

ENGINEERED ACTIVE SINGLE POLYPEPTIDE CHAIN INSULIN ANALOGS (SPC-Insulin)

Summary

WHO has listed insulin as one of essential medicines for the top popular (1 in 4 adults in USA) disease of diabetes. This invention is a SPC-insulin, which has 3-5 times of longer acting duration than that of Insulin Regular. The SPC-insulin is a new generation active insulin because it has an "upgraded" structure from less-stable two chains to more-stable one chains. All commercial insulins and analogs remain two-chain configuration linked by disulfide bonds, which are readily (4-6 mins) reduced into inactive a- and b-chains once they are free in circulation. In comparison, the SPC-insulin linked a- and b-chains together could remain their configuration longer even the disulfide bonds are reduced, which results a longer half-life and acting duration. Testing on normal and type-1 diabetic mice, the unmodified recombinant SPC-insulin showed an active duration up to 30-48 hours, which is 3-5-fold longer than that of the regular insulin under the same unmodified condition (such as Humulin R). The SPC-insulin also provides a basic structure to be further easily modified into even longer acting forms using known chemical and biochemical approaches.

Competitive Advantages

- Regular insulins (such as Humulin R, Norvolin R) can only last 6-8 hours. The SPC-insulin can last 30-48 hours.
- Current recombinant insulin production are produced by multiple (3-4) steps. The SPC-insulin could be produced in "one-step" to save time and costs.
- The SPC-insulin could be a new generation insulin to be further modified into breaking-record long-acting insulin analogs.

Meet the Inventor

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Problem Addressed

- Commercially available regular insulins have short half-life and require multiple injections.
- Commercially available insulins and analogs remain two-chain configuration linked by disulfide bonds, which are readily reduced into inactive a- and b-chains once they are free in circulation
- Production of commercially available recombinant insulins needs multiple steps

Applications

- Diabetes therapy in humans or veterinarian applications
- Upgrading the existing regular insulins to reduce the injection frequencies and stabilize glucose levels longer on diabetes patients
- Replacing and/or an addition of the current long-acting insulin analogs

Patents

- US 62/739,776

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