

(54) Title of the invention : NOVEL THIAZOLIDIN-4-ONE-HYDRAZIDE DERIVATIVES AS MODULATORS OF ADIPOCYTE DIFFERENTIATION AND GLUCOSE UPTAKE

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## (57) Abstract :

The present invention relates to novel thiazolidin-4-one-hydrazide derivatives useful as modulators of adipocyte differentiation, glucose uptake, insulin sensitivity, and glucose homeostasis. More particularly, the invention provides structurally distinct 3-amino-N'-(3-(4-oxo-2-phenylthiazolidin-3-yl)benzoyl)benzohydrazide derivatives comprising substituted aromatic moieties selected from trifluoromethyl, fluoro, chloro, methoxy, and related functional groups. The disclosed compounds demonstrate enhanced intracellular glucose uptake, improved adipocyte differentiation, and selective upregulation of GLUT4 expression with comparatively controlled PPAR $\gamma$  activation. The invention further provides pharmaceutical compositions comprising the disclosed derivatives together with pharmaceutically acceptable carriers or excipients. In-vitro biological evaluation using differentiated 3T3-L1 adipocyte models demonstrated enhanced glucose transport activity, adipogenic maturation, favorable cellular tolerability, and modulation of adipogenic transcriptional markers including GLUT4, PPAR $\gamma$ , and C/EBP $\alpha$ . The disclosed compounds are useful for prevention, management, or treatment of type 2 diabetes mellitus, insulin resistance, impaired glucose tolerance, metabolic syndrome, obesity-associated metabolic dysfunction, and related metabolic disorders.

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