

Plastic additives leach into medical experiments, research shows

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(PhysOrg.com) -- Researchers in the University of Alberta's Faculty of Medicine & Dentistry have shown that using plastic lab equipment can skew or ruin the results of medical experiments.

The researchers identified two classes of chemical compounds in commonly-used plastic lab ware that leach could into solutions. They further demonstrated that the compounds interacted biologically with, and changed the behaviour of, human enzymes and brain receptors in different experiments.

The researchers describe their findings in an article that appear in the latest issue of the academic journal *Science*.

Using mass spectrometry to analyze the solutions at the molecular level, lead researcher of the study and professor of pharmacology, Andy Holt, and his colleagues identified the presence of two families of compounds from the plastic that had contaminated their experiments and produced biological effects: quaternary ammonium biocides-anti-bacterial agents that manufacturers add to plastics-and oleamide, as well as related chemicals compounds used to improve the properties of plastics.

Oleamide and related additives are also known to leach into foods and drinks that are stored in plastic, or plastic-lined, containers, especially those made of polypropylene. However, the potential health effects of that are not known, says Holt.

"Because oleamide is a molecule found in the human body that contributes to normal physiological functioning, ingesting molecules that are structurally similar to oleamide may either over-stimulate or-more likely-inhibit the body processes regulated by oleamide," he said.

Holt's lab conducts basic research into how human enzymes work at the molecular level. With a greater understanding of how enzymes work, scientists can design drugs that will regulate enzyme behaviour in order to treat medical conditions.

But the effects of the contaminants were, "so potent on our enzymes there was quite a significant effect on our results," Holt said. They traced the source of the problem back to plastic tubes they had been using to prepare reaction solutions.

Use of similar tubes also resulted in substantial effects on the behaviour of brain receptors being studied in a different lab by his colleague Susan Dunn, professor and chair of the Department of Pharmacology.

Holt and his colleagues tested pipette tips, Eppendorf tubes and Multiwell plates from several manufacturers. The contaminants leached from all of these items in the majority of cases. But the specific contaminants, and the degree to which they leached out, was different in different products.

Given that plastics are in common use in research laboratories, scientists everywhere will likely be interested in these findings. "If you are testing whether a drug has an effect on an enzyme and the results are inconsistent-one day there's an apparent effect and the next day there's not -where does that leave you?" Holt said. "The time and money that is wasted; there are implications for the public interest."

According to Holt, these latest findings have, "significant and far-

reaching implications for the integrity of scientific work."

Provided by University of Alberta

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