Novel glucagon-like peptide-1 drugs designed for type 2 diabetes

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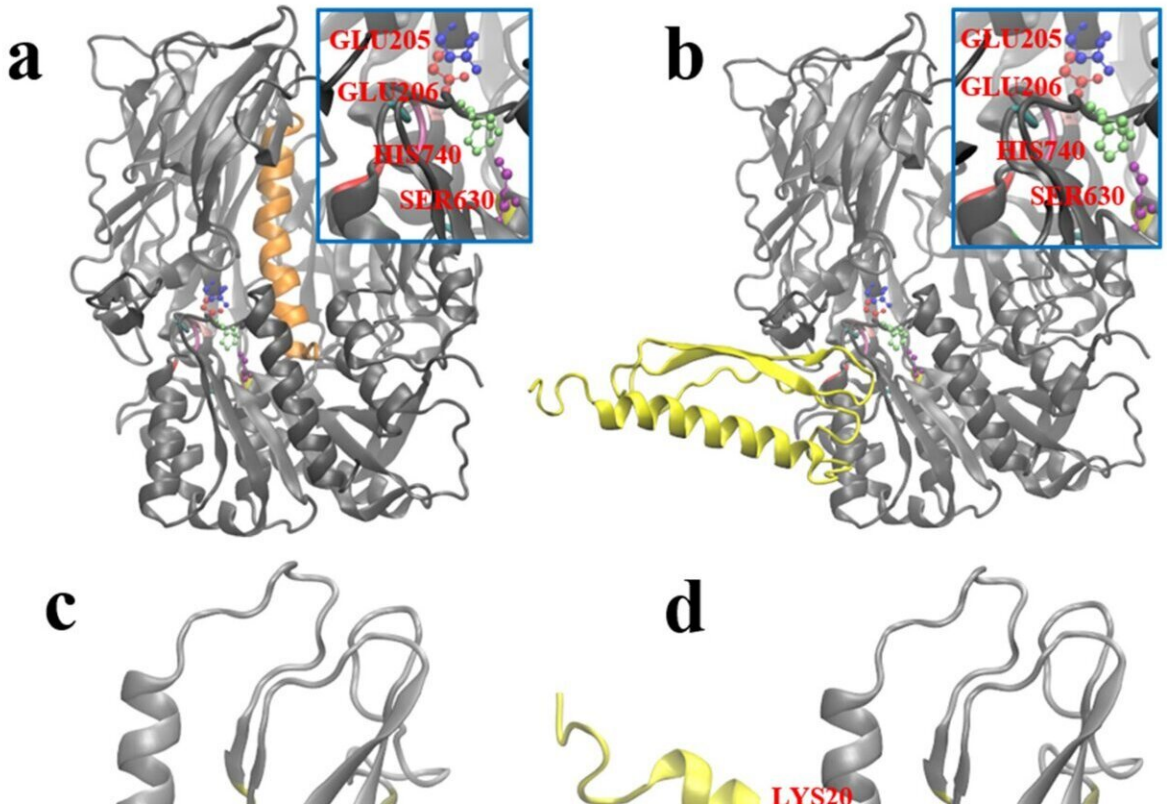

Molecular docking between GLP-1 analogs and GLP-1 receptor and DPP-4. Credit: Wang Peng

Novel glucagon-like peptide-1 (GLP-1) drugs were designed and industrially prepared by researchers at the Hefei Institutes of Physical

Science of the Chinese Academy of Sciences through molecular design, strain construction, isolation and purification, and animal experiments, according to a paper published in *Pharmaceuticals*.

"The GLP-1 analogs we developed boast stable and hypoglycemic effects," said Sun Lei, first author of the paper.

GLP-1 can promote pancreatic beta cells synthesis, insulin secretion and inhibition of glucagon release, which has a good therapeutic effect on type 2 diabetes. However, natural GLP-1 is easily degraded by dipeptidyl peptidase-4 (DPP-4) in human body, limiting its therapeutic effect on type 2 diabetes mellitus. At present, the global output value of GLP-1 analogs has reached tens of billions of dollars, and highly stable GLP-1 drugs are a research hotspot.

In this study, on the basis of in-depth analysis of the molecular structure of human GLP-1, DPP-4 and GLP-1 receptors, a variety of GLP-1 analogs binding to the fusion protein fragments were designed, and then high-purity samples were prepared by industrial production.

Animal experiments showed that this GLP-1 analog could effectively prevent the degradation of the DPP-4, and the hypoglycemic duration was more than 24 hours, indicating a high potential for commercial application.

This study provides a new way for the design and industrial production of novel protein drugs based on synthetic biology.

More information: Lei Sun et al, Rational Design by Structural Biology of Industrializable, Long-Acting Antihyperglycemic GLP-1 Receptor Agonists, *Pharmaceuticals* (2022). DOI: 10.3390/ph15060740

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