

# Psychoneuroendocrinology in Reproduction

AN INTERDISCIPLINARY APPROACH

L. Zichella and P. Pancheri Editors

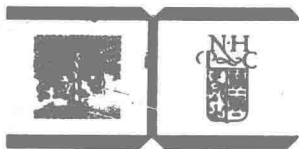
DEVELOPMENTS IN ENDOCRINOLOGY VOLUME 5

# PSYCHONEUROENDOCRINOLOGY IN REPRODUCTION

## AN INTERDISCIPLINARY APPROACH

Proceedings of the Second International Symposium on Clinical  
Psychoneuroendocrinology in Reproduction held in Venice, Italy,  
June 3-5, 1979

L. Zichella *and* P. Pancheri *Editors*



1979  
ELSEVIER/NORTH-HOLLAND BIOMEDICAL PRESS  
AMSTERDAM · NEW YORK · OXFORD

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ISBN for this volume: 0-444-80172-3  
ISBN for the series: 0-444-80009-3

Published by:  
Elsevier/North-Holland Biomedical Press  
335 Jan van Galenstraat, P.O. Box 211  
Amsterdam, The Netherlands

Sole distributors for the USA and Canada:  
Elsevier North Holland Inc.  
52 Vanderbilt Avenue  
New York, N.Y. 10017

**Library of Congress Cataloging in Publication Data**

International Symposium on Clinical Psychoneuro-  
endocrinology in Reproduction, 2d, Venice, 1979.  
Psychoneuroendocrinology in reproduction.

(Developments in endocrinology ; v. 5).

Bibliography: p.

Includes index.

1. Endocrine gynecology--Congresses. 2. Obstetri-  
cal endocrinology--Congresses. 3. Neuroendocrinology--  
Congresses. 4. Labor (Obstetrics)--Congresses.  
5. Ovulation--Congresses. 6. Obstetrics--Psychoso-  
matic aspects--Congresses. I. Zichella, L. II. Pan-  
cheri, Paolo. III. Title. IV. Series.

RG159.I58 1979 618.1 79-21138

ISBN 0-444-80172-3

## PREFACE

The publication of this volume follows closely that of the proceedings of the last Symposium on psychoneuroendocrinology in reproduction which was held at Siena in 1976, and represents a logical evolution. Three years can be a very brief space of time in the field of biomedical research based on acquisitions which are now permanent and in a certain sense "crystallized", but it can also be a very long interval in fields of science which have been explored only recently and therefore are in a phase of intense development. There is no doubt that psychoneuroendocrinology in human reproduction has the right to a place in the latter group of scientific disciplines.

The Venice Symposium of 1979, of which this volume is an exact report, has confirmed how progress in research in psychoneuroendocrinology in its two-fold aspect, technical and methodological, finds its most productive application in the various aspects of human reproduction. Today's improved knowledge of the role of hypothalamic polypeptides in their two-fold aspect, psychosomatic and somatopsychic, progress in the knowledge of the integrative neuroendocrine mechanisms which regulate ovulation at the hypothalamic level and the study of the determining factors and the psychoneuroendocrine correlates of labour, are the main areas in which evolution in research in the last three years is most evident.

However, we do not think that the most prominent message which appears after a comparative analysis with the precedent volume, is the obvious progress in research made over three years, but rather the confirmation of the validity of a conceptual foundation which has been increasingly enriched with new theoretical and clinical possibilities and which has provided research with new and more productive possibilities.

In fact, the field of human reproduction is considered to be increasingly more the ideal condition for the systematic study of psychosomatic inter-relations between the individual and the environment and for the identification of the "missing link" between soma and psyche, which used to be the stumbling block of all psychosomatic research up until very recent times.

The reproductive mechanisms appear to be regulated by a series of genetically determined automatisms, which are accompanied by many psychoneuroendocrine correlates and specific emotions.

The present state of research in this field is such that, in the animal, there are many notions relative to the pre-determined biological mechanisms of reproduction, but data regarding interference by psychosocial determining factors are few. In the human, a good knowledge of individual emotionality and its psychosocial determining factors is not accompanied by an adequate study of the modifications brought about in the psychobiological mechanisms of reproduction. The contributions in this volume bear witness both to this fundamental difficulty and to the attempts made to overcome it.

However, apart from the results obtained in the single studies, the need to verify clinically the results of animal experiments and above all to emphasize still more the role of human emotions in the reproductive processes clearly emerges.

In this perspective, the need to analyze the effect, on a behavioural level, of hypothalamic polypeptides and hypophyseal hormones either directly or indirectly involved in the process of reproduction, is felt increasingly more by many researchers.

Attention has been drawn to the more specific problem of the mechanisms of control of ovulation and of the methods of detection and induction. It is known that, especially in the first aspect of the problem, theoretical models which appeared granite-like are now under discussion.

Prolactin is the mysterious hormone of reproduction, even though new candidates are coming forward; until we know all about prolactin we must give it all the honours of protagonist.

The problem of the mechanism of birth, considering the role of the foetus and the multifactorial characteristics found especially in Man, and the unquestionable emotional, natural, individual and cultural atmosphere which characterizes it, constitutes a marvellous, even though difficult, model of psychoneuroendocrine and psychosomatic investigation. Progress made in this area represents a certain theoretical and practical result.

The study of psychological disturbances of the menstrual cycle provides a new methodological approach to clinical facts, which, up until now, were more part of the anecdotal than of precise scientific evidence.

In conclusion, the approach is interdisciplinary, therefore the language of the authors is not always homogeneous and the structure of analysis is sometimes still uncertain or incomplete.

Nevertheless, the fascination of this subject cannot but bring the experts together in the search for that integration which only an exchange with others can give. In this way, stimuli are created which can give new perspectives to one's own interests and foundations for research. This would certainly be a positive result.

The high qualifications of the contributors aid an attempt to bring the most advanced experiences in the biological sciences of reproduction nearer the need, in Man, of a clinical and therapeutical synthesis. The way is long, but not impossible.

P. Pancheri

L. Zichella

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## INTRODUCTION

In considering the common clinical observation of the psycho-emotional influences exercised on reproduction or on its control, scientific attention turns more easily towards the environmental or stress factors, and more rarely towards psychological factors, so we believe it is proper and legitimate to ask you to give your attention to a much more general approach to this problem.

At the end of the first Symposium, held in Siena in 1976, Diczfalusy, who unfortunately cannot be here with us in Venice, authoritatively warned us not to seek a new science. In affirming our belief that there is only one science which regards human problems, we wish to explain here the reason for our permanent interest in the psychoneuroendocrinology of reproduction.

Reproduction, or preservation of the species drive, to which all the problems of humanity are rightly or wrongly attributed, directs biologically, with self-preservation, the instinctive mechanism and the basic behaviour of all living beings. According to MacLean, as you know, the seat of these drives is the limbic zone of the paleoencephalon. In the human being, these drives correlate with different formative, cultural and relationship characterizations, and then find, at psychobehavioural and functional levels, agonistic and antagonistic modulations which are much more sophisticated, complex and therefore less definable from an analytical point of view than those of an animal.

It is enough to consider the role of sexuality in Man: it was originally the specific behaviour of reproduction and has now become an ambitious counter-figure, although it cannot biologically substitute the survival drive of the species, which, in our view, is the only drive which can compete with, and equal, for its power, the individual survival drive. The reproductive genius, also in the human, based on phylogenetic memories, moves sometimes beyond and sometimes above the individual, characterizing the connections between the individual and the environment in a less evident, but at the same time no less categorical way. However, more frequent episodes of deficit and rarer episodes of facilitation of the natural process of reproduction (in all its continuum) can, in Man, responding perhaps to a still difficult to define internal ecology, imply modulations, other than on behalf of the environment, on behalf of the individual himself, in the widest sense, and this goes beyond the common significance of individual homeostasis.

Therefore, from the theoretical point of view, with clear methodological reflexes, we maintain that in the human being we must escape from a too schematic conceptualization which is incapable of dealing with the complexity of the problem.

Speaking of psychoneuroendocrinology, we can certainly no longer consider stress according to experimental models, or with the limiting characteristics of psychological stress in the general sense of these terms.

Considering stress as a mechanism of adaptation, it is for example possible to hypothesize that in the basic homeostatic process of the reproductive function, for the presence of episodic performances (coitus, labour, breast-feeding, etc.) at high functional and emotional levels, which we have already defined as conditions of high psychosomatic risk (Rome, 1977), we could have different levels of stress which can pass, although not obligatorily, from a physiological to a pathological condition.

In the interpretation of the mechanism of correlation between psyche and soma, especially in psychoneuroendocrinology, we are today out of the intuitive phase. Progress in the biochemistry and physiology of neurotransmitters and neurohormones seems to force psychologists to have an insight of emotionality as a stimulus and the personality as a transducer of the emotional influences on the physiology and physiopathology of human endocrine functions.

As regards reproduction, we must better define the characteristics of the psychological expression of this function. The direction to follow, in order to achieve this, has already been incisively indicated by research on hormones and behaviour, and much more generically by observations of the ethology on natural and acquired behavioural models. Only in this way is it easier to interpret the possible psychological influences on reproduction and to propose tools suitable for their measurement.

Therefore, we can consider as being a conceivable characteristic of the reproductive function a visceral emotion which guarantees specific behavioural mechanisms at different levels of integration and of conscience, on which emotions on environmental, individual social or situational scales may or may not positively or negatively interact.

It seems logical to think that the levels of interaction between the psyche and reproduction will probably become ever more personalized in Man.

Only the perfection of tools for psychological exploration will allow us to satisfy the need for scientific and clinical examination.

In this manner, we can perhaps conceptualize a type of psychosomatic homeostasis, almost a psychological self-preservation modulated by the personality, through which conditions of equilibrium or apparently paradoxical individual responses can be explained. At the psychic level, these conditions can be assimilated with those structured neuroses brilliantly intuited and described by Freud.

Therefore, the relationships between emotion and function cannot be made banal at the risk of realizing a non-productive approach.

The problem is undoubtedly one of definition of the variables. To this end, we believe that it is correct to continue studying these aspects. On the other hand, from the endocrinological aspect of reproduction, problems correlated particularly to its clinical approach are still numerous, as you will hear from the experts. It is enough to consider the obscure points of the subtle mechanisms of ovulation and the methods of detection and induction used. Furthermore, we know all the controversies about natural mechanisms of induction and the maintenance of labour, and about the different chronological sequence of their interventions. We have devoted part of the Symposium to this problem.

From the first biochemical approach of Scharrer (1939) on the concepts, as Reichlin underlines in his book, of the neural mediation of the endocrine function, the topic has been enlarged by the identification of many factors. It is enough to consider, after neurotransmitters, the recent progress made in research on neuropeptides. Moreover, old problems, for example the pineal and its function, and the neurohypophysis and its function, have recently undergone fruitful re-examination.

Nevertheless, a global approach to the study of neurohormonal mechanisms, of which polypeptides seem to have become increasingly more, even though rather mysteriously, the protagonists, seems almost to give space to a teleological valuation.

In fact, the structural and perhaps biosynthetic link between different principles involved in physiologically connected functions, the ubiquitous puzzle of some of these in remote function from that in which they were originally detected and defined, the modified functional role of some hormones defined in haste as local (prostaglandins) and of others defined as central (neuropeptides), all appear to stimulate every researcher in this field to bring, together with the evidence, the availability of a much wider approach, even if it is particularly complex, from the methodological point of view, in the human being.

Perhaps the old reserve against a teleological interpretation will shortly be comparable to the scandal of uncovered piano legs in the Victorian Era!

In conclusion, in clinical psychoneuroendocrinology, it appears, and I believe that you will agree, that biochemistry, like psychology, must modify its customary approach.

It is necessary to realize a deepening of the interaction between environment, stress, homeostasis (in a wider sense than the traditional) and function with much more elaborate models and methods.

If progress on the diverse scales in effect underlines the intervention of ever cloudier structural elements, which characterize the activity and therefore the normal relationship between nervous functions and endocrine functions in the human, they integrate only partially in behaviour; vice versa, frequent clinical conditions, which require only documentation: individual behaviour and/or psycho-emotional and characterologic factors can influence the hormonal activity and the biological functions controlled by them.

The diverse capacity for adaptation to external rhythms (essential in the animal) to ensure survival, and the presence of internal rhythms, amongst passive and/or active oscillation which respond, as stressed by Hutchinson, to subtle regulators not yet well-defined, could give the possibility of defying those characteristics of emotionality and personality of which I have repeatedly spoken, responsible for an individual nervous modulation and mediation which, also if difficult to define, will be, I think, an important area in the future development of clinical psychoneuroendocrinology.

Relative to the problems dealt with both in this Symposium and also in research in general, the tendencies in some sectors can appear more homogenous and more incisive, in other sectors uncertain or marginal.

Some speakers who could have told us much did not respond to our invitation. Others came spontaneously and will perhaps tell us a little we want to hear. Others abandoned us at the last moment, involved in one of the aspects of the scientific race, with its politics, schedule conflicts, together with the financial struggle and travel which condition our world today.

In an attempt to give ourselves a biorhythm outside this race, we have decided, and wish to have your consent, to hold this Symposium every three years, in a corner of our country where humanism was born, or at least passed through, always in a different place, and under the circumstances, always more ecological.



For the next time, we had thought of Spoleto during the Festival of the Two Worlds. It will therefore be easier to ask ourselves about the recomposition of Man.

The attempt at a scientific reconstruction after a skillfull breakdown and analysis of a unity conceived in the genius of creation is not a work of presumption, but the result, like the work of restoration (which is an ancient art in this city and country); is a tenacious and precious joint group effort, often anonymous with roles at times not comparable, which does not disdain the contribution of technological progress, but which has, as its aim, keeping only prejudice aside, the impalpable re-composition not differentiated by spirit, light or impasto from the work of the artist.

In this perspective, it will be possible to attempt a real approach to Man "in situation", who, under the psychoemotional aspect, is ever more the true protagonist of modern physiology and physiopathology.

L. Zichella