follicular fluid (FF) obtained from laparoscopic oocyte retrieval, as did the Hill et al. group; however, we did not pool fluids from individual aspirates. It seems unlikely that our lymphocyte concentrations are higher because of this. In any case, the difference between 1×10^4 cells/ml and 16×10^4 to 40×10^4 cells/ml may not be significant because an inherent 10% to 20% error is possible in enumerating the cells. In catagorizing FF samples as clear or contaminated with red blood cells (RBC), we did not use an empirically derived test, as is mentioned in the Drs. Hill and Anderson letter (but not described in their paper). However, we considered a sample clear if it had no hint of RBC contamination based on gross inspection (color) of the sample. In fact, though, after Ficoll separation, we noticed that all samples, even the so-called clear samples, had some RBC contamination. We do not believe that the lymphocytes obtained in the "clear" samples represent significant contamination from the lymphocytes in the circulation. We did not perform an adherence step of our samples to treated plastic to remove macrophage/monocytes before analyzing our cells for the T8 and T4 components; this procedure also is not described in the Hill et al.[1] study. Such a step would have offered additional control for interpretation of our results. After consultation with Coulter Immunology (Hialeah, FL), we reacted our cells with the anti-T4 or anti-T8 reagent without fixation. We included the sodium azide step to prevent capping and to maintain the cells in a nonmetabolic state. In our hands, we were unable to fix the cells with the 1% paraformaldehyde as described in the Hill et al. study.[1] Subsequent discussion with Dr. D. J. Anderson suggests that our use of 37% stock paraformaldehyde may not yield the same gentle fixation as that of fresh paraformaldehyde from a crystal stock reagent and would explain our inability to stain the cells during the initial experiments of our study. Our stock sodium azide solution was a 3.2% mixture (32 mg/ml); we added 0.5 ml of this to our cell preparations. For peripheral blood samples, the volumes were 3 ml (giving a final concentration of 0.5% sodium azide to a maximum of 6 ml for a laparoscopic oocyte retrieval volume [a final concentration of approximately 0.25% sodium azide, not 1% as mentioned in the Drs. Hill and Anderson letter]). Such concentration of sodium azide should not cause cellular damage due to osmotic pressure changes.

In summary, we do not feel that our methods created confounding artifacts. The analysis of individual follicle aspirates is technically feasible; and enhances the possibilities of understanding the role of lymphocytes in genesis of the follicle and/or oocyte maturation. There is a great deal of diversity in the white blood cell profile in the human ovarian follicle, and we also suggest that the human follicle may have a unique immunologic environment.

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Local Reaction to Progesterone

To the Editor:

The article by William R. Phipps et al.,[1] describes an unfortunate, but avoidable, consequence of a mistake in progesterone administration. In the discussion they refer to Greenblatt's and Allen's[2] finding that local intramuscular injection site complications of progesterone are rare, particularly when the correct technique is used.

In 1971, Nillius and Johansson[3] studied progesterone absorption when injected deep into the gluteal muscles. They noted that there was a very rapid absorption of progesterone, reaching peak levels within 2 hours and persisting for 48 hours, an unexpectedly long time. They suggested that a considerable amount of the administered progesterone diffused into the fat tissues. The progesterone deposited in the fat tissue then diffuses back into the blood stream when the plasma levels decline, and a depot effect thus is obtained. The disappearance curve after intramuscular administration was found to fall more slowly than after vaginal or rectal administration, indicating that the intramuscular site of injection, as well as the fat tissues, also serves as a depot for progesterone.

My own experience of the use of progesterone in-

jections spans 40 years using doses of up to 100 mg, but it has always been emphasised that injections must be given into the gluteal muscles, in which fat cells are intermingled with muscle cells, but never into the thigh or deltoid muscles, which contain no fat cells.

The finding of Phipps et al. that gram-stained fluid aspirated from the site showed no viable bacteria confirms my own findings that aspirations from progesterone injection or implantation sites are always sterile. Consequently, their extensive and diverse use of antibiotics would have little effect. Perhaps there is a need to emphasize that whenever the words "intramuscular progesterone" are used they should be linked with the words "injected into the gluteal muscles."

Dr. Katharina Dalton
London, England
November 28, 1988

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Reply of the Author:

I appreciate the opportunity to respond to Dr. Dalton's letter. Dr. Dalton's vast experience with progesterone administration is well known and respected, but I believe her conclusions relating to our report to be in part unfounded.

The manufacturer's package insert for the progesterone preparation we used (50 mg/ml in peanut oil; Eli Lilly, Indianapolis, IN) does not recommend the use of one intramuscular (IM) injection site over another. Our patient used the vastus lateralis muscles bilaterally because of the ease of self-administration of IM injections into these sites, and her previous experience with such injections for other medications.

The technique advocated for gluteal IM injections of progesterone by Dr. Dalton[1] uses a 1.5-inch (3.8 cm) needle. It has been clearly demonstrated that, for a substantial majority of women, because of the thickness of the layer of fat overlying the gluteal muscles, such a technique in fact will not result in a truly IM injection, but rather a deep subcutaneous one.[2,3] Thus, Dr. Dalton's success with this technique over the years is unlikely to be related to the intermingling of fat cells with gluteal muscle fibers as she states. Nonetheless, it may well be that, for progesterone injections, the gluteal region is a superior site compared with the anterior thigh, perhaps precisely because the injection is given into the subcutaneous fatty tissue and not muscle. Certainly the use of subcutaneous injections does not lead to the development of myofibrosis, which may occur as a consequence of repeated IM injections.[4]

Based on the clinical findings and our patient's response to clindamycin, all of the physicians involved with her care, including an infectious disease specialist, were unanimous in the belief that a substantial secondary bacterial infection had occurred. Thus, I believe that the extensive use of antibiotics as described was absolutely necessary. Our patient's myositis was quite different from the gluteal region sterile abscesses Dr. Dalton has described as occurring in some of her patients,[1] which in fact are probably subcutaneous abscesses.

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January 17, 1989

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Progesterone for Diagnosis of Ectopic

To the Editor:

I wish to comment on a paper recently published in *Fertility and Sterility* in which a single serum progesterone (P) measurement was used for timely diagnosis of early ectopic pregnancy. In this manuscript by Yeko et al.,[1] a dilatation and curettage was recommended if the serum P level was <15 ng/