difference in gestational age (eg, 78 vs 83 days for 21 weeks' human gestation) can lead to a difference of 180 g for a singleton fetus (720 vs 900 g). These weight differences can have substantial implications in surgical technique. At the latter part of the range (29 weeks' human gestation), when the fetus is growing more rapidly, the difference is even larger; for a 107-day (2.23 kg) versus 112-day (2.71 kg) singleton fetus, the difference is about 500 g. Finally, calculations based on these variations can also greatly influence results. For example, calculation of satisfactory fetal CPB flow rates (on the basis of milliliters per kilogram per hour) can be substantially different and potentially inadequate when using the wrong gestational age and fetal weight.

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Reply to the Editor:

We appreciate the comments of Drs Sedgwick and Eghtesady.

Indeed, the increase in uteroplacental blood flow during the course of pregnancy initially reflects placental development and thereafter vasodilation of the spiral arteries, which increases perfusion of the intravillous space. The increase in uterine blood flow after 110 days in sheep (75% of the gestation), which is associated with a 3-fold increase in fetal weight, is related to vasodilation of the spiral arteries and has been shown to be proportionate to the increase in wet weight of the uterus and its metabolically active tissues, including the fetus, the membranes, and the placenta.[1]

When performing experiments, investigators should always try to choose experimental settings that are the closest to the human model that they are trying to reproduce, bearing in mind, however, that no model will ever correspond exactly to the human condition. This is particularly true when the experimental setting involves pregnancies, which depend on a wide number of factors, including genetic, hormonal, and anatomic factors, both on the maternal and fetal side. As such, we welcome the formula proposed by Drs Sedgwick and Eghtesady but would caution against a rigid application.

Uterine blood flow, for example, has probably little effect in fetal cardiac bypass experiments because the pump provides perfusion only to the fetoplacental unit and not to the maternal uteroplacental compartment. Therefore, endometrial-myometrial blood flow changes beyond 110 days of pregnancy are not likely to significantly influence fetal cardiac bypass.

The increase in fetoplacental blood flow during the last third of pregnancy reflects primarily vascular growth and, to a lesser extent, vasodilation. This generates a fairly stable fetal umbilical blood flow by the end of pregnancy of approximately 200 mL $\cdot$ kg^{-1} $\cdot$ min^{-1} in most studied species. On the other hand, placental weight during ovine pregnancy is relatively stable after the middle third of gestation.[2] Taken together, these observations indicate that the increase in fetoplacental blood flow during the last third of the gestation is proportionate to the increase of the fetal weight. Therefore, planning of the pump perfusion rate on the basis of the fetal weight as predicted by fetal biometry[3] at 300 mL $\cdot$ kg^{-1} $\cdot$ min^{-1} (100 mL $\cdot$ kg^{-1} $\cdot$ min^{-1} fetal perfusion rate + 200 mL $\cdot$ kg^{-1} $\cdot$ min^{-1} placental perfusion rate) is likely to be appropriate during both the middle and the last third of the pregnancy.

Beyond all these considerations, our choice of using near-term fetal sheep originated primarily from the general consensus in the literature of using animals at this stage of pregnancy, which also allows us to perform operations on larger fetuses. The suggestion of lowering the gestational age of future fetal experiments at 83 to 112 days of pregnancy in sheep is well accepted, but its benefits will need to be proved experimentally.

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Separate or composite graft replacement for diseases of both the aortic valve and the ascending aorta

To the Editor:

With great interest, we read an excellent article entitled "Clinical outcomes after separate and composite replacement of the aortic valve and ascending aorta," in the August 2004 issue of the *Journal*.[1] Sioris and associates reported the differences between aortic root replacement and aortic valve replacement combined with supracoronary replacement of the ascending aorta (separate grafting). They concluded that separate grafting and the Bentall operation provide comparable long-term results and that no patient required reoperation for aortic root aneurysm after separate grafting in patients with aortic valve disease associated with normal or mildly dilated aortic sinuses or a dilated ascending aorta. Their study consisted of a large number of patients (587 patients), and their mean follow-up was 4.6 $\pm$ 3.1 years.

We have a patient who required aortic root replacement because of dilatation of the residual sinuses of Valsalva 10 years after separate grafting.[2] The patient had undergone the initial operation for type A