluctuations in the concentration of the air pollutants over time during the pregnancies.

Using a detailed questionnaire, the study authors could disentangle the influence of air pollutants from that of other factors known to influence birth weight. In particular, maternal smoking, the height and weight of

the mother before pregnancy, the educational level of the mothers as well as the duration of the pregnancy and the child's gender could be controlled for.

The proportion of newborns with a birth weight below 3,000 grams increased with increasing concentrations of fine particulate matter (PM_{2,5}) during pregnancy. A similar association was observed between the absorbance of fine particulate matter and birth weight. The absorbance of particulate matter is considered to be a marker of the particles originating from traffic, and in particular from diesel vehicles.

Earlier American Studies had already suggested that fine particulate matter might influence the birth weight. This recent study is the first study from Germany and Western Europe and also the first one to suggest so clearly that traffic-related air pollutants have an influence.

The biological mechanisms which could explain the influence of air pollutants on the growth of the unborn child are not known as yet. Fine particulate matter consists of hundreds of chemical substances. It is conceivable that a minor fraction of the fine particulate matter reaches the blood through the lungs and influences the placenta or other organs which are responsible for regulating the growth of the foetus. Studies from the US and Poland have for example shown that polycyclic aromatic hydrocarbons (PAH), which are produced during incomplete combustion processes, can reach the foetus and influence its growth.

Source: National Research Center for Environment and Health

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