

## Abstracts of Papers for the Third Conference of European Comparative Endocrinologists August 2-5, 1965

97. *The Evolution of the Vertebrate Neurohypophyseal Hormones.* J. F. G. VLIEGENTHART AND D. H. G. VERSTEEG, Laboratory of Organic Chemistry, University of Utrecht, Utrecht, The Netherlands.

Sachs and Takabatake (1964) have demonstrated that vasopressin is a product of protein biosynthesis. We may conclude, therefore, that the amino acid sequences in the neurohypophyseal hormones are determined by the genetic code. A point mutation, that is a single base change in the genetic code, will result in the alteration of one amino acid.

Up until now the structures of the following six natural neurohypophyseal hormones have been chemically established: vasotocin, arginine- and lysine-vasopressin, mesotocin, isotocin and oxytocin. We want to put forward two alternative routes (Vliegenthart and Versteeg, 1965) for the evolution of these peptides. Our suggestions are based on the assumptions that: (a) the two-peptide series are derived from a common ancestor; (b) the genetic code is universal; (c) there has been one point mutation at a time; (d) a mutation may be either a step in the evolution as a whole, or may lead to a side-branch specific for an animal group; and (e) a simplified phylogenetic scheme according to Romer is suitable to our purpose. We consider vasotocin to be the common ancestor. We propose that mesotocin is more ancient than oxytocin, because the code for arginine that can be converted to the code for lysine and isoleucine, cannot give rise to a code for leucine by a single base mutation. Oxytocin has been derived from mesotocin by the change  $\text{ileu}^8 \rightarrow \text{leu}$ . The other conversions  $\text{gluNH}_2 \xrightarrow{4} \text{ser}$  and  $\text{ileu}^2 \rightarrow \text{phe}$  are also fitting in the present state of knowledge of the genetic code (Bernfield and Nirenberg, 1965).

In our first scheme isotocin has arisen from mesotocin ( $\text{gluNH}_2 \xrightarrow{4} \text{ser}$ ). This peptide forms a side-branch specific for the actinopterygians. In the alternative, less probable, scheme we suggest that isotocin is a derivative from vasotocin via the intermediate 4-ser, 8-arg-oxytocin.

### REFERENCES

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