

## Magnetic Field, Blood Flow

<https://pubmed.ncbi.nlm.nih.gov/35209740/>

**Extremely low frequency electromagnetic stimulation reduces ischemic stroke volume by improving cerebral collateral blood flow** 2022  
Extremely low frequency electromagnetic stimulation (ELF-EMS) has been considered as a neuroprotective therapy for ischemic stroke based on its capacity to induce nitric oxide (NO) signaling. Here, we examined whether ELF-EMS reduces ischemic stroke volume by stimulating cerebral collateral perfusion.  
In conclusion, we showed that ELF-EMS enhances (cerebro)vascular perfusion by stimulating NO production, indicating that ELF-EMS could be an attractive therapeutic strategy for acute ischemic stroke by **improving cerebral collateral blood flow**.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5119968/>

**Mechanisms and therapeutic effectiveness of pulsed electromagnetic field therapy in oncology** 2016  
All mice exposed to PEMFs exhibited significant pyknosis, shrinkage of the tumor cell nuclei by 54% within a few minutes after PEMF therapy and by 68% within 3 h and **reduction in the blood flow in about 15 min following PEMF therapy**. These effects may be due to PEMF therapy that stimulates murine melanoma to self-destruct by triggering rapid pyknosis of tumor cell nuclei and reducing blood flow <sup>96, 97, 98, 99</sup>.

<https://academic.oup.com/asj/article/29/2/135/270272?login=false>

**Evidence-Based Use of Pulsed Electromagnetic Field Therapy in Clinical Plastic Surgery** 2009  
Diathermy-based RF PEMF has been employed in (1) double-blind clinical studies for chronic wound repair, in which actively treated pressure ulcers closed by 84% versus 40% in sham-treated wounds in one study<sup>7</sup> and 60% versus no closure in the control group in another study<sup>8</sup>; (2) studies showing that a decrease in edema in acute ankle sprains was sevenfold versus the control group<sup>9,10</sup>; (3) studies showing a pain decrease in acute whiplash injuries of 50% and a range of motion increase of 75% in treated versus control patients<sup>11,12</sup>; (4) **skin microvascular blood flow studies, in which blood flow was enhanced by about 30% in both healthy<sup>13</sup> and diabetic<sup>14</sup> individuals; and (5) studies in which postmastectomy lymphedema was reduced by 56% and skin blood flow increased fourfold.<sup>15</sup>**

<https://pubmed.ncbi.nlm.nih.gov/34300141/>

**Effects of Acute Low-Frequency Pulsed Electromagnetic Field Therapy on Aerobic Performance during a Preseason Training Camp: A Pilot Study** 2021  
Bio-electromagnetic-energy-regulation (BEMER) therapy is a technology using a low-frequency pulsed electromagnetic field (PEMF) in a biorhythmic format. BEMER has been shown to optimize recovery and decrease fatigue **by increasing blood flow in microvessels**.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9939155/>

**Is extremely low frequency pulsed electromagnetic fields applicable to gliomas? A literature review of the underlying mechanisms and application of extremely low frequency pulsed electromagnetic fields** 2022  
A system with ELF-PEMF(max. 35  $\mu$ T) was employed in multiple sclerosis with fatigue 76 and was found to **improve organ blood flow**. 77

<https://onlinelibrary.wiley.com/doi/pdfdirect/10.1111/jch.13877>

**Impact of pulsed electromagnetic field therapy on vascular function and blood pressure in hypertensive individuals** 2020  
.1 | **Flow-mediated dilatation** and blood pressure At pre-assessment, the two groups demonstrated no differences in FMD, FMD NOR, SBP, DBP, and MAP ( $P > .05$ , Table 1). After PEMF therapy, the change in FMD from pre- to post-assessment trended toward being significantly different between groups ( $P = .05$ ). The PEMF group increased FMD ( $P < .01$ , Table 2), but the control group did not change ( $P > .05$ , Table 2). Figure 1A illustrates the changes in FMD in the PEMF and the control groups. This significant difference between groups remained after normalizing FMD for hyperemia (Figure 1B). **There was an increase in FMD NOR in the PEMF group** ( $P < .05$ , table 2) after treatment; however, FMD NOR in the control group remained the same ( $P > .05$ , table 2).