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## Age variations of melatonin level and its hormesis; implications for AIS and osteoporosis

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from 6th International Conference on Conservative Management of Spinal Deformities  
Lyon, France. 21-23 May 2009

Published: 14 December 2009

*Scoliosis* 2009, **4**(Suppl 2):O8 doi:10.1186/1748-7161-4-S2-O8

This abstract is available from: <http://www.scoliosisjournal.com/content/4/S2/O8>

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### Introduction

Melatonin, the "light of night", is a very important hormone for the function of the human organism. Its secretion increases in early childhood. In adolescence there is a decrease of the hormone concentration. The levels continue to decline gradually during middle age. In an older population the levels of melatonin in the serum are very low. Among many other functions, melatonin is involved in human sexual maturation and then declines, affecting menses and osteogenesis.

### Methods and materials

The development of menarche could be explored for evidence of hormesis. Hormesis is defined as the response of cells or organisms to an exogenous substance (e.g. a drug or toxin) or an intrinsic factor (e.g. a hormone) in which the factor induces stimulatory or beneficial effects at low doses and inhibitory or adverse effects at high doses [bimodal dose-response] or vice versa.

### Results

When menarche is at about 10 years, this is the age at which AIS appears, and the circulating melatonin levels are about 120 pg/ml - positive hormesis for menses, figure 1. If there is a circulating melatonin defect, then a delay of menarche compared with the normal peers is expected,

and subsequently, the female is susceptible to scoliosis. In this way, melatonin could be certainly involved in the pathogenesis of Scoliosis [1]. Around the age of 45 years when the circulating melatonin levels are about 20 pg/ml - negative hormesis for menses - (figure 1), menopause begins. As a result of the problems of osteoporosis, fractures then start [2-5].

### Discussion

The bone-protecting effect of melatonin is well documented in ovariectomized rats which can depend in part on the free radical scavenging properties of melatonin. Additionally, melatonin may impair development of osteopenia associated with senescence by improving non-rapid eye movement sleep and restoring GH secretion. Whether modulation of blood levels of melatonin can be used as a novel mode of therapy for scoliosis and augmenting bone mass in diseases deserves to be studied [3].

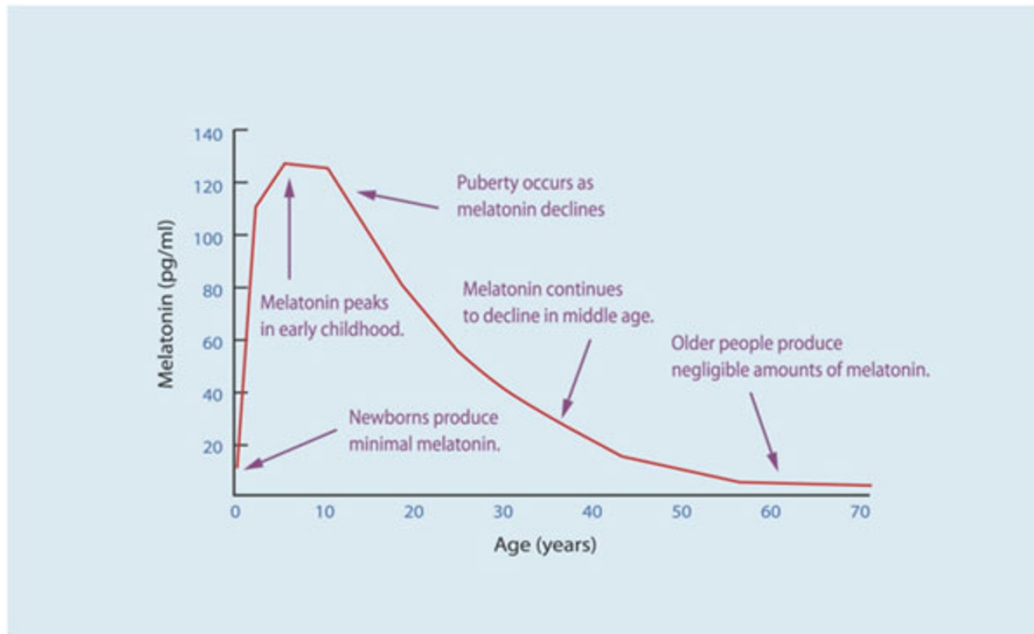


Figure 1

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