When tryptophan is added to a culture of the 'relaxed' mutant which has been inhibited by 5-methyl tryptophan, the cells retain their accumulated RNA as growth and protein synthesis slowly recommence and interesting changes can be observed in ultracentrifuge diagrams (Fig. 1). The 14–18*S* components now sediment very close to the 30*S* ribosomes and an additional small boundary which sediments at about 40*S* appears. Like the 14–18*S* material, these new components are extremely sensitive to RNase. In normal *E. coli* cells, particles sedimenting at about 30 and 40*S* have been implicated in the synthesis of ribosomes[9]. We may therefore be observing in these experiments further stages in ribosome synthesis from 14–18*S* precursors.

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PHYSIOLOGY

Transmission of Noradrenaline across the Human Placenta

Fœtal bradycardia during labour is usually taken to be a sign of 'fœtal distress', its occurrence being interpreted as a consequence of fœtal hypoxia. Beard[1] has recently considered the possibility of an endogenous humoral agent such as noradrenaline in the maternal circulation contributing to, or causing, this type of fœtal response. After injecting noradrenaline into the pregnant human subject, he noted a transitory fœtal bradycardia but was not able to decide from his results whether this effect stemmed from uterine vasoconstriction with subsequent fœtal hypoxia or from a direct action of noradrenaline on the fœtal cardiovascular system.

It seemed important to try to elucidate this point. Although the administration of radioisotopically labelled noradrenaline to the mother followed by direct detection of activity in the fœtal blood appeared to offer the best chance of obtaining this information, it was not considered justifiable to perform such an experiment in the presence of a normal fœtus. Procedures have thus been confined to clinical circumstances incompatible with fœtal survival; choice and availability of clinical material have of necessity been limited.

Following intravenous injection of ^{14}C-DL-noradrenaline into the mother, the labelled noradrenaline content of serum deriving from maternal venous, umbilical venous (afferent) and fœtal heart blood was measured (Table 1). In all cases, the placenta appeared to be normal for the stage of pregnancy.

Although there was wide variation, appreciable amounts of labelled noradrenaline crossed the placenta to appear in blood flowing from the placenta to the fœtus. During the passage of this blood through the fœtus, almost all labelled noradrenaline had disappeared from the circulation, presumably by a combination of tissue binding and metabolic change.

In certain circumstances, intravenous noradrenaline will give rise to bradycardia in the human new-born infant[3]. It would be reasonable therefore, in the light of our results, to interpret Beard's findings[1] as indicating that fœtal bradycardia following noradrenaline injection into the mother may be due, in part at least, to a direct action of noradrenaline on the fœtal circulatory system. One proviso, however, must be mentioned; the ^{14}C-noradrenaline used in these experiments was a racemic DL mixture. Even though it is likely that the inactive D- and the physiologically active L-isomers are metabolized similarly[4], we have no information as to whether there is any preferential transfer of either across biological membranes. Final verification of this point must await the availability of radioisotopically labelled L-noradrenaline.

This work was supported by grants from the Medical Research Council and the U.S. Public Health Service (grant No. *M*-4859).

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Presence of a Phosphatido-peptide Fraction in Liver Cell Membrane and its Possible Role in the Active Transport of Amino-acids

Previous work in this laboratory has shown that a phosphatido-peptide fraction becomes promptly labelled during the perfusion of the isolated rat liver with rat blood containing labelled amino-acids, and reaches a maximum in its radioactivity a few minutes after the start of the experiment[1–3]. The reaction is strongly inhibited by metabolic inhibitors, such as ethionine, potassium cyanide and 2,4-dinitrophenol. It was also shown that the phos-

Table 1

Clinical features	Duration of pregnancy (weeks)	Maternal serum	Cord serum		Fœtal heart serum	
		C.p.m./1 ml.	C.p.m./1 ml.	Percentage of maternal count	C.p.m./1 ml.	Percentage of maternal count
Hydrocephalic fœtus	37	1,925	200	10	Nil	—
Anencephalic fœtus	38	314	Specimen lost		4	1·3
Termination of pregnancy by hysterotomy (rubella in pregnancy)	24	417	76	18	9	2·2
Termination of pregnancy by hysterotomy (psychiatric reason)	15	640	13	2	4	0·6

β-[^{14}C]-DL-Noradrenaline (5 μc.) was injected intravenously into the mother over a period of 2–5 min immediately before delivery. Immediately after delivery specimens of blood were collected as quickly as possible from the venous circulation of the mother, from the placental end of the umbilical cord and from the fœtal heart, either simultaneously or within a few minutes of each other. In every case collection of blood was completed within 10 minutes of the end of the injection. Serum was separated without delay.

Noradrenaline was assayed by a modification of the methods of Weil-Malherbe (ref. 2). The *p*H of the serum was adjusted to 8·4 and, without protein precipitation, was passed through a small column of alumina on to which the noradrenaline was absorbed. After washing with *p*H 8·4, 0·2 M acetate buffer, the column was eluted with 0·2 N hydrochloric acid. The eluate was evaporated to dryness, and dissolved in 0·1 ml. water, to which 4 ml. methanol and 16 ml. liquid scintillator (1 l. toluene + 0·3 g 1,4-*bis*-2-(4-methyl-5-phenyloxazolyl)-benzene + 5 g 2,5-diphenyloxazole, were added. Radioactivity was determined in a 'Tri-Carb' liquid scintillation spectrometer. Each sample was counted for a length of time sufficient to give a standard error of ± 1 per cent.