

## Preface

For many years the classical and accepted view of the thalamus has been that it is a crucial but passive relay for messages going to the cerebral cortex. Except for olfactory inputs, nothing can get to the cortex from the sensory periphery or from lower brain centres without going through the thalamus. Understanding this role for the thalamus seemed to be enough. However, over the last few decades, evidence about the complex neuronal properties and connections that are demonstrable in the thalamus has led to questions about what the thalamic relay is actually doing. Not only does the thalamus send its outputs to the cortex, but it also receives a rich innervation back from the cortex, and these corticothalamic afferents are of two quite distinct structural and functional types. In addition, there are inputs to the thalamus from the brain stem, and there are complex local inhibitory circuits.

The thalamus could therefore no longer be viewed as a neutral gateway, passively passing messages to the cortex. A review of its functional role was needed. This meeting to discuss the role of the thalamus in relation to cortical functions brought together evidence about the thalamus and the cortex, and about their complex interactions. The meeting was organized by The Royal Society and the Novartis Foundation. The first two days were a well-attended public meeting at The Royal Society in London, and the third day, which was limited to a smaller group of speakers, was held at the Novartis Foundation. The cell properties and intrinsic organization of the thalamus were considered, as well as the nature of the connections that pass information between the thalamus and cortex in both directions. The cortical and brain stem inputs to the thalamus were seen in relation to both the attentional demands of the animal and to the perceptual processing that depends upon the patterns of inputs reaching the cortex from the thalamus. The thalamus can thus be seen as a relay where messages can be modulated, and the modulation can come from the cortex itself or from the brain stem. The thalamus can now also be seen as serving not merely to pass messages from the periphery and from lower centres to the cortex, but also to pass messages from one cortical area to another. Many of these messages, possibly all of them, are copies of messages that are concurrently going to motor centres, indicating that most of the inputs to the cortex that form the basis of perceptual processes are to be seen as copies of motor instructions, upon which we build our sensory world.

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