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Total polychlorinated biphenyls and congener profiles as measured in various blood matrices

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Polychlorinated biphenyls (PCBs) are manmade, lipophilic, organic compounds that bioaccumulate in animal tissues. Independent lines of research have implicated PCBs in multiple negative health outcomes including cancer, organ failure, and reduced birth weight. Blood serum samples are predominantly used for PCB screening. A serum screen format assumes that all PCB congeners will be represented in the non-membranous serum matrix even though the number and position of chlorines attached to the biphenyl structure influence solubility into lipid bilayers. As membranes are separated out in the preparation of serum, PCBs that have a propensity to localize in bilayers may be removed and thereby underestimated. This study (in progress) compares differences in PCB levels across blood matrices. Blood samples (n=10) were fractioned into whole blood, serum, plasma, clot and packed red cells. PCBs were extracted by a liquid-phase protocol and analyzed via dual-column gas chromatography with electron capture detection. Resulting values will be analyzed via repeated measures ANOVA. It is hypothesized that there will be significant differences in the PCB congener profiles between the matrices. Specifically, it is anticipated that lower molecular weight congeners will be present at higher concentrations in clot, packed cell and whole blood matrices than in plasma or serum matrices.