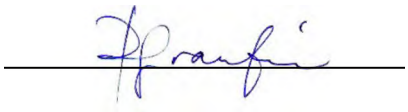
STATE OF MINNESOTA DISTRICT COURT FOR THE COUNTY OF HENNEPIN FOURTH JUDICIAL DISTRICT

CIVIL ACTION NO. 27-CV-10-28862

STATE OF MINNESOTA, *et al.* v. 3M COMPANY

EXPERT REPORT OF PHILIPPE GRANDJEAN, MD, DMSc



PREPARED ON BEHALF OF PLAINTIFF STATE OF MINNESOTA

22 September, 2017

in elderly subjects from the Faroe Islands, where exposure levels are similar to background levels in the US (unpublished results).

h. Data from the C8 project showed that total cholesterol and LDL-cholesterol increased at higher PFOA exposures (and HDL increases in women) [235]. The variability in PFC-associated cholesterol changes is quite large [8], although a variety of factors, such as age, sex, and body mass index could affect the degrees of the relationship [284].

i. Indirect evidence suggests that PFC metabolism is not linked to changes in lipid metabolism (which would suggest a reverse causation), thereby rejecting a hypothesis that both PFCs and cholesterol could be affected by a common cause that would produce apparent positive associations between PFCs and cholesterols in serum. Thus, subjects who are taking statins to decrease their serum-cholesterol do not show any lower serum-PFC concentrations [282]. This report agrees with our findings in the Faroes (unpublished).

j. While early data from Cottage Grove suggested no risk, an increased risk of cerebrovascular disease was indicated by a mortality study that relied on comparisons with the general population [285]. The subsequent 3M-supported follow-up [76] again showed strongly elevated risk of cerebrovascular death in workers with high exposure, especially when compared to an internal control group. The draft report by Drs Lundin and Alexander from the University of Minnesota[iiiii] provides a balanced presentation, but the published article that was co-authored by 3M's Dr. Olsen calls the association "inconsistent" because the mortality was not clearly elevated when compared to the general Minnesota population.

k. Cross-sectional NHANES data suggest that serum-PFOA concentration is associated with systolic blood pressure and the risk of hypertension [286]. Hypertension may relate to an increased risk of cerebrovascular mortality.

l. NHANES data suggest that increased serum concentrations of PFOA and PFOS are associated with an increased risk of chronic kidney disease, as defined by a low glomerular filtration rate [287].[iiiii] Here, reverse causation cannot be ruled out, i.e., that kidney disease prevents PFC excretion via the urine[59]. A major caveat, however, is that PFBA was not considered, as it may not have been detectable in the serum, while the major accumulation in the body is in the kidneys [52].

m. Regarding uric acid, the C8 Project examined its association with serum PFOA levels after adjustment for potential confounders. An increased risk of elevated uric acid was found in adults, including clinically defined hyperuricemia [288]. Again, this evidence is yet somewhat uncertain, as reverse causation may be present.

[iiiii] 3MA02557439.pdf. Final report, Mortality of Employees of an Ammonium Perfluorooctanoate Production Facility, August 22, 2007.

[iiiii] I note that the first author of this article, and co-author of five other publications on cardiovascular outcomes in PFOS-exposed populations, has provided erroneous information to the West Virginia University regarding his educational background. The articles in question were co-authored be established colleagues, and none of them has been retracted.

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