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ULTRASONICALLY INDUCED FETAL WEIGHT REDUCTION IN MICE

W. D. O'Brien, Jr.
Division of Biological Effects, Bureau of Radiological
Health, Food and Drug Administration, Rockville, MD

The use of ultrasound in the clinical practice of medicine continues to increase. And yet an adequate assessment of the risk associated with such exposures is not available (O'Brien et al., 1972). In an effort to develop experimental data which would be useful in the assessment of risk, pregnant mice have been exposed to ultrasound at the eighth day of gestation. This is the period of development which corresponds to neurogenesis and early organogenesis. The neural groove is open throughout its length and mid-gut is wide open. Embryologically, this period corresponds to approximately the 20th day of human gestation (Rugh, 1968).

CF1 mice are time-mated by generally placing 2 males with 8 females for a 2 hour period. After the males are removed, evidence of successful mating is determined by examining for the presence of a vaginal plug.

At the eighth day of gestation, the mice are weighed and anesthetized with veterinarian sodium pentobarbital diluted to 10% with 0.9% sodium chloride administered intraperitoneally according to weight. The total abdominal surface is shaved and the ears are punched to code the animal. The mouse is positioned on axis in the exposure field at a distance of 24 cm from a 3.18 cm diameter, 1 MHz transducer with 0.9% sodium chloride as the transmission medium. All reported ultrasonic intensities (accuracy $\pm 20\%$) represent the spatially averaged intensity at the site of the mouse but without the animal in place, which is determined by dividing the total ultrasonic power by the transducer surface area. Beam plots of the ultrasonic field at 24 cm from the transducer yield a 3 dB beam width of 1.3 cm and a ratio of on-axis intensity to spatially averaged intensity of 2.8. See O'Brien et al (1974) for further equipment, dosimetry and animal handling details.

The fetuses were removed by laparotomy at the eighteenth day of gestation, which is one to two days prior to birth. The experiment was performed double blind, that is, both the irradiation and examination were performed without the knowledge of the exposure condition.

A total of 2866 fetuses from 273 litters were examined. The following table shows the average fetal weight and number of fetuses for each of the seven exposure conditions.

<u>EXPOSURE INTENSITY (W/cm²)</u>	<u>EXPOSURE TIME (Sec)</u>	<u>NUMBER OF FETUSES</u>	<u>AVERAGE WEIGHT (GM)</u>	<u>PERCENT CHANGE (RE: SHAM)</u>
0 (SHAM)	300	837	1.15	--
0.5	300	411	1.08	- 6.1
0.7	300	263	1.04	- 9.6
2.0	20	441	1.07	- 7.0
3.0	20	210	1.05	- 8.7
3.0	10	498	1.07	- 7.0
5.5	10	206	0.94	-18.3

The nonparametric Kruskal-Wallis statistical test showed that the average fetal weight reduction, shown in the table is significant at the 0.1% level ($P \alpha \leq 0.001$).

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