

**The Influence of Resting Heart Rate on Low- and Very Low-Frequency Blood Pressure Variability**

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Low-frequency (LF) blood pressure variability (BPV) is associated with sympathetic modulation of vascular tone, whereas very low-frequency (VLF) BPV reflects myogenic vascular responsiveness to blood pressure oscillations. Heart rate (HR) can affect blood pressure (BP) and is also modulated by sympathetic tone, but whether an equal change in HR affects measures of BPV in individuals with different resting HR levels remains unclear. **Purpose:** To compare measures of BPV in young adults with low (LowHR; HR<70bpm) and high (HighHR; HR>70bpm) resting HR. **Methods:** Subjects were divided into 2 groups: 12 LowHR (female=2; age 25±1 yrs; BMI 24.1±0.7 kg/m<sup>2</sup>) and 15 HighHR (female=9; age 25±1 yrs; BMI 23.1±0.7 kg/m<sup>2</sup>) who were matched on HR change (10±1 bpm)) during upright leg cycling. Respiration was paced, and beat-to-beat BP and BPV were assessed for 5 min. Natural log-transformation (Ln) was performed on BPV data. **Results:** The LowHR group had a lower resting HR than HighHR (62±2 bpm vs. 81±2 bpm, *P*<0.05). Both LowHR and HighHR had similar BP increases from rest when matched on HR change to a small exercise stimulus (*P*<0.05). However, LowHR had an overall lower BPV<sub>LnLF</sub> than HighHR (*P*<0.05). No condition or group differences were observed for BPV<sub>LnVLF</sub> (*P*>0.05). **Conclusions:** A stimulus that caused an equal change in HR also caused an equal change in BP in both groups. The lower BPV<sub>LnLF</sub> in individuals with low resting HR suggests an overall lower sympathetic modulation of BP, with no differences in myogenic responsiveness between groups.

**Table 1. BP and BPV responses to a change in HR of 10 bpm.**

		Rest	EX10	Condition	P Value Interaction	Group
SBP	LowHR	117±4	133±4	<b>0.000</b>	0.509	0.450
	HighHR	113±2	131±3			
DBP	LowHR	66±3	69±2	<b>0.002</b>	0.542	0.507
	HighHR	66±2	72±2			
MAP	LowHR	86±3	94±2	<b>0.000</b>	0.332	0.556
	HighHR	86±2	97±2			
BPV <sub>LF</sub>	LowHR	6.52±1.91	8.67±1.81	0.314	0.783	0.129
	HighHR	9.92±1.71	11.15±1.62			
BPV <sub>VLF</sub>	LowHR	9.18±5.23	9.88±4.09	0.822	0.635	0.151
	HighHR	18.96±4.7	17.03±3.66			
BPV <sub>LnLF</sub>	LowHR	1.56±0.22 *	1.92±0.20	0.060	0.515	<b>0.032</b>
	HighHR	2.12±0.16	2.30±0.13			
BPV <sub>LnVLF</sub>	LowHR	1.54±0.30	1.90±0.29	0.596	0.257	0.111
	HighHR	2.42±0.30	2.29±0.32			

Data are mean±SE. BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure; MAP, mean arterial pressure; BPV<sub>LF</sub>, blood pressure variability-low frequency; BPV<sub>VLF</sub>, blood pressure variability-high frequency; BPV<sub>LnLF</sub>, blood pressure variability-naturally log transformed low frequency; BPV<sub>LnVLF</sub>, blood pressure variability-naturally log transformed very low frequency. \*significantly different than baseline based on an independent *t*-test (*P*<0.05).