

## Hypertension

High blood pressure, or hypertension, afflicts an estimated one in four American adults. This condition puts a strain on the heart and blood vessels and greatly increases the risk of stroke and heart disease.

The endogenous cannabinoid system plays a role in regulating blood pressure, though its mechanism of action is not yet fully understood.<sup>1</sup> Animal studies demonstrate that anandamide and other endocannabinoids profoundly suppress cardiac contractility in hypertension and can normalize blood pressure,<sup>2-3</sup> leading some experts to speculate that the manipulation of the endocannabinoid system “may offer novel therapeutic approaches in a variety of cardiovascular disorders.”<sup>4</sup>

The administration of exogenous cannabinoids has yielded a range of cardiovascular effects on humans and laboratory animals.<sup>5-9</sup> These effects may be influenced by various factors, including dose, route of administration, and tolerance.

Some human subjects administered cannabis and/or cannabinoids in experimental conditions experience a mild, temporary increase in heart rate and blood pressure. However, tolerance to these effects tends to develop quickly over time following repeated use and the risk of serious cardiovascular events due to the administration of either purified or synthetic cannabinoids appears to be low.<sup>10-12</sup>

Cannabinoid administration in animals has been associated with vasodilation, transient bradycardia and hypotension (lowering of blood pressure),<sup>13</sup> as well as an inhibition of atherosclerosis (hardening of the arteries) progression.<sup>14-16</sup>

Recently, human data has replicated some of these preclinical results. A 2018 observational study reported that lifetime use of cannabis is not independently associated with any increased risk of atherosclerosis in younger to middle age adults.<sup>17</sup> A 2021 study assessing the relationship between cannabis use and cardiovascular disorders in a nationally representative sampling of 57,000 US adults concluded, “After controlling for several confounding variables, we found that there was a decrease in the prevalence of cardiovascular events with marijuana use.”<sup>18</sup> However, other observational studies have yielded contradictory results.<sup>19</sup>

In one recent observational trial involving elderly subjects with hypertension, the ingestion of cannabinoids (either via oil extracts or by the inhalation of cannabis flower) over a three-month period “was associated with a reduction in systolic and diastolic blood pressure, as well as heart rate.”<sup>20</sup> Similarly, a recent literature review of 46 clinical trials involving the medical use of either purified or synthetic cannabinoids, including THC, reported that their use was frequently associated with hypotension over the course of treatment.<sup>21</sup>

Most recently, the results of a 2021 literature review of 67 studies published in the *American Journal of Medicine* concluded, “[M]arijuana itself does not appear to be independently associated with excessive cardiovascular risk factors,” although authors did caution that “it can be associated with other unhealthy behaviors such as alcohol use and tobacco smoking that can be detrimental” to cardiovascular health.<sup>22</sup>

At this time, clinical research assessing the administration of cannabinoids for hypertension is still in its infancy<sup>23</sup> and those higher-risk populations – such as those with underlying cardiovascular conditions – are typically cautioned by experts to limit their exposure to cannabis smoke.<sup>24</sup>

## REFERENCES

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