P_S. These data indicate that bradykinin has an immediate and direct effect on the pulmonary vasculature and significantly reduces its resistance to flow. This effect is mediated through the resistance vessels proximal to the area of the Starling resistor.

Initiation of respiration by direct electrical stimulation of the fetal brain stem. VICTOR CHERNICK, ADOLPH SKLENOVSKY, VICTOR HAVLICEK, and REYNALDO D. PAGTAKHAN. *Univ. of Manitoba, and Children's Hosp., Winnipeg, Manitoba, Canada.*

The mechanisms which ensure fetal apnea and the initiation of respiration at birth are poorly understood. Direct study of the fetal respiratory center has not been previously undertaken. We have mapped the inspiratory center of the exteriorized fetal sheep near term using stereotaxic placement of a stimulating electrode in the region of the medulla. Ventilatory efforts were monitored by connecting the trachea to a liquid plethysmograph. The results were compared to a similar mapping of the respiratory center of the newborn lamb. The fetal respiratory center was quite diffuse, extending from the obex to the lower pons and 2.5 mm on either side of the midline. In contrast, the respiratory center of the newborn lamb was more localized, extending only 6 mm rostral to the obex. In the unanesthetized fetus the threshold current required to initiate respiration was 0.15 ± .06 ma. Stimulation of a similar area in the unanesthetized newborn lamb caused apnea at 0.33 ma. Pentobarbital increased the threshold current in the fetus to as high as 1.96 ± .40 ma. In contrast pentobarbital decreased the apneic threshold in the newborn lamb to .21 ± .03 ma. It is concluded that the respiratory center is not actively inhibited during the latter period of gestation and therefore cannot account for respiratory inactivity in utero. The nature of the respiratory response to electrical stimulation of the brain stem and the influence of pentobarbital appears to depend on the presence or absence of rhythmic respiration.

Acid mucopolysaccharides in cardiac intracavitary tumors. REUBEN MATALON and RENÉ A. ARCILLA. *Univ. of Chicago, Chicago, Ill.*

Three left atrial myxomas and one myxosarcoma were analysed and studied in tissue culture. The myxomas contained 0.2% mucopolysaccharide (wet weight) which on fractionation yielded hyaluronic acid 22%, chondroitin sulfate 30%, chondroitin 47%, and dermatan sulfate <1%. On incubation of the explants there was rapid growth of cells and gelling of the culture medium. The latter has never been observed in the culture of various human tissues including those of cardiac origin. Electronmicroscopy showed abundant collagen fibers, which may be responsible for the gel formation. Hyaluronic acid was the major component of the culture medium.

Analysis of the myxosarcoma revealed high molecular weight hyaluronic acid as the only polysaccharide. These striking differences in composition might be specific for the two types of tumors.

Sera from two patients with myxomas and one patient with myxosarcoma revealed a five-fold increase of mucopolysaccharide. Following the surgical removal of the tumors the serum mucopolysaccharide returned to normal in all three patients.

PULMONARY

Airway closure in normal subjects and patients with cystic fibrosis. ANTHONY MANSELL, ARTHUR C. BRYAN, and HENRY LEVISON. *Univ. of Toronto, Research Inst., Hosp. for Sick Children, Toronto, Ont., Canada.*

Lung units close as lung volume is reduced and the volume at which closure occurs (CV) can be detected as a discontinuity of the alveolar plateau in the single breath nitrogen washout (Anthonisen, N. R.: Resp. Physiol. 8, 58–65, 1969–70). We have used this technique to define the closing volumes of 23 normal children, ranging from 8–18 years and 136–179 cm height, and those of 16 patients with cystic fibrosis, 7–27 years and 125–176 cm, with the following results:

	Normals	Cystic Fibrosis
Closing volume as percent of vital capacity	8.5% ± S.D.4.3	24.2% ± S.D.16.0
Closing volume as percent of total lung capacity	28.9% ± S.D.5.0	48.0% ± S.D.15.8
Functional residual capacity—closing volume (FRC-CV)	0.88L ± S.D.0.31	0.07L ± S.D.0.40

All differences are highly significant ($P > 0.01$). Six of the 16 patients with cystic fibrosis had a closing volume greater than the functional residual capacity, indicating gas trapping during normal tidal breathing. Closing at high lung volume is a major factor in producing the gas exchange failure in these cases. For this reason this method appears to be a sensitive indicator of gas exchange abnormality in certain pulmonary diseases in childhood.

Pulmonary ischemia and surfactant in the neonatal lung. RONALD S. BLOOM, CHERILL M. PARMENTIER, COLBY R. PARKS, DAVID E. WOODRUM, and W. ALAN HODSON (Intr. by Ralph J. Wedgwood). *Univ. of Washington Hosp., Seattle, Wash.*

Hyaline membrane disease is associated with a functional and possibly a quantitative deficiency in surfactant. It has been suggested that this is caused by hypoperfusion of the lungs. This work demonstrates that when the left pulmonary artery is occluded in the fetal state and the animal is permitted to breathe, there is no change in surfactant. Nine fetal lambs varying in gestational age from 132–147 days were partially delivered by Caesarian section. With the umbilical circulation intact, a thoracotomy was performed under local anesthesia and the left main pulmonary artery ligated. The chest was closed and 45 minutes post ligation, the umbilical cord was clamped and the animal was allowed to breathe. The lambs were sacrificed and the lungs removed 8 hours (mean) after ligation, Heart rate, blood pressure, pH, PCO_2 and PO_2 were monitored through a carotid catheter to evaluate the lamb's condition throughout the experiment. DNA, total and compositional phospholipid analysis were performed on both the right and left lung of each animal. There was no significant difference between the non-ligated and ligated lungs in the total amount of phospholipid/mg DNA, phosphatidylcholine/mg DNA, DNA/gm wet wt. and pressure volume characteristics. These results indicate that in the fetal lamb short term pulmonary ischemia within the last 10% of gestation, does not affect pulmonary surfactant.

$\dot{V}A/\dot{Q}$ relationships and lung volume in hyaline membrane disease. PETER A. M. AULD and CARLOS A. TORI. *Cornell Univ. Med. Ctr., N. Y., N. Y.*