not demonstrate a visible change in LTP resulting from JP-5 incubation, suggesting the effect observed in male brains was not an effect of overt toxicity on the brain tissue itself. **Conclusions:** Our previous data supported the hypothesis that JP-5 can mimic estrogen's effect in activating gene expression in an in vitro luciferase assay. Our in vivo rat data thus far indicate a significant reduction in plasma estradiol levels due to JP-5 exposure, supporting the hypothesis that JP-5 can behave as an estradiol-like compound, binding to ER at a sufficient level to potentially trigger a down regulation of estradiol synthesis. Although estradiol in our ex vivo hippocampal slice model increased synaptic plasticity, our data suggest that JP-5 does not have this effect. Thus far, our data support the hypothesis that JP-5 has components that are structurally similar to estradiol and can inappropriately modulate estrogen-mediated regulation of important biological processes. **Source of Support** This work was funded by Defense Health Program (DHP), Military Operational Medicine Research Program 330 (MOMRP), Joint Program Committee 5 (JPC-5), funding opportunity number W81XWH-331 23-MOMRP-D. **Disclaimer** The views expressed in this abstract are those of the author and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government. **Animal Care and Use statement** The study protocol was reviewed and approved by the Wright-Patterson Air Force Base Institutional Animal Care and Use Committee in compliance with all federal regulations governing the protection of animals in research.

3914 NEUROENDOCRINE EFFECTS OF INHALING EMISSIONS GENERATED BY 3-DIMENSIONAL (3D) PRINTING WITH POLYCARBONATE STOCK

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Background and Purpose: Inhalation of emissions (particulate and volatile chemicals) generated while 3D printing with polycarbonate feedstock results in the deposition of bisphenol A (BPA) in the respiratory system and affects reproductive function and circulating concentrations of anterior pituitary hormones and gonadal steroids in rats exposed to 3D-printer emissions (3DE). The goal of this study was to look at possible mechanisms that might underlie these changes. We hypothesized that inhalation of 3DE affects reproductive and metabolic hormone release by affecting olfactory bulb signaling, or by interfering with hypothalamic and pituitary regulation of hormone release. **Methods:** Male Sprague Dawley rats (n = 36) were exposed to filtered air or emissions generated using PC filament with five 3D-printers (exposure 4 h/d). The 4 h average particle concentration in the breathing space was 2.15 mg/m^3. Animals were exposed 1d or 4 d/week until they had been exposed for 8 or 30d. Using BPA measured during a single exposure, a deposition model estimated BPA deposition in the respiratory system was 0.115 µg/day. Circulating hormones were measured using ELISAs and qRT-PCR was performed in pituitary, hypothalamic and olfactory bulb tissue collected 1d after 1, 8 or 30d exposure to measure changes in the expression of inflammatory factors, neuroendocrine factors, factors involved in regulating oxidative stress, and transcription factors. Data were analyzed using 2(condition) x 3 (exposure time) ANOVAs. Statistically significant interactions were analyzed using either a one-way ANOVA to assess changes over time or Student's *t*-tests to analyzed changes between controls and treated at a single time point. Differences with $p < 0.05$ were considered statistically significant. **Results:** Exposure to 3DE resulted in reductions in progesterone and thyroid stimulation hormone and increases in follicle stimulating hormone and estradiol. After 1d of exposure to 3DE, transcripts for the immediate early gene *Cfos* were reduced and there was an increase catalase (*Cat*) and tumor necrosis factor α (*Tnfa*) expression in the olfactory bulb. After 30d of exposure, *Cfos* was still reduced, and interleukin 1ß (*Il1ß*) and vimentin (*Vim*) were increased. In the pituitary, there were no changes in transcript expression after 1 and 8d of exposure to 3DE. However, after 30d of exposure to 3DE, there was a reduction in Il1ß and a slight reduction in estrogen receptor (*Er*) expression. Exposure to 3DE induced an increase in calcitonin-gene related peptide, acetylcholinesterase and *Cat* expression and reductions in glial fibrillary acetic protein (*Gfap*) and cyclic AMP response element binding protein (*Creb*) after 1d of exposure. **Conclusions:** Based on the results of this study, inhalation of 3DE generated by printing with polycarbonate stock induces effects on anterior pituitary hormones and gonadal steroids that are similar to the effects seen with exposure to BPA. Although additional data needs to be collected, changes in the hypothalamus and olfactory bulb suggest that inhalation of 3DE induces inflammation and oxidative stress. It also may interfere transcription of factors involved in one of the signaling pathways used by the estrogen receptor to regulate transcription (CREB-mediated). Disclaimer; "The findings and conclusions in this report are those of the author(s) and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention."

3915 Multi-organ Transcriptomics to Determine Molecular Effects in Rats Developmentally Exposed to Perfluorooctane Sulfonate (PFOS) and Tetrabromobisphenol A (TBBPA)

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Background and Purpose: Environmental chemicals can impact the thyroid hormone (TH) system, leading to disruptions in critical processes such as metabolism, growth, and neurodevelopment. This is concerning because TH dysregulation during early development has been linked to cognitive deficits, metabolic disorders, and other long-term health effects in humans. Perfluorooctane sulfonate (PFOS) and Tetrabromobisphenol A (TBBPA) are environmental chemicals that may interfere with TH system components such as TH synthesis, transport, and metabolism, disrupting serum TH levels based on various test systems, as well as causing neurodevelopmental effects in aquatic organisms. Still, to what extent they may cause adverse effects in mammals through TH-disrupting modalities and potential underlying mechanisms remains poorly characterized. Here, we apply multi-organ transcriptomics on tissues from rat offspring developmentally exposed to these chemicals to identify potential effects of TH system disruption at the transcript level. By scrutinizing effects of PFOS and TBBPA, our aim is to provide a broader insight into how chemical interference impact organs and tissues during development to obtain knowledge required for developing new approach methodologies with adequate predictive capacity of *in vivo* effect outcomes. **Methods:** Pregnant Sprague Dawley rat dams were exposed to 0.4 or 0.8 mg/kg bw/day PFOS, or 250 or 500 mg/kg bw/day TBBPA during gestation and lactation (n=8 gestation study, only high doses, n=12 postnatal study, low and high doses). Offspring thyroid stimulating hormone levels in serum (GD21 and PD16) was assessed alongside thyroid gland weights (PD22), liver weights (PD16 and PD22), and histopathological assessment of thyroid glands and livers from male offspring (PD16). Bulk-RNA-barcoding and sequencing (BRB-seq) (total 437 samples) was performed on several organs and tissues from male fetuses (GD21, n=8) and pups (PD16, n=10); adrenals, cerebral cortex, heart, hypothalamus (only PD16), liver, pituitary, testis, and thyroid gland. **Results:** No effects on organ weights or histopathological changes in liver tissues were observed in offspring exposed to PFOS or TBBPA. In male offspring exposed to PFOS, thyroid glands had a slight increase in follicular cell height. In the large transcriptomics study, across all tissues and ages, we identified 716 differentially expressed genes (DEGs), with transcriptional effects specific to either fetuses or pups. PFOS and TBBPA affected expression of genes in all tissues, with most DEGs in the pituitary, liver, and hypothalamus of PD16 pups. At PD16, PFOS and TBBPA downregulated many of the same genes in the pituitary, liver, and hypothalamus, suggesting similar toxicological profiles. At GD21, TBBPA downregulated genes related to metabolism in the pituitary and testis, mirroring expression patterns observed in the pituitary, liver, and hypothalamus at PD16. The liver (PD16) displayed chemical-specific upregulation of distinct genes. **Conclusions:** Although PFOS and TBBPA, at administered doses, resulted in few and subtle pathological effects on the rat offspring, a multi-organ transcriptomics profile revealed significant changes to gene expression fingerprints across various organs known to be sensitive to TH regulation during development. Continued studies will further characterize potential histopathological effects at organ level and compare these to organ-specific and -shared changes in the transcriptional regulation of genes.

3916 Studying the obesogenic properties of a set of 21 per- and polyfluoroalkyl substances (PFAS) *in vitro*

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Background and Purpose: Per- and polyfluoroalkyl substances (PFAS) are known to induce toxicity primarily through peroxisome proliferator-activated receptors (PPARs). Recent studies have also identified other targets related to glucose and lipid homeostasis, raising concerns that PFAS exposure could lead to metabolic diseases such as cardiovascular disease, obesity, metabolic dysfunction-associated steatotic liver disease, and type II diabetes. Despite this, research into the metabolism-disrupting effects of PFAS remains underdeveloped. **Methods:** In the Dutch research project AFARA (Animal-free assays for endocrine disruption: from science to regulatory acceptance), 21 PFAS of high concern were selected for testing. These PFAS were chosen because they were recently found near perfluorochemical production sites in the Netherlands or Belgium, or detected in high frequencies or concentrations in human specimens, drinking water, food sources, or environmental biota in the Netherlands or Europe. A test battery consisting of a PPARγ transactivation assay and a human mesenchymal stem cell (hMSC) assay was employed to investigate the potential obesogenic effects of these PFAS *in vitro*. These assays together provide information on two key characteristics of obesogenic chemicals: 1) transactivation of PPARγ, the master regulator of adipogenesis, and 2) influence on hMSCs to favor the adipogenic pathway during differentiation and stimulate intracellular lipid accumulation. PFAS were tested up to 1 mM in the PPARγ transactivation assay and up to 100 µM in the hMSC assay. **Results:** Several PFAS, including HFPO-DA, FBSA, PFOS, and PFOA, were positive in the PPARγ transactivation assay. However, only HFPO-DA in-

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