

TABLE 2

OBSERVATIONS MADE AT THE TIME OF CESAREAN SECTION OF RATS EXPOSED TO METHANOL AND ETHANOL^a

| | MECO | 10ME | 20ME | ETCO | 10ET | 16ET | EMCO | 5ME | 20ET |
|--------------------------------------|-----------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| No. pregnant/No. bred | 15/15 | 15/15 | 15/16 | 15/15 | 15/15 | 15/16 | 15/15 | 13/14 | 14/16 |
| \bar{x} Corpora lutea/dam \pm SD | 15 \pm 1 | 17 \pm 1 | — ^b | 15 \pm 2 | 14 \pm 1 | 16 \pm 1 | 14 \pm 3 | 16 \pm 2 | 15 \pm 2 |
| \bar{x} Implants/dam \pm SD | 15 \pm 1 | 16 \pm 1 | 14 \pm 1 | 15 \pm 2 | 14 \pm 1 | 16 \pm 1 | 14 \pm 3 | 15 \pm 1 | 14 \pm 2 |
| Percentage of implants resorbed | 8 | 5 | 10 | 7 | 4 | 7 | 6 | 4 | 6 |
| Sex ratio (F:M) | 53:47 | 52:48 | 58:42 | 47:53 | 54:46 | 59:41 | 51:49 | 56:44 | 55:45 |
| \bar{x} Fetal weights \pm SD (g) | | | | | | | | | |
| Female | 3.15 \pm 0.32 | 2.93 \pm 0.26* | 2.76 \pm 0.47* | 3.10 \pm 0.36 | 3.10 \pm 0.57 | 3.09 \pm 0.43 | 2.99 \pm 0.32 | 3.19 \pm 0.24 | 2.94 \pm 0.25 |
| Male | 3.34 \pm 0.36 | 3.12 \pm 0.30* | 2.82 \pm 0.56* | 3.33 \pm 0.31 | 3.26 \pm 0.55 | 3.18 \pm 0.39 | 3.16 \pm 0.29 | 3.30 \pm 0.24 | 3.06 \pm 0.28 |

^a Rats were exposed 7 hr/day throughout gestation. MECO = methanol controls; 10ME = 10,000 ppm methanol; 20ME = 20,000 ppm methanol (exposure was for Gestation Days 7-15); ETCO = ethanol controls; 10ET = 10,000 ppm ethanol; 16ET = 16,000 ppm ethanol; EMCO = ethanol, methanol controls; 5ME = 5000 ppm methanol; and 20ET = 20,000 ppm ethanol. (The EMCO group was added subsequent to our initial evaluation of methanol and ethanol; it was the comparison group for 5ME and 20ET.)

^b Information not collected.

* Significantly different from appropriate control group at $p < 0.05$.

TABLE 3

SKELETAL MALFORMATIONS IN RATS AFTER PRENATAL EXPOSURE TO METHANOL AND ETHANOL^a

| | MECO | 10ME | 20ME | ETCO | 10ET | 16ET | EMCO | 5ME | 20ET |
|--|---------|----------|---------|---------|----------|----------|---------|---------|---------|
| No. litters (fetuses) observed | 15 (98) | 15 (115) | 15 (92) | 15 (99) | 15 (100) | 15 (107) | 15 (90) | 13 (90) | 14 (92) |
| No. litters (fetuses) affected | | | | | | | | | |
| Cranial | 0 | 0 | 2 (3) | 0 | 0 | 0 | 0 | 0 | 0 |
| Abnormal exoccipital | | | 1 (1) | 0 | | | | | |
| Abnormal zygomatic | | | 0 | 1 (1) | | | | | |
| Abnormal nasal | | | 0 | 1 (1) | | | | | |
| Shortened maxilla | | | 0 | 1 (1) | | | | | |
| Split basiophenoid | | | 0 | 1 (1) | | | | | |
| Vertebral | 0 | 0 | 1 (1) | 0 | 0 | 0 | 0 | 0 | 0 |
| Scoliosis | | | 1 (1) | 0 | | | | | |
| Decreased thoracic vert. | | | 1 (1) | 0 | | | | | 0 |
| Fused thoracic centra | | | 0 | 2 (2) | 1 (1) | | | | 0 |
| Decreased lumbar vert. | | 1 (1) | 1 (1) | 0 | 0 | | | | 0 |
| Fused lumbar centra | | 0 | 2 (2) | 0 | 0 | | | | 0 |
| Fused cervical arches | | 0 | 0 | 1 (1) | 0 | | | | 0 |
| Lordosis | | 0 | 0 | 0 | 0 | | | | 1 (1) |
| Ribs | 0 | 2 (2) | 12 (39) | 1 (1) | 0 | 2 (2) | 0 | 0 | 2 (2) |
| Rudimentary cervical | | 0 | 10 (35) | 0 | 0 | 0 | 0 | 0 | 0 |
| Extra cervical | | 0 | 3 (3) | 2 (2) | 0 | 0 | 0 | 0 | 2 (3) |
| Wavy/fused | | 0 | 7 (7) | 0 | 1 (1) | 0 | 1 (1) | 0 | 0 |
| Missing | | 0 | 0 | 0 | 0 | 0 | 0 | 1 (1) | 0 |
| Total malformations, litters (fetuses) | 0 | 2 (2) | 14 (72) | 4 (4) | 0 | 2 (3) | 0 | 1 (1) | 4 (5) |

^a Rats were exposed 7 hr/day throughout gestation. MECO = methanol controls; 10ME = 10,000 ppm methanol; 20ME = 20,000 ppm methanol (exposure was for gestation days 7-15); ETCO = ethanol controls; 10ET = 10,000 ppm ethanol; 16ET = 16,000 ppm ethanol; EMCO = ethanol, methanol controls; 5ME = 5000 ppm methanol; and 20ET = 20,000 ppm ethanol. (The EMCO group was added subsequent to our initial evaluation of methanol and ethanol; it was the comparison group for 5ME and 20ET.)

TABLE 4

VISCERAL MALFORMATIONS IN RATS AFTER PRENATAL EXPOSURE TO METHANOL AND ETHANOL^a

| | MECO | 10ME | 20ME | ETCO | 10ET | 16ET | EMCO | 5ME | 20ET |
|--|----------|----------|---------|----------|----------|----------|---------|---------|---------|
| No. litters (fetuses) observed | 15 (107) | 15 (107) | 15 (96) | 15 (107) | 15 (106) | 15 (114) | 15 (99) | 13 (90) | 14 (97) |
| No. litters (fetuses) affected | | | | | | | | | |
| Cardiovascular | 0 | 1 (1) | 1 (2) | 0 | 0 | 1 (1) | 0 | 0 | 0 |
| Right aortic arch | | 1 (1) | 1 (1) | | | 1 (1) | | | |
| Right ductus arteriosus | | 0 | 1 (1) | | | 1 (1) | | | |
| Ventricular septal defect | | 1 (1) | 3 (3) | | | 0 | | | |
| Missing innominate | | 0 | 2 (2) | | | 0 | | | |
| Abnormal subclavian | | 1 (1) | 1 (1) | | | 0 | | | |
| Right azygos vein | | 0 | 1 (1) | | | 0 | | | |
| Aortic coarctation | | 1 (1) | 0 | | | 0 | | | |
| Urinary | 0 | 1 (1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hydronephrosis | | 1 (1) | 3 (4) | | | | | 0 | 0 |
| Ectopic kidney | | 2 (2) | 2 (4) | | 2 (2) | | | 1 (2) | 4 (4) |
| Bladder hypoplasia | | 0 | 1 (1) | | 0 | | | 0 | 0 |
| Bladder agenesis | | 0 | 5 (10) | | 0 | | | 0 | 0 |
| Mis-shaped kidney | | 0 | 1 (1) | | 0 | | | 0 | 0 |
| Eye | 0 | 0 | 2 (2) | 1 (1) | 0 | 0 | 0 | 0 | 0 |
| Microphthalmia | | 0 | 2 (2) | 1 (1) | | | | | |
| Anisotropia | | 1 (1) | 0 | 1 (1) | | | | | |
| Abnormal/missing optic nerve | | 1 (1) | 0 | 1 (1) | | | | | |
| Ablepharia | | 0 | 3 (3) | 0 | | | | | |
| Abnormal lens | | 0 | 2 (2) | 0 | | | | | |
| Brain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hydrocephalus | | 2 (4) | 2 (2) | | | | | | |
| Exencephaly | | 0 | 3 (4) | | | | | | |
| Encephalocele | | 0 | 2 (3) | | | | | | |
| Total malformations, litters (fetuses) | 0 | 2 (2) | 7 (15) | 1 (1) | 2 (2) | 1 (1) | 0 | 1 (2) | 4 (4) |

^a Rats were exposed 7 hr/day throughout gestation. MECO = methanol controls; 10ME = 10,000 ppm methanol; 20ME = 20,000 ppm methanol (exposure was for Gestation Days 7-15); ETCO = ethanol controls; 10ET = 10,000 ppm ethanol; 16ET = 16,000 ppm ethanol; EMCO = ethanol, methanol controls; 5ME = 5000 ppm methanol; and 20ET = 20,000 ppm ethanol. (The EMCO group was added subsequent to our initial evaluation of methanol and ethanol; it was the comparison group for 5ME and 20ET.)

TABLE 5

SUMMARY OF MALFORMATIONS AND VARIATIONS IN RATS AFTER PRENATAL EXPOSURE TO METHANOL AND ETHANOL^a

| | MECO | 10ME | 20ME | ETCO | 10ET | 16ET | EMCO | 5ME | 20ET |
|---|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| No. litters (fetuses) examined | 15 (205) | 15 (222) | 15 (188) | 15 (206) | 15 (206) | 15 (221) | 15 (189) | 13 (180) | 14 (189) |
| No. litters/% fetuses with skeletal malformations | 0 | 2/2 | 14*/79 | 3/3 | 0 | 2/3 | 0 | 1/1 | 4/5 |
| No. litters/% fetuses with visceral malformations | 0 | 5/8 | 10*/29 | 1/1 | 2/2 | 1/1 | 0 | 1/3 | 4/5 |
| No. litters/% fetuses with skeletal variations | 8/12 | 11/24 | 14/69 | 13/30 | 15/38 | 14/45 | 14/42 | 12/27 | 14/47 |
| No. litters/% fetuses with visceral variations | 11/21 | 13/26 | 12/26 | 10/16 | 7/10 | 7/15 | 6/8 | 7/11 | 8/9 |
| No. litters with abnormal fetuses ^b | 0 | 7 | 14 | 4 | 2 | 2 | 0 | 2 | 7 |
| % of Litters with abnormal fetuses ^b | 0 | 47 | 93* | 27 | 13 | 13 | 0 | 15 | 50 |
| % of Normal fetuses | 100 | 96 | 46* | 98 | 99 | 98 | 99 | 98 | 95 |

^a Rats were exposed 7 hr/day throughout gestation. MECO = methanol controls; 10ME = 10,000 ppm methanol; 20ME = 20,000 ppm methanol (exposure was for Gestation Days 7-15), ETCO = ethanol controls; 10ET = 10,000 ppm ethanol; 16ET = 16,000 ppm ethanol; EMCO = ethanol; methanol controls; 5ME = 5000 ppm methanol; and 20ET = 20,000 ppm ethanol. (The EMCO group was added subsequent to our initial evaluation of methanol and ethanol; it was the comparison group for 5ME and 20ET.)

^b Having skeletal or visceral malformations.

* Significantly different from the appropriate control group $p < 0.05$.