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A time to remember

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A Time To Remember

Consequences of ageing on the circadian
memory modulation in rodents

Barbara Biemans

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A Time To Remember

Consequences of ageing on the
circadian memory modulation in rodents

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Preface

Rhythmic behaviour is present in the simplest of organisms and throughout the plant and animal kingdom. Almost all behaviours are somehow influenced by a biological clock system. A small nucleus in the hypothalamus dictates the pace of the entire brain. This is the suprachiasmatic nucleus, seat of the circadian pacemaker in mammals. It is remarkable that such a tiny structure effectively manipulates higher brain functioning. It succeeds in doing so, and among the more complex tasks under circadian control is cognition.

The field of learning and memory has remained rather distant from rhythm research. As an unwritten rule in memory research, animals are generally tested for their retention of a learning task 24 hours (or at 24 h multiples) after training. It is obviously more convenient for human subjects to be tested during the day, and for animal researchers as well to work during daytime. This inadvertently leads to near 24-hour intervals. On top of this there is good reason to abide by a strict 24-hour rhythmicity, because learning and memory have strong circadian components, as we shall see.

Cognitive performance often deteriorates severely with old age, and this observation is the basis of a currently expanding field in neuroscience. In addition, the expression of circadian rhythmicity declines with age, and so does the neuronal integrity of the suprachiasmatic nucleus. One may therefore wonder whether loss of circadian organisation contributes to aspects of the decay in memory function with old age. This could especially be the case in patients with Alzheimer's disease, who suffer severe degeneration of both. This thesis describes a series of experiments with rodents focusing on the pacemaker's age-dependent modulatory interaction with memory. The reader is first introduced to the topic by an overview of the literature.

