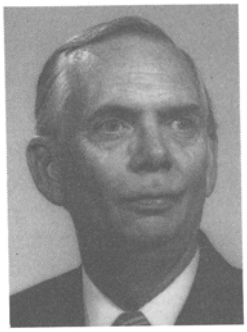
THE SEVENTH SSR RESEARCH AWARD
CHARLES BARRACLOUGH

The SSR Research Award is given to an active regular member of the Society for outstanding research published over the past 6 years, regardless of the age of the recipient. The 1984 award is presented to Professor Charles A. Barraclough of the University of Maryland for outstanding contributions to current understanding of the neuroendocrine mechanisms that control the release of pituitary gonadotropins.



Charles Barraclough was born in New Jersey in 1926. He received a B.S. degree from St. Joseph's College, Philadelphia, and then from Rutgers University the M.S. degree and Ph.D. in physiology. His predoctoral studies under the guidance of Dr. James Leathem were conducted in a laboratory located over a garage in New Brunswick. The animals were housed in cages fabricated from bread boxes; woodshavings were obtained by weekly trips to the local sawmill. This was truly "hands-on" research.

Infertility produced in neonatal female rodents by a single injection of testosterone was the topic under study. It marked the origin of a lifelong interest in neuroendocrinology. As well as being the first of many models Barraclough would develop, this animal model was to be used repeatedly to obtain answers to the questions posed. At this time Barracough stood at a crossroads: a career in biologic research or a career as a piano player in well-known bands? Fortunately for us he went up the hard road of basic biomedical research, but according to admirers the world of popular entertainment lost out greatly.

Barraclough proceeded into fruitful postdoctoral years at UCLA under the guidance of the remarkable Dr. Charles Sawyer. From then on, Barraclough's research program has been a closely interwoven series of physiologic experiments directed at unraveling the complex interactions that occur along the hypothalamicpituitary-gonadal axis. The internal coherence of these numerous experiments creates the exceptional strength and validity of his overall scientific contribution.

His unusual persistence in attacking this important and complex problem has produced an abundance of new information and creative interpretations. His remarkable staying power is reflected in an unrelenting continuity of thought and effort which pervades his publications in relation to experimental design, development of animal models, and careful evaluation of existing literature. His motto in research appears to be "in vivo veritas," since his work emphasizes the basic importance of defining hormone action under physiologic conditions.

It is generally agreed that during the past 6 years Barraclough and his associates have provided us with a brilliant series of experiments on the role of catecholamines in the regulation of gonadotropin secretion. This remarkable achievement is a synthesis which rests on a long preamble of experimentation in Barraclough's laboratory. We now have better comprehension of the natural process that activates the neural component involved in ovulation. The high quality of these experiments led in 1983 to a return engagement to speak at the Laurentian Hormone Conference. Here only some of the highlights of these investigations can be mentioned.

Essential components of the neuroendocrine control system and their interrelationships have been defined. Studies with Scott Chappell demonstrated that selective release of FSH occurs from activation of only a portion of GnRH system. The strength and duration of the GnRH stimulus delivered to the pituitary cells determines whether FSH or LH or both hormones are released. Also, an inhibin-like ovarian factor was identified as a potential control mechanism for blocking preovulatory FSH selectively. The positive feedback effects of estradiol and progesterone on induction of ovulatory LH and FSH secretion were examined. Recent work demonstrates that progesterone amplification of LH secretion depends on the amount of estrogen receptors produced by estradiol in the hypothalamus. The turnover rates of norepinephrine and dopamine were measured in microdissected hypothalamic nuclei. Norepinephrine initiates the preovulatory gonadotropic surge by releasing newly synthesized GnRH from axon terminals. The relationship between catecholamine turnover rates and plasma concentrations of estradiol and progesterone were determined. From the interrelationships of these physiologic phenomena, a detailed timetable for the intrahypothalamic events has been constructed for proestrous rats. The preovulatory secretion of gonadotropins is preceded by sequential changes in norepinephrine, dopamine, and GnRH content.

The expression of the entire sequence of neuroendocrine events depends on the maturation of the ovarian follicles under basal FSH and LH. As serum estradiol rises, there is increased hypothalamic release of norepinephrine and increased hypothalamic synthesis of GnRH. Estrogen present in "adequate concentration and duration" is the zeitgeber of events that precede ovulation. The neurohypohyseal-ovarian circle appears to have been completed.

Charles Barraclough has been accompanied in this great, continuing adventure by many predoctoral and postdoctoral students. His leadership in research has been recognized by the national scientific community through continuous NIH funding for over two decades, his membership and chairmanship of NIH Reproductive Biology Study Section, and as a member of several editorial boards.

Dr. Charles Barraclough is an astute experimentalist of impressive originality and of high productivity in reproductive biology. His investigations of neurohypophyseal-ovarian interrelationships have paved the way toward greater understanding of the physiologic control of ovulation.

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