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(54) Title: MAGNESIUM COMPOSITIONS FOR MODULATING THE PHARMACOKINETICS AND PHARMACODYNAMICS OF INSULIN AND INSULIN ANALOGS, AND INJECTION SITE PAIN

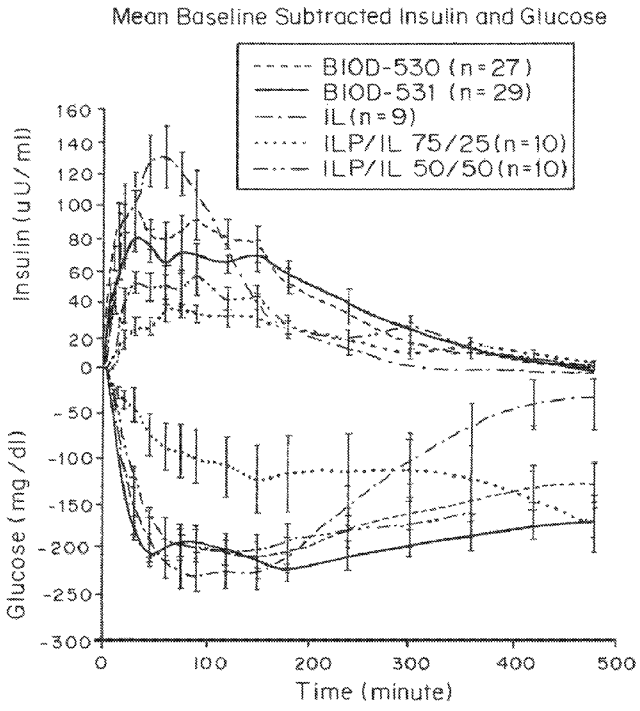


FIG. 9

(57) Abstract: Compositions and methods for modulating injection site pain associated with rapid acting injectable insulin formulations have been developed for subcutaneous injection. The formulations contain insulin in combination with a zinc chelator such as ethylenediaminetetraacetic acid ("EDTA"), a dissolution/stabilization agent such as citric acid, a magnesium salt, and, optionally, additional excipients. New presentations include rapid acting concentrated insulin formulations and a way to enhance the absorption of commercially available rapid acting analog formulations by mixing them with a vial containing dry powder excipients that accelerate their absorption. Devices for mixing excipient and insulin together at the time of administration, while minimizing residence time of the mixture, are also described.

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