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(19) **United States**(12) **Patent Application Publication**
Shafer(10) **Pub. No.: US 2005/0075701 A1**(43) **Pub. Date: Apr. 7, 2005**(54) **DEVICE AND METHOD FOR ATTENUATING
AN IMMUNE RESPONSE****Publication Classification**(75) **Inventor: Lisa Lynn Shafer, Stillwater, MN (US)**(51) **Int. Cl.⁷ A61N 1/18**(52) **U.S. Cl. 607/72**

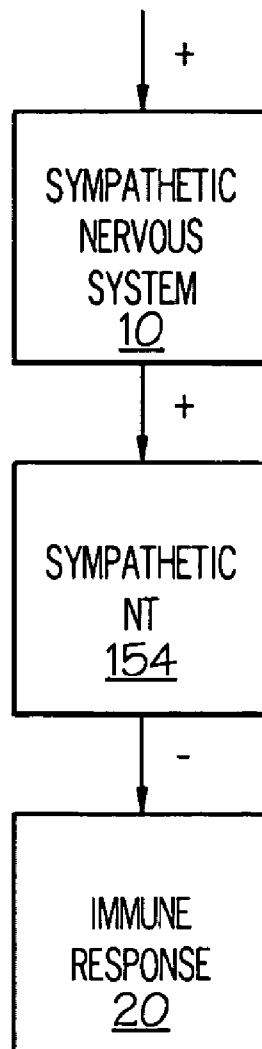
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(57)

ABSTRACT

Stimulation of one or more neurons of the sympathetic nervous system, including the splenic nerve, to attenuate an immune response, including an inflammatory immune response, is discussed. Devices and systems to stimulate the sympathetic nervous system to attenuate an immune response are also discussed. Devices discussed include pulse generators and drug pumps. Systems are described as optionally having one or more sensors and operator instructions. In specific examples, stimulation of the splenic nerve of pigs with a pulse generator is shown to be safe and effective in attenuating a lipopolysaccharide-induced immune response.

(73) **Assignee: Medtronic, Inc., Minneapolis, MN**(21) **Appl. No.: 10/820,677**(22) **Filed: Apr. 8, 2004****Related U.S. Application Data**(60) **Provisional application No. 60/507,855, filed on Oct. 1, 2003.**

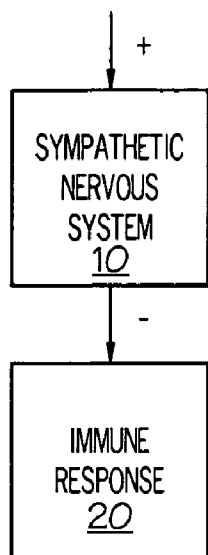


FIG. 1

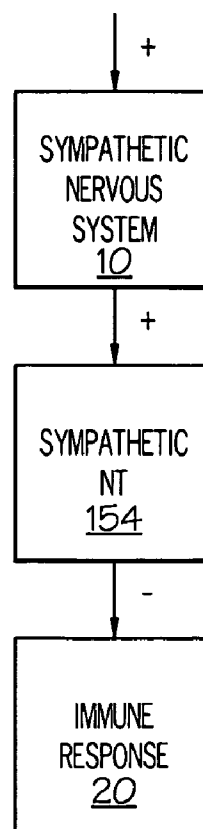


FIG. 3

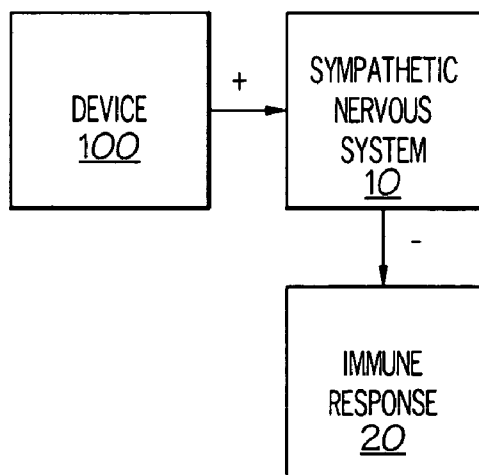


FIG. 4

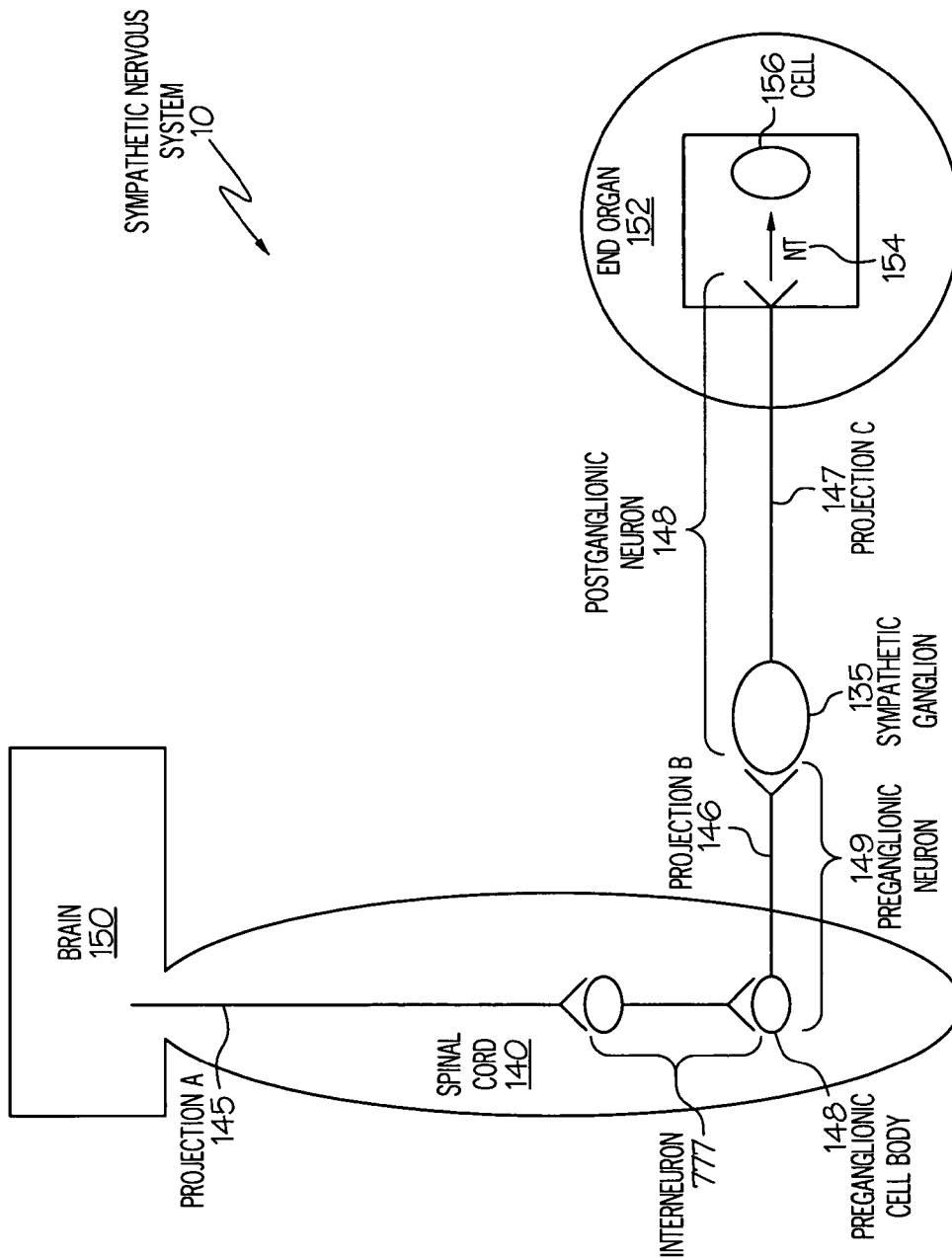


FIG. 2

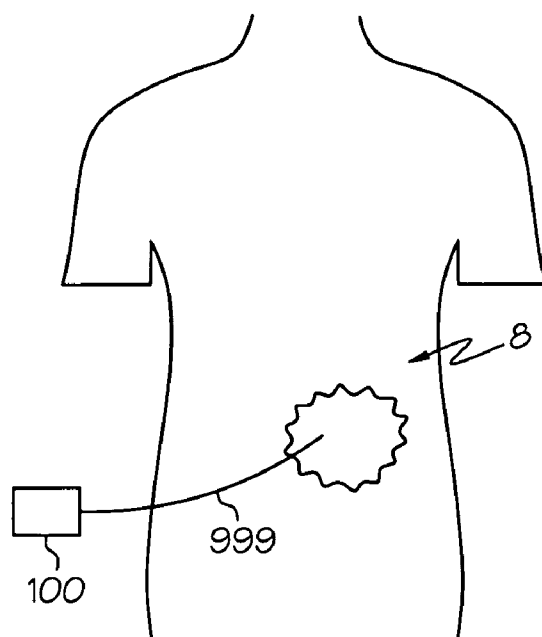


FIG. 5A

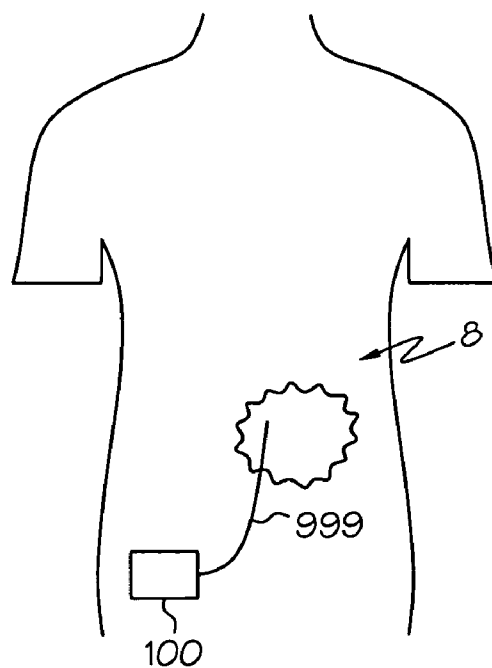


FIG. 5B

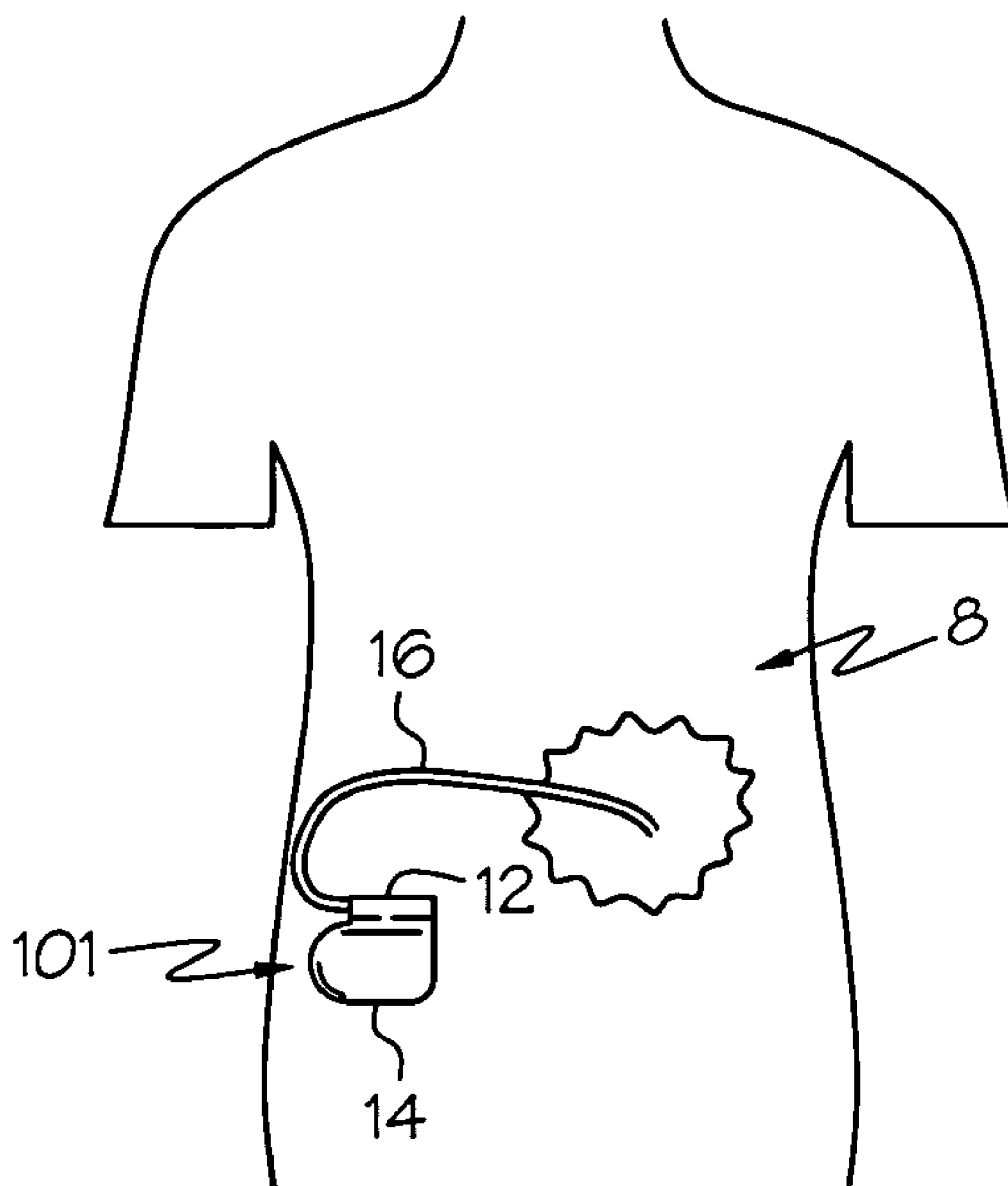


FIG. 6A

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