

Differential changes of autonomic nervous system function with age in man. Pfeifer MA, Weinberg CR and other. Am J Med. 1983 Aug;75(2):249-58.

To assess the relationship between aging and autonomic nervous system function, cardiovascular and pupillary autonomic nervous system reflexes were measured in subgroups of 103 normal male subjects ranging in age from 19 to 82 years (mean age = 39 years). Both the plasma norepinephrine level, a measure of cardiovascular sympathetic nervous system activity, and the mean arterial blood pressure increased with age ($r = 0.68$ and 0.67 , respectively, both p less than 0.001). In contrast, the plasma epinephrine level, a measure of adrenomedullary sympathetic nervous system activity, was unrelated to age ($r = 0.08$, $p = \text{NS}$). Respiratory variation of heart rate during beta-adrenergic blockade, an index of cardiac parasympathetic nervous system activity, was reduced in older subjects ($r = -0.54$, p less than 0.001). Thus, there was evidence of an age-related increase of cardiovascular sympathetic nervous system activity and a reduction of cardiac parasympathetic nervous system activity. These findings are consistent with the hypothesis that there is sympathetic nervous system and parasympathetic nervous system compensation of cardiovascular function in response to an age-related decrease in baroreceptor sensitivity. However, dark-adapted pupil size during parasympathetic nervous system blockade, an index of iris sympathetic nervous system activity, declined with age ($r = -0.81$, p less than 0.001). The latency time for the pupillary response to a light stimulus, an index of iris parasympathetic nervous system activity, was prolonged in older subjects ($r = 0.58$, p less than 0.001). Thus, both sympathetic nervous system and parasympathetic nervous system inputs to the iris were diminished in older subjects, findings consistent with the generalized decrease of peripheral somatic nerve function that has been reported with aging in man. It is concluded that autonomic nervous system function also declines with aging, but that other age-related changes such as a decline of baroreceptor sensitivity may lead to compensatory autonomic nervous system response, which could mask underlying functional defects.