



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE

## FLORE

# Repository istituzionale dell'Università degli Studi di Firenze

### **Response to Seasonal Changes in Blood Pressure: Possible Interaction Between Sunlight and Brain Serotonin**

Questa è la Versione finale referata (Post print/Accepted manuscript) della seguente pubblicazione:

*Original Citation:*

Response to Seasonal Changes in Blood Pressure: Possible Interaction Between Sunlight and Brain Serotonin / P. A. Modesti; S. Rapi; G. F. Gensini; M. Morabito; S. Orlandini; L. Masetti; G. Mancia; G. Parati. - In: HYPERTENSION. - ISSN 0194-911X. - ELETTRONICO. - 62:(2013), pp. e2-e2. [10.1161/HYPERTENSIONAHA.113.01439]

*Availability:*

This version is available at: 2158/815076 since:

*Published version:*

DOI: 10.1161/HYPERTENSIONAHA.113.01439

*Terms of use:*

Open Access

La pubblicazione è resa disponibile sotto le norme e i termini della licenza di deposito, secondo quanto stabilito dalla Policy per l'accesso aperto dell'Università degli Studi di Firenze (<https://www.sba.unifi.it/upload/policy-oa-2016-1.pdf>)

*Publisher copyright claim:*

(Article begins on next page)

# Letter to the Editor

Letters to the Editor will be published, if suitable, as space permits. They should not exceed 1000 words (typed double-spaced) plus 5 references in length and may be subject to editing or abridgment.

## Response to Seasonal Changes in Blood Pressure: Possible Interaction Between Sunlight and Brain Serotonin

Drs Dhar and Lambert<sup>1</sup> correctly note that the potential relationship between sunlight and seasonal blood pressure (BP) changes is not investigated in our study.<sup>2</sup> We agree that this interaction, possibly mediated, at least in part, by changes in brain monoamine concentration, should not be neglected. In addition, the UV-dependent cholecalciferol formation is a potential modifier of the results: the BP-lowering effects of cholecalciferol having recently been reported.<sup>3</sup> However, a reliable measurement of sunshine exposure in our patients was not available.

The difficulty of obtaining true measurements of subjects' exposure to weather-related factors is a major problem when investigating the effects of climate on human health. As an example, the estimate of exposure to weather changes performed by measuring outdoor temperature is not likely to be a very accurate assessment because of the time spent indoors in a climatized environment. In our study, this exposure misclassification was controlled by measuring personal level temperature. With this approach, temperature and seasonality (objectively assessed as the number of hours between sunrise and sunset) were found to independently affect ambulatory BP (daytime systolic BP being negatively affected by temperature, daylight hours being positive predictors of nighttime systolic BP).

Obtaining a reliable measurement of bright sunshine exposure is more problematic, however, because available conventional methods (bright sunshine hours directly measured at the nearest available ground sensors, or using satellite data) give only a rough estimate of the final effect of the sun on study participants. In addition to time spent indoors or to the time spent away from the indicated home addresses, dressing habits<sup>4</sup> and also use of sunglasses might influence data. Hopefully our study, together with the correspondence it has generated, will stimulate additional research to examine such associations.

## Disclosures

None.

Pietro Amedeo Modesti

Stefano Rapi

Gian Franco Gensini

Department of Clinical and Experimental Medicine

University of Florence (CESPRO)

Florence, Italy

Marco Morabito

Simone Orlandini

Interdepartmental Centre of Bioclimatology

University of Florence (CIBIC)

Florence, Italy

Luciano Massetti

Institute of Biometeorology

National Research Council

Florence, Italy

Giuseppe Mancina

Gianfranco Parati

Department of Clinical Medicine and Prevention

University of Milano-Bicocca

Milano, Italy

1. Dhar AK, Lambert GW. Seasonal changes in blood pressure: possible interaction between sunlight and brain serotonin. *Hypertension*. 2013; 62:e1.
2. Modesti PA, Morabito M, Massetti L, Rapi S, Orlandini S, Mancina G, Gensini GF, Parati G. Seasonal blood pressure changes: an independent relationship with temperature and daylight hours. *Hypertension*. 2013;61:908-914.
3. Forman JP, Scott JB, Ng K, Drake BF, Suarez EG, Hayden DL, Bennett GG, Chandler PD, Hollis BW, Emmons KM, Giovannucci EL, Fuchs CS, Chan AT. Effect of vitamin D supplementation on blood pressure in blacks. *Hypertension*. 2013;61:779-785.
4. Bamashrus S, Bamosmoosh M, Modesti PA. Searching for pale, getting rickets. *Intern Emerg Med*. 2010;5:135-136.