NEW PHYTOCHEMICAL BASED COCKTAIL FOR IN VITRO ADIPOCYTES DIFFERENTIATION

F.A. ABDUL MAJID1, M. TAHER1 AND M.R. SARMIDI2
1Department of Bioprocess, 2Chemical Engineering Pilot Plant, Faculty of Chemical and Natural Resources Engineering, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor.

Research objective:
To replace expensive compound for adipocytes differentiation with phytochemicals

ADIPOCYTES
Play a major role in energy homeostasis in the organism
Function is to synthesize and store triglycerides at times of caloric excess and to mobilize these stores when Caloric intake is low
Widely used for in vitro endocrinology study (3T3-L1)

Mechanism of ADIPOCYTES DIFFERENTIATION
In vivo: Transformed from preadipocytes
In vitro: differentiation cocktail containing
1) 1-methyl-3-isobutyl xanthine (a synthetic glucocorticoid, activates the glucocorticoid receptor pathway).
2) IBMX, Dexamethasone (cAMP phosphodiesterase inhibitor, increase intracellular cAMP)
3) Insulin (is known to act through the insulin like growth factor 1 (IGF-1) receptor)

Recent study (Taher, 2004) Cinnamtannin B1 (CB1) Mimic Insulin by facilitate cells glucose uptake.

Research Methodology

<table>
<thead>
<tr>
<th>Day</th>
<th>Sample 1 (Negative control)</th>
<th>Sample 2 (Positive control)</th>
<th>Sample 3 (Treated sample)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No inducer</td>
<td>Dex. 0.25 mM IBMX 0.5 mM Insulin 1 mg /mL</td>
<td>Dex. 0.25 mM IBMX 0.5 mM Cinnamtannin B1 100 mg/mL</td>
</tr>
<tr>
<td>2</td>
<td>No inducer</td>
<td>Insulin 1 mg /mL</td>
<td>Cinnamtannin B1 100 mg/mL</td>
</tr>
</tbody>
</table>

CONCLUSION
Cinnamtannin B1 could be used to replace insulin for adipocytes differentiation

Lipid Droplets Formation in Differentiated Adipocytes

Lipid Droplets accumulation (a) and glucose uptake (b) in tested cells

CONCLUSION
Cinnamtannin B1 could be used to replace insulin for adipocytes differentiation

Acknowledgement:
MOSTI, IRPA VOT 74054, Dr Norimah Yusof, Dr, Shaharuddin Mohammad, MINT, CEPP, UTM