Therapeutic Delivery of Nitric Oxide From Novel Diazeniumdiolated Derivatives of Acrylonitrile-based Polymers

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Technology description

Summary

Nucleophile/nitric oxide adduct ions (materials containing the X-N_2O_2- functional group; known as diazeniumdiolates or NONOates) spontaneously dissociate at physiological pH to release nitric oxide (NO) with reproducible half-lives ranging from 2 seconds to 20 hours. The bulk of the known and patented NIH compositions and methods using diazeniumdiolates are derived from amine nucleophiles (i.e., where X- is R^1R^2N-). These inventors more recently developed simple and efficient chemical methods to produce diazeniumdiolates by bonding the N_2O_2- functional group directly to carbon atoms. Using these methods, the NIH inventors have now produced and tested polymers in which the NO releasing group is attached directly to the carbon backbone of polyacrylonitrile containing polymers.

Available for licensing are compounds, compositions, medical devices, and methods of treatment using acrylonitrile-based polymers that release NO for a week or longer. Polyacrylonitrile itself, co-polymers, admixtures, and products such as cloth and hollow fiber hemofilters have been treated and shown to release NO over time. These polyacrylonitrile-based products could be useful in conjunction with medical devices where the many therapeutic actions of NO would be beneficial. Treatments using stents, extracorporeal blood tubing, shunts, wound dressings and many other devices could be greatly improved by NO actions including but not limited to prevention of clotting, promotion of tissue vascularization, and reduction of excessive tissue proliferation.

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