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Longitudinal Study of 7 Plasma Corticosteroids (CS) in Mother
and Child at Birth and during the Neonatal Period.*

The adrenal cortex seems to play an important role in the
newborn's adaptation to extrauterine life. Since systematic
studies on multiple CS in the same human newborn have not yet
been reported, progesterone (P), deoxycorticosterone (DOC), 17 α -
hydroxyprogesterone (17 α), corticosterone (B), aldosterone (A),
cortisone (E) and cortisol (F) were followed in a single 250 μ l
peripheral plasma sample in 12 vaginally delivered full-term
infants of either sex. Mean concentrations (after automated
LH-20 multi-column chromatography and specific radioimmuno-
assays) were in ng/ml: (PMP=paired maternal plasma)

Steroid	PMP	Cord	2h	4h	6h	12h	24h	4d	7d
P	120	271	57	68	46	24	13	0.9	0.5
DOC	3.0	6.0	5.5	4.5	3.0	1.2	1.2	0.13	0.10
17 α	11.0	33	8.9	6.0	4.0	2.0	0.9	0.8	1.24
B	36.3	10.5	9.3	3.0	2.8	5.2	5.3	7.9	2.5
A	1.0	2.1	3.0	3.7	3.5	3.3	3.4	2.1	1.4
E	60	138	83	87	75	57	41	23	22
F	548	69	104	49	28	76	27	57	35

Besides marked materno-fetal CS differences, P, 17 α and DOC (pre-
dominantly of placental origin) disappear rapidly with varying
half lives. A, B, E and F, however, remain elevated in comparison
with later infancy, reflecting high adrenal biosynthetic activi-
ty. * (Approved by parents and Hospital's Ethical Committee)

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Adrenal function in premature infants with respiratory
distress syndrome (RDS).

To evaluate the controversial role of adrenocorti-
cal hormones in RDS, plasma cortisol (F) and urinary
excretion of tetrahydrocortisol (THF), tetrahydrocor-
tisone (THE), and aldosterone were determined by
specific radioimmunoassays during the first 8-10 days
of life in 10 normal premature infants (group I) and
in 10 premature infants with RDS (group II). In group
I plasma F decreased from 15.8 $\pm$ 5.4 μ g/100 ml on the
1st day to 4.1 $\pm$ 0.8 μ g/100 ml after 1 week. Urinary
THF (0.005 - 0.08 mg/m²/24 h) and THE (0.01 - 0.1 mg/
m²/24 h) were low when compared with normal values of
older children (THF 0.3 - 2.5 mg/m²/24 h, THE 0.3 -
3.0 mg/m²/24 h). In group II plasma F rose from 15.2 $\pm$
1.7 μ g/100 ml to 27.2 $\pm$ 8.7 μ g/100 ml on the 7th day.
Urinary THF and THE in group II were 2-3 times higher
than in group I. Aldosterone excretion was high, but
varied widely (1.0 - 60.0 μ g/m²/24 h) in group I and
II, the normal adult values being 2.0 - 12.0 μ g/m²/24 h.
No correlation to the sodium balance could be detected.
There is no evidence for a postnatal adrenal insuffi-
ciency in premature infants with RDS. The low urinary
THF and THE in the presence of normal or elevated
plasma F levels can be explained by different metabo-
lic pathways in premature infants.

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Early and late effects of neonatal cortisone on
growth of rats.

Corticosteroids are being used to prevent or ameliorate
respiratory distress syndrome. An evaluation of possible deleter-
ious effects was undertaken in Caesarian-derived Sprague-Dawley
rats by giving 1.25mg of cortisone acetate I.M. on the 4th day of
life to 20 pups; 25 controls received 0.05ml saline. This dose is
equivalent to approximately 70 mg/m² of prednisone. Pups were
reared in litters of 8 (all treated or all control); terramycin
was added to the drinking water. At age 21 days body weight,
stem-length and tibia length were all less in the cortisone treated
animals than the same measurements in the controls, but skeletal
maturation was advanced in the treated animals.

	Treated	Control	P
Body weight, gm.	51.15	63.04	<0.001
Stem length, mm.	112.55	125.32	<0.001
Tibia length, mm.	16.88	20.35	<0.001
Ossification, no.	118.0	107.56	<0.05

At age 12 weeks, decreased body weight (male p 0.01 < 0.001; female
p 0.02 < 0.01) and bone length (male p 0.10 < 0.05; female
p 0.05 < 0.02) were still evident but the number of epiphyseal
fusions was the same in treated and control animals. These findings
have implications for the future growth of infants given
corticosteroids because reduced linear growth and accelerated
skeletal maturation will eventuate in short stature.

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Studies on prepyloric lipase in premature and full-term newborns.

Lipolytic activity of pharyngeal origin with pH-optimum 5.4
has been found in esophageal and gastric aspirates of adult sub-
jects (Hamosh et al.: J.clin.Invest.1975;55:908). We studied the
gastric contents of seven premature and 11 full-term newborns to
find out if lipolytic activity is present in the stomach. The
samples were acid enough to exclude pancreatic lipase. As sub-
strates we used H³-trioleate and ingested pasteurized milk, and
the incubations were performed in 37°C at various pH in a 5%-
albumin-buffer solution. Mono-, di-, triglycerides and FFA were
separated by TLC. Four out of seven premature and all full-term
newborns had clear lipolytic activity in the stomach shortly af-
ter birth, starting in the former group from the gestational age
of 34 weeks. The lipase activity differed from pancreatic lipase
by lower pH-optimum and acid-resistance. A lipase activity of
this kind was also shown in a gastric sample of one infant with
pyloric stenosis, and in a sample from the upper segment of eso-
phagus of a newborn with esophageal atresia. Our preliminary re-
sults suggest that lipase activity in gastric contents appears
already in newborns and even in prematures with gestational age
over 33 weeks, and that the lipase involved differs from pancre-
atic lipase. Some evidence is given for the origin of the lipase
from the uppermost gastrointestinal tract.

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Strasbourg, France. Glycoprotein synthesis by human
small intestine in organ culture.

Glycoprotein synthesis was measured by the incorpo-
ration of 14-C-glucosamine into total acid precipitable
protein of jejunal explants cultured in vitro. The rate of
glucosamine incorporation remained constant up to
48 hours. During this time a continuous release of
glycoprotein into the culture medium was observed.
Pulse-chase experiments indicated that the mean half
life of overall labelled tissue glycoprotein was about
20 hours. SDS-polyacrylamide-gel-electrophoresis of the
isolated brush border membrane showed that all major
protein bands of high molecular weight had incorporated
14-C-glucosamine. These proteins were identified as
maltase-glucoamylase, lactase, sucrase-isomaltase,
enterokinase and alkaline phosphatase. Specific enzyme
activity could not be assigned to the two remaining
labelled bands. After 5 hours of culture lactase showed
the highest glucosamin incorporation. These results
indicate that the organ culture method is suitable for
studying the biosynthesis of human intestinal brush
border enzymes in biopsies from patients with intes-
tinal malabsorption syndromes.

S.AURICCHIO, G.ANDRIA*, L.GRECO* and
50 G.MAZZACCA* (Department of Pediatrics and
Department of Gastroenterology, University of Naples,
Naples, Italy). Peptidases of brush border of human
and rabbit small intestinal mucosa.

Three peptidase activities were found to be
present in human and rabbit small intestinal mucosa:
the aminopeptidase A, hydrolyzing the α -L-glutamyl-
p-naphthylamide (BNA); the dipeptidyl aminopeptidase
IV, hydrolyzing glycyl-L-proline from glycyl-L-prolyl-
BNA; a carboxypeptidase, hydrolyzing N-CBZ-L-prolyl-
L-alanine. These enzymatic activities are almost
totally localized in the brush border and have maximal
activity in the distal ileum: they were due to three
different enzymes, which have been separated each from
the other, as well as from the oligoaminopeptidase
(hydrolyzing L-leucyl-BNA), and partially purified.

The identification of these new peptidases of the
brush border demonstrates a previously unrecognized
importance of this subcellular organelle in the
digestion of proteins and peptides, in a complementary
way to intraluminal and intracellular digestion.