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THE NERVE GROWTH FACTOR AND THE NEUROSCIENCE CHESS BOARD

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The date of 10 December 1986 marked the end of the errant life of the Nerve Growth Factor and its official recognition by the scientific community.

The ceremony held in Stockholm on the occasion of its presentation to the Swedish royal family brought it to the attention of both biologists and non scientists. Its solemn recognition as the firstborn of a constantly growing group of endogenous specific growth factors and as a precursor of the oncogens brought it to the attention also of researchers working in other scientific sectors, in particular in biochemistry, molecular biology, genetics and immunology. One constant feature of the long and tortuous path followed by NGF ever since, half a century earlier, it had appeared on the biological scene, was the fairytale and adventurous nature of the path it followed. NGF was to open up increasingly broad vistas and horizons as we strove to find a place for it in the framework of the neurosciences.

When, in the winter of 1951 the effects obtained by grafting a malignant tumour on to chick embryos were reported for the first time at a neuroembryology congress, the results aroused more perplexity than interest.

The discovery that nerve fibres could cross barriers, such as vein tunics, that normally barred them access, penetrate the circulatory system, and at the same time ramify chaotically in embryonic organs, was considered to be an abnormal phenomenon. This was because it reflected and extended to nervous tissue components a property typical of neoplastic cells from which derived the hitherto unidentified substance synthesized and released by the cells themselves.

The use of in vitro culture techniques led to the discovery that the submaxillary gland of the adult male rate synthesizes and releases into circulation a protein molecule that is exactly the same as the one produced by tumours that is ten thousand times more active than that identified.

The discovery that NGF plays an essential role in promoting the differentiation of nerve cells receptive to its action suggested that other similar factors might exert a proliferative or differentiating action on both neuronal and non neuronal populations.

The demonstration that NGF specific antibodies caused the death of the nerve cells receptive to its action represented undeniable proof of the essential role played by this molecule. Many years later its action mechanism was to be interpreted differently, that is, that the activation of the programmed death gene is normally inhibited by the action of the NGF gene.

Studies carried out in 1971 revealed the sequence of amino acids contained in NGF, that is, its primary structure. This demonstration then led to the discovery of the NGF gene.