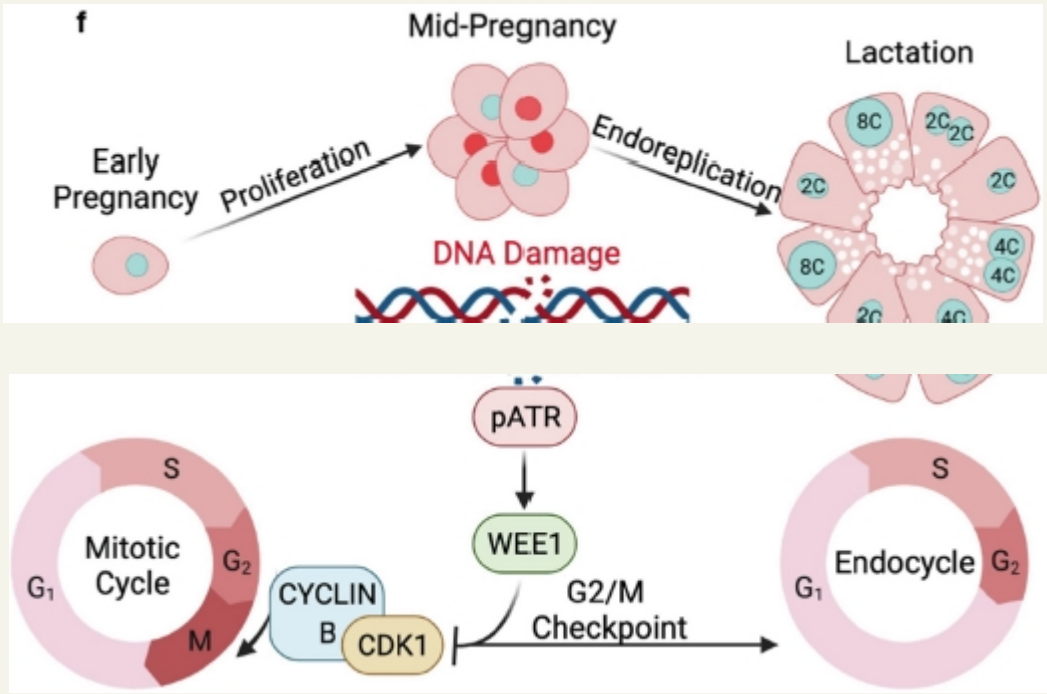


through G2/M checkpoint activation .

TECHNOLOGY DESCRIPTION

Administration of a CDK1 inhibitor, particularly one that targets mammary gland alveolar cells, to a lactating mammalian subject increases milk production. CDK1 inhibitors include DNA damaging agents.



Cartoon representing the regulation of alveolar endoreplication by the ATR-DNA damage response pathway. Proliferation of alveolar cells results in accumulation of DNA damage during pregnancy and activation of the ATR pathway. As a result, ATR mediates the transition from a mitotic cell cycle into an endocycle through the activation of the CDK1 inhibitor WEE1, which activates the G2/M checkpoint and regulates alveolar endoreplication during lactation.

Physiological DNA damage accumulates during the extensive cell proliferation of mid-pregnancy and drives endoreplication and terminal differentiation through G2/M checkpoint activation at the onset of lactation. This mechanism involves the activation of the ATR-mediated DDR to replication stress, and the subsequent activation of the G2/M checkpoint. WEE1 governs this process, revealing a novel role for this CDK1 inhibitor in the regulation of mammalian endoreplication.

The CDK1 inhibitor can work through a number of different mechanisms:

It can increase the expression of the Wee1 like protein Kinase or it can be a DNA damanging agent, such as a DNA intercalating agent like an anthracyline such as doxorubicin. The DNA damaging reagent can be an inhibitor of ribonucleoside diphosphate reductase such as hydroxyurea. It can also be an inhibitor of CDK1 such as a CDK1 antisense mRNA or other inhibitory mRNA like an siRNA or miRNA.

APPLICATIONS

- ▶ Increasing milk production in a bovine, ovine, caprine, or camelid.
- ▶ Increasing milk, production in a lactating human.

ADVANTAGES

Increases milk production without the use of growth hormones.

INTELLECTUAL PROPERTY INFORMATION

Country	Type	Number	Dated	Case
United States Of America	Published Application	20240374626	11/14/2024	2023-910

Additional Patent Pending

RELATED MATERIALS

► [Physiological DNA damage promotes functional endoreplication of mammary gland alveolar cells during lactation](#) - 04/17/2024

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

► [Compositions and Methods Useful in Promoting Milk Production](#)