Novel treatment with PPAR modulators for metabolic diseases

THE CHALLENGE

Metabolic syndrome affects about 25% of the global population, encompassing conditions like abdominal obesity, insulin resistance, elevated triglycerides, low HDL cholesterol, and hypertension, which increase the risk of type 2 diabetes, dyslipidaemia, hepatic steatosis, and cardiovascular diseases. Current treatments often involve multiple medications, including metformin, PPARγ agonists, SGLT2 inhibitors, and GLP-1R agonists for diabetes management, as well as statins and PPARα agonists for dyslipidaemia. However, these treatments come with significant side effects.

Researchers at the Biomedical Research Institute INCLIVA and the University of Valencia have developed a **dual PPARα/γ agonist and pan-PPAR modulator**. This small molecule shows promise in regulating lipid levels, maintaining glucose balance, reducing inflammation, and improving vascular function. This innovative approach aims to address the root causes of metabolic disorders while minimizing the adverse effects associated with current treatments.

TECHNOLOGY DESCRIPTION

Researchers have identified a novel quinoline and prenylated tetrahydroquinoline, THQ 5a, capable of partially inhibiting the activity of peroxisome proliferator-activated receptors (PPARs), including PPARα, PPARβ/δ, and PPARγ. Treatment of obese (ob/ob) mice with THQ 5a has led to improvements in lipid and glycemic parameters, such as reduced blood glucose and insulin levels, as well as decreased levels of total and non-HDL cholesterol.

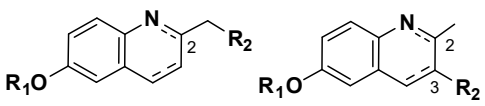

Figure. THQ 5a molecular structure

APPLICATION SECTORS

Health and Medicine: Drug development in metabolic disorders.

OBJECTIVE OF THE COLLABORATION

The institution seeks a **collaboration** with a biotechnology or pharmaceutical company for the **commercial exploitation of its invention**. The preferred approach is a technology transfer agreement through sale or licensing (exclusive or non-exclusive), with potential collaboration in further development for practical applications. However, the specific terms and conditions of the collaboration are open for discussion if there is interest in the technology.

ADVANTAGES

- ✓ It acts as a partial agonist or modulator, **minimizing the side effects** commonly associated with current treatments.
- ✓ It has demonstrated a significant **reduction in non-HDL cholesterol levels in preclinical mouse studies**, without elevating hepatic transaminases and indicating a low risk of hepatotoxicity.
- ✓ It **regulates lipid profiles** and **maintains glucose homeostasis**, positioning it as a promising therapy for various metabolic disorders, including metabolic syndrome.

STAGE OF DEVELOPMENT

The current Technology Readiness Level (TRL) of this technology is 3. It has undergone ***in vitro*** **and** ***in vivo*** **testing**, including trials with primary cultures in cells and mice, yielding satisfactory results.

INTELLECTUAL PROPERTY RIGHTS

European patent application (**EP24382406**) has been submitted in 2024 to protect this technology. Shared ownership with the University of Valencia.

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