IPA's BioStrand LENS^{ai}™ integrates advanced HYFT™ technology to enhance LLMs and accelerate antibody discovery

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BioStrand's LENS^{ai} has incorporated its proprietary HYFT technology as the semantic source input for their Large Language Models (LLMs). Large language models are a type of artificial intelligence models trained on extremely large datasets to understand and predict new content. The integration of HYFT technology and LLMs enables a better and more accurate understanding of complex biological systems and facilitates the discovery of novel therapeutic targets by connecting biological information that appears otherwise unrelated.

The complexity of biological information is that it relates to multiple dimensions such as functions of proteins, 3D structures of molecules, genetic information involving the whole process of translating DNA code into RNA and proteins, and much more. All these dimensions need to be captured to understand biological systems and create meaningful predictions and insights.

HYFT technology uses unique patterns found in nature to create a huge network of connections that help us understand how things are related. Unlike other methods and technologies, the unique feature of HYFTs is its ability to connect in one single network crucial dimensions in biology such as sequence information (DNA, RNA or amino acids), information on 3D structures of proteins, function and information found in scientific literature and other sources of knowledge. This HYFT network contains over 660 million HYFT patterns and 25 billion relations (connections). Although LLMs are trained on big datasets, they lack 'understanding' of complex biological systems. HYFT technology helps overcome a big problem for LLMs in biotechnology, where computer programs need to grasp the inter-related nature of all biological information to give useful results. By using HYFT patterns as "words", which carry information and knowledge and thus are connected meaningfully, they introduce 'meaning' to LLMs.

With the help of the HYFT network, these programs can better understand the specific context and connections in biology, become better at interpreting biological information, making valuable predictions and uncover new information and insights.

Dr. Dirk Van Hyfte, Head of Innovation and Co-Founder at BioStrand, stated, "The integration of HYFT technology into our LLMs marks a transformative moment in biotechnology. We start to understand the 'language of biology'. We are now able to tap into a wealth of explicit information on the entire biosphere, enabling us to more efficiently determine and visualize the connectedness of different entities. The integration of HYFT technology with the most recent AI developments such as LLMs but also with the 3D protein structure prediction capabilities of AlphaFold-2, a protein structure analysis AI created by DeepMind, an Alphabet business focused on artificial intelligence, as well as ESM-2, a ground-breaking approach developed by Meta AI researchers to predict protein structure, creates a very powerful system for our AI-based learning. This next-level improvement will accelerate our antibody discovery process and may open new possibilities in precision medicine."

Key benefits of incorporating LENS^{ai} HYFT technology into BioStrand's LLM include:

- Enhanced biological language understanding, enabling BioStrand's LLMs to generate more accurate and meaningful insights.
- A comprehensive knowledge graph of over 25 billion relationships, empowering fine-grained levels of exploration.
- Superior context understanding through the integration of HYFTs with structural prediction capabilities.
- Application of AI and machine learning techniques in antibody discovery and precision medicine, potentially leading to the development of novel therapies.
- Efficient and insightful wet-lab experiments supported by up-to-date and complete information and predictions from in silico models.

The combination of BioStrand's AI-driven approach and IPA (ImmunoPrecise Antibodies)'s best-in-class laboratory capabilities creates a powerful synergy that will revolutionize antibody discovery across various therapeutic domains. This innovative collaboration demonstrates ImmunoPrecise's commitment to advancing the field of biotechnology through the application of cutting-edge AI-driven technologies and state-of-the-art laboratory expertise.

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