Wirkungen von DCA viel evidenter in adrenalektomierten als in intakten Tieren sind. – Durch gleichzeitige DCA-Behandlung konnte sogar nach kompletter Adrenalektomie die Cortisol-Pufferwirkung der lebenden Nebenniere nachgeahmt werden. Anscheinend sind die Wirkungen dieser beiden Typen von Nebennierenhormonen weitgehend maskiert, wenn Nebennierenrindengewebe eine einseitige Überdosierung durch die Sekretion von antagonistischen Corticoiden hemmen kann.

Spontaneous Peristaltic Activity of Veins of Chick Embryos and Newly Hatched Chickens Explanted *in vitro*

In a previous study by ATTARDI, GANDINI, and MARCON[1] it has been shown that the chick embryo arteries cultivated *in vitro* exhibit spontaneous contractions of a peristaltic type, with a frequency up to 20 per minute, which last for 2 or 3 days: these results have been recently confirmed by TONI[2]. A similar contractile activity has been observed also in the rabbit embryo arteries cultivated *in vitro* (ATTARDI[3]).

We have undertaken the present investigations, of which the first results are reported here, with the aim of establishing whether a contractile activity can be demonstrated also in venous segments of the circulatory tree, especially in those regions where, on account of the particular conditions of the venous return, the participation of the vein walls in the blood propulsion is most probable. We should mention here the existence, already demonstrated in some species of Vertebrates, of auxiliary hearts, which help the venous circulation in particular regions, as the portal heart of Bdellostoma (CARLSON[4]) and the pulsatile veins of the bat wings (discovered by WHARTON JONES[5] and recently studied *in vitro* by MISLIN[6]).

We have first taken into consideration the veins of the portal system of chick embryos and newly hatched chickens (omphalomesenteric vein, mesenteric vein, right portal vein[7], left portal vein[8]), where the blood is almost lacking in *vis a tergo*, owing to the fact that it has flowed through the capillary network of the yolk-sac and of the alimentary canal, and it probably needs help in order to overcome the resistance of the hepatic capillary bed. Reference should be made, in this connection, to the above mentioned portal heart of Bdellostoma and to the observations by RONCATO[9], concerning the occurrence of rhythmical movements of relatively high frequency (up to 15–20 per minute) and long duration (up to 6 h) in segments of the portal and superior mesenteric veins of adult dogs, suspended in autologous blood serum and submitted to a certain stretch.

We have examined also the left umbilical vein, for which it can likewise be assumed that the *vis a tergo* is not sufficient by itself to ensure the blood flow towards the heart, as it tends to exhaust itself through the considerable length of the vessel.

For these investigations chick embryos from 6 days of incubation up to the hatching, and newly hatched chickens up to 5 days of age have been employed. The explants have been prepared on coverslips by the usual hanging-drop method in a medium composed of homologous plasma and 10-day-old chick embryo extract in equal parts. Usually fragments of vein 2 to 3 mm in length have been explanted; whenever possible more than one fragment of each vein have been tested. We have tried to place the fragments in the medium as far as possible in an extended state, as this condition is favourable to the contractile activity. – The results of our observations are presented in the Table.

The contractile activity started generally a few minutes after the explantation or anyhow within the first hour and became exhausted after a few hours (from 2 to 15 h), only slight undulations of the walls persisting after that time. The spontaneous contractions occurred at periods alternating with periods of rest of different duration. The contractions, more or less powerful, were generally of a peristaltic type, and propagated along the whole segment or only one part of it; one could observe rather often peristaltic waves alternating with antiperistaltic ones. In some cases the rhythmical contraction, instead of peristaltic, was longitudinal or annular in a more or less limited part of the fragment, without any sign of propagation.

The fact should be noted that the veins examined have shown a contractile activity *in vitro* in a higher percentage of explants (about 45%) than the embryonic arteries placed under the same experimental conditions. This may be due to the fact that the state of extension of the walls which is favourable to the contraction is more easily produced, by the plasma clot retraction and the action of the temperature, in the veins than in the arteries, owing to the histological features of the former (smaller content of elastic fibres and muscle cells, greater looseness of the structural components, etc.). The contractile activity which is exhibited by the veins of chick embryos and newly hatched chickens differs from that of the embryonic arteries for the lower power, the early beginning and the relatively short duration of the contractions.

In the explants of the umbilical vein derived from the region of the umbilical cord of chick embryos in the first half of incubation (from the sixth day), we have observed very often a rather powerful contractile activity, which appeared to be localized outside the venous walls, in muscle cells which had become differentiated within the mesenchyme of the umbilical cord[1]: a certain amount of this tissue was in fact always explanted together with the venous segments, on account of the difficulty of isolating completely the vein in this region. In the second half of incubation a contractile activity proper to the walls of the umbilical vein could on the contrary be demonstrated also in this portion of the vessel. It is however worth noticing the fact that even when the contractions appeared to occur in the tissue adherent to the vein, they had a clear influence on the thin walls of the vessel, producing rhythmical movements of them. It is therefore likely that the contractile activity of the muscular tissue which develops in the umbilical cord has an adjuvant effect on the circulation through the umbilical vein in the first periods of incubation, when this vessel does not yet present its own contractile activity. A detailed study

[1] G. ATTARDI, E. GANDINI, and L. MARCON, Boll. Soc. ital. Biol. sper. *24*, 1333 (1948).

[2] G. TONI, Boll. Soc. ital. Biol. sper. *29*, 6 (1953).

[3] G. ATTARDI, Boll. Soc. ital. Biol. sper. *25*, 1057 (1949).

[4] A. J. CARLSON, Z. allg. Physiol. *4*, 264 (1904).

[5] T. WHARTON JONES, Philos. trans. roy. Soc. London, 1852.

[6] H. MISLIN, Helv. physiol. Acta *5*, C 3 (1947); *5*, C 18 (1947); *7*, C 15 (1949); Exper. *9*, 425 (1953).

[7] Trunk formed by union of the omphalomesenteric and mesenteric veins.

[8] Independent vessel which collects part of the blood from the gizzard and proventriculus and enters the left lobe of the liver.

[9] A. RONCATO, Arch. Fisiologia *20*, 159 (1922).

[1] Probably these muscle cells belong to that part of the amnion which contributes to form the umbilical cord.

Vein	Stage of development	Total number of explants*	Number of contractile explants*	Frequency of the contractions at 38·5°C (minimum and maximum values)
Omphalomesenteric vein	14 days incubation	33 (7)	11 (5)	3–12
	15 days incubation	29 (9)	9 (3)	3–13
	16 days incubation	19 (4)	11 (3)	3–20
	17 days incubation	12 (2)	7 (2)	2–10
	18 days incubation	7 (2)	5 (2)	3–18
	19 days incubation	13 (4)	7 (4)	1–14
	20 days incubation	11 (4)	4 (4)	5–13
	Hatching	4 (2)	3 (2)	7–19
	1–5 days after hatching	11 (6)	6 (4)	5–17
Mesenteric vein	16 days incubation	12 (4)	1	5
	17 days incubation	7 (2)	1	6
	19 days incubation	11 (4)	1	4
	20 days incubation	15 (4)	9 (4)	14–16
	1–5 days after hatching	25 (5)	12 (4)	7–15
Right portal vein	17 days incubation	1	1	10
	18 days incubation	2 (2)	2 (2)	6– 8
	20 days incubation	4 (4)	1	6
	1–5 days after hatching	7 (7)	7 (7)	6–11
Left portal vein	18 days incubation	3 (3)	1	8
	20 days incubation	4 (4)	1	12
	Hatching	1	1	7
	1–5 days after hatching	7 (7)	7 (7)	9–18
Umbilical vein (abdominal portion)	16 days incubation	19 (4)	2 (1)	4
	17 days incubation	10 (2)	5 (2)	5– 7
	18 days incubation	7 (2)	2 (1)	2– 6
	19 days incubation	19 (4)	6 (3)	5– 6
	20 days incubation	26 (5)	21 (5)	2–14
	Hatching	1	1	10
	1–5 days after hatching	32 (6)	17 (6)	7–14

* The figure between brackets refers to the number of chick embryos or chickens from which the explants were derived.

of the relations between the muscle cells and the walls of the umbilical vein is now being made.

The results reported above concerning the presence of a spontaneous peristaltic activity in the veins of the portal area and in the umbilical vein of chick embryos and newly hatched chickens, confirm on the one hand the findings which have been obtained with a physiological method by RONCATO on the portal and superior mesenteric veins of adult dogs, and on the other hand support the hypothesis of an active participation of the venous walls in the blood propulsion in those areas: this hypothesis has already been advanced by RONCATO for the veins studied by himself and by other authors (RENAUT[1], DUBREUIL and LACOSTE[2], BUCCIANTE[3]) for those veins, especially in man, which are in an unfavourable condition as regards the venous return because of the force of gravity and contain a more or less conspicuous amount of muscular elements in their walls.

Further researches are in progress in order to ascertain whether, in other segments of the venous system of the chick, especially in those in which the blood is flowing, in the fully developed animal, against the pull of gravity, a contractile activity *in vitro* can be demonstrated already during the embryonic life or in the first periods after hatching.

G. ATTARDI and D. ATTARDI-GANDINI

Institute of Histology and General Embryology, University of Padua, June 19, 1954.

[1] J. RENAUT, Traité d'Histologie pratique (Rueff et Cie, Paris, 1888).

[2] G. DUBREUIL and A. LACOSTE, Ann. Anat. path. *8*, 988 (1931).

[3] L. BUCCIANTE, Arch. it. Med. sper. *7*, 361 (1940); Medicina e Biologia *2*, 35 (1943).

Résumé

Les veines du système porte et la veine ombilicale gauche d'embryons de poulet dans la dernière semaine d'incubation et de poussins à l'éclosion ont été cultivées *in vitro*. Les auteurs y ont démontré la présence de contractions péristaltiques spontanées. Ils pensent que cette activité contractile rythmique favorise *in vivo* la circulation dans ces territoires veineux.

PRO EXPERIMENTIS

A Method for the Destruction *in situ* of Gonads of *Drosophila* larvae

Introduction.—In connection with experiments involving ovary transplantations between different stocks of Drosophila larvae, the need had arisen for removing or destroying a larval gonad with as little damage as possible, so that further operations, such as the implantation of a gonad from a different stock, might be successful on the same larva. It had been proved possible to remove mechanically one ovary with a good survival rate[1], but very difficult to remove one ovary and then to implant another one or to remove both ovaries with success, because of the great loss of body fluid and damage to the cuticle and inner organs.

To overcome this difficulty, a method for destroying a larval gonad *in situ*, with a minimum of damage or loss of body fluid, has been developed and tested.

[1] E. M. PANTELOURIS (in press).