MODIFICATIONS OF THE GONAD OF
CARCINIDES (CARCINUS) MOENAS L. (Crustacea, Decapoda)
AFTER BILATERAL Y ORGAN ABLATION

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In *Carcinides moenas* L. bilateral Y organ ablation conducted before sexual maturity causes a considerable delay of gametogenesis, degenerative modifications of the gonads; after sexual maturity this operation is not followed by any gonad change.

The hypothesis of Y organ intervention in moult control in malacostracan Crustacea (Gabe, 1953) has been verified experimentally in *Carcinides (Carcinus) moenas* (Echalier, 1954). The physiological importance of this gland having therefore been established, it is well to study subsequent histological changes in animals which have been subjected to bilateral surgical Y organ ablation. The facts related below concern changes in gonad structure in *Carcinides moenas* of both sexes mentioned in a previous note (Echalier, 1954), as well as in animals without Y organs, maintained alive without moulting up to a year after the operation.

The effect of this operation on the gonad is fundamentally different according to whether it is done before or after sexual maturation.

In *Carcinides moenas* L. bilateral Y organ ablation causes no important change in gonad structure. Also in animals which measure between 20 to 30 mm at the time of the operation and autopsied 5 months later, the ovary has full activity; at the beginning of interphase one meets here, besides oogonia and young oocytes, a large number of more developed oocytes in full vitellogenesis. The oocytes like the follicular cells show no cytological anomaly; there is nothing to distinguish the ovaries of the animals without Y organs from those of their controls, sham-operated at the same time.

Examination of the δ animals results in an identical conclusion; in those which had attained a size greater than 18 mm at the time of the operation, the testicle is morphologically normal at the end of 5 months and the use of cytological techniques demonstrates that spermatogenesis is progressing as in the controls.

In agreement with this data, it is well to point out that a rather ample, apparently normal egg laying has been observed in a δ 6 months after the operation.
Entirely different are the conclusions that we have been able to make in animals which had been subjected to Y organ ablation at a time when their size did not exceed 16 mm and which had been maintained alive for a year. Indeed, the ovary of deprived of Y organs shows profound alterations, while in the sham-operated controls held [mis en élevage] for the same time, the ovarian structure is strictly comparable to that of unoperated freshly caught animals of a corresponding size. In the operated animals, oogonia are infrequent and mitosis exceptional. Most of the oocytes are at the beginning of a long interphase [interphase de grand accroissement]; some from among them are very rich in ribonucleic acid, while others on the contrary are very poor. Nowhere are there follicular cells regularly placed around the oocytes and we have not found any oocyte in vitellogenesis. In addition, one sees very large degenerative phenomena; certain oocytes are manifestly in the process of lysis and extensive areas of the gonad are thinned out; one finds in them a very empty [lâche] connective tissue of alveolar appearance. Comparison with controls of the same age which have moulted four or five times in the experimental period and the dimensions of which have more than doubled, shows that the development of the ovary has been considerably retarded by Y organ ablation. It is not any less true that the ovary of the operated animals has undergone a certain development, as is proved by the comparison with that of normal animals, freshly captured and of a corresponding size. Neither the controls of the same age nor those of the same size show degenerative phenomena in the ovary.

The study of the gonad made apparent anomalies equivalent to those which we have just described. The testicle of animals without Y organs for a year contains cells which correspond to the description of spermatogonia; we find no trace of spermatozoïds and the dimensions of the testicles are very reduced, while in controls of the same age these organs are well developed and in full activity.

A comparison of animals without Y organs and sham-operated controls proves [prouve à l'évidence] that the testicular and ovarian anomalies [page 1855] described could not be accidental. And so to us it seems indisputable that there is a cause and effect relation between Y organ ablation and the modifications in question. These results suggest two hypotheses. On one hand, one can accept that the anomalies of the gonad in the animals without Y organs represent only one particular aspect of a very general perturbation of metabolism; the existence of this kind of perturbation is demonstrated moreover by the definitive arrest of the moultng rhythm. On the other hand, it is possible to envisage the intervention of a specific principle elaborated by the Y organ and acting on the gonad. The data which we actually have at our disposal does not allow us to make the distinction [de conclure]. There is every reason to observe that the normal functioning of the gonad once differentiated is possible in the absence of the Y organ; in the context [esprit] of our second hypothesis, the intervention of a possible gonadotropic principle, elaborated by the Y organ, would thus be limited to the onset [déclenchement] of gametogenesis.
REFERENCES