detached from the other chromosomes and related by its short arms to a persistent nucleolus.

The preparation was made from a lymphocyte culture stimulated with phytohaemagglutinin and incubated for 72 h. No treatments with colchicine or hypotonic solutions were used. The cells were fixed in a solution consisting of 3 parts methanol and 1 part acetic acid and the chromosomes were spread by an air-drying technique.

The lymphocytes were obtained from a married woman aged 26 who has one son aged 3 and has aborted five times at 8–9 weeks. Cultures treated with colchicine and hypotonic solutions yielded cells of normal karyotype apart from one unusual *A*.1 chromosome in all the cells examined. This chromosome had an exceptionally obvious secondary constriction which was further from the centromere than usual. The patient denied a history of jaundice or of an illness suggestive of non-icteric hepatitis. Her father gives a history of jaundice and has had several surgical operations on his bile ducts. Her mother, who has had three children but no miscarriages, also had the unusual *A*.1 chromosome.

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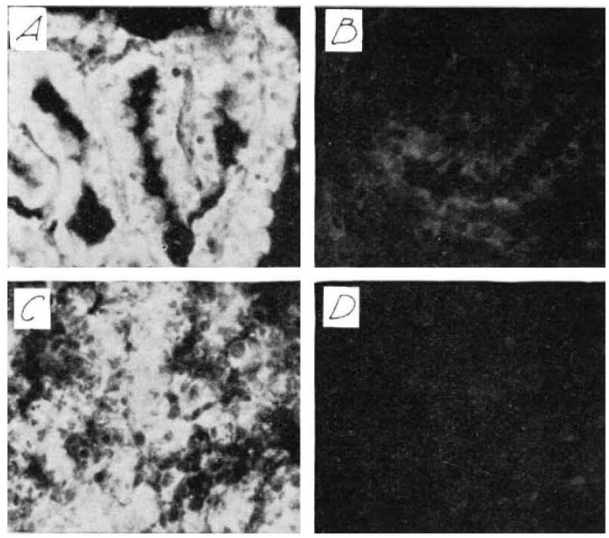

Fig. 1. *A*, Section of yolk sac treated with anti-Rα, labelled with fluorescein, displaying specific fluorescence in cytoplasm of yolk sac cells. *B*, Section of yolk sac treated with anti-Rα, labelled with fluorescein, adsorbed with foetal rat serum to bind antibodies against α-foetoprotein; relatively little or no specific fluorescence is apparent. *C*, Section of foetal rat liver treated with anti-Rα, labelled with fluorescein; most of the specific fluorescence is associated with the cytoplasm of parenchymal cells. *D*, Section of foetal rat liver treated with anti-Rα, labelled with fluorescein, adsorbed with foetal rat serum. (All × 150.)

Cellular Distribution of Serum α-Foetoprotein in Organs of the Foetal Rat

The mammalian foetus synthesizes a serum α-globulin, called α-foetoprotein, which is not found in the adult of the species[1–7]. Although interspecies structural differences among the α-foetoproteins have been noted[4–7], the protein of each species appears to be a homologue of foetuin, or bovine α-foetoprotein[5,7]. Synthesis of serum α-foetoprotein has been shown to occur in the liver in both the rat foetus[8,9] and the human embryo[9], and in the yolk sac of the rat[9]. The cells responsible for this synthesis are not known, however, and it has been suggested that the haematopoietic tissue of the liver may be the site of synthesis[8]. In the present investigation, the cellular distribution of α-foetoprotein in organs of the rat foetus was investigated by means of the fluorescent antibody method.

Albino rat foetuses of a Wistar strain were removed from their membranes after gestation for 15–19 days, frozen in tubes immersed in solid carbon dioxide and 95 per cent ethyl alcohol, and sectioned while frozen at 4–8μ, either sagittally or in cross-section; the placenta and membranes were similarly frozen and sectioned. The sections were placed on glass slides, thawed and dried, placed in acetone for 10 min and again dried; they were then stained either with rabbit antiserum specific for rat serum α-foetoprotein (anti-Rα) labelled with fluorescein, or with the same labelled antiserum from which reactive antibodies against α-foetoprotein had been removed by adsorption with foetal rat serum. The rabbit antiserum had been prepared as described elsewhere[7]; it was labelled with fluorescein isothiocyanate[10] and made specific for rat α-foetoprotein by adsorption with maternal rat serum[7]. The stained sections were washed in 0·1 molar sodium chloride, mounted in glycerol buffered at *p*H 8, and examined under the dark field microscope using ultra-violet light from a mercury arc lamp filtered through a Corning '5840' filter as the excitation beam. After selected fields had been photographed, the sections were stained with haematoxylin and eosin and the fields compared with their photographs.

None of the tissues of the rat foetus displayed specific fluorescence after staining with labelled anti-Rα except those of the liver and yolk sac (Figs. 1*A* and *C*). In the liver, the fluorescence was found to be primarily in the cytoplasm of the parenchymal cells (Fig. 1*C*). Although slight fluorescence of the cytoplasm of some of the haematopoietic cells appeared to be present, the larger portion of the haematopoietic tissue did not show specific fluorescence. In the yolk sac, the fluorescence was associated with the cytoplasm of the yolk sac cells (Fig. 1*A*). Specific fluorescence was not found in the brain, heart, lungs, thymus, muscle, gastrointestinal tract, pancreas, spleen, kidneys, bone marrow, or placenta. Little or no fluorescence was observed in either the yolk sac (Fig. 1*B*) or the liver (Fig. 1*D*), when the fluorescent antiserum was adsorbed with foetal rat serum to bind the antibodies against α-foetoprotein before staining.

The presence of serum α-foetoprotein only in the yolk sac and in the liver of the rat foetus as determined in these experiments agrees with the finding that foetal rat liver and yolk sac will synthesize radioactive serum α-foetoprotein when cultured in the presence of leucine labelled with carbon-14, whereas the other foetal rat tissues will not[9]. The results also suggest that hepatic synthesis of serum α-foetoprotein probably takes place, primarily at least, in the parenchymal cells.

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