



**Dietary proteins and serine
proteases stimulate
secretion of satiety
hormones by the STC-1 cell
line**

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Obesity

- Impaired balance between energy intake and energy expenditure
- Weight loss of 5-10% beneficial for health
- Long-term treatments for weight loss often unsuccessful
- Search for new treatments --> dietary protein is a good candidate
- High-protein diets lead to increased satiety ¹
- High-protein diets lead to increased levels of satiety hormones ¹
- Which proteins induce secretion of satiety hormones ?

¹ Westerterp-Plantenga et al.; Int. J. Obesity; 2006



Satiety hormones - CCK

- Regulation of gut motility
- Contraction of gall bladder
- Pancreatic enzyme secretion
- Inhibition of gastric emptying
- Inhibition of food intake

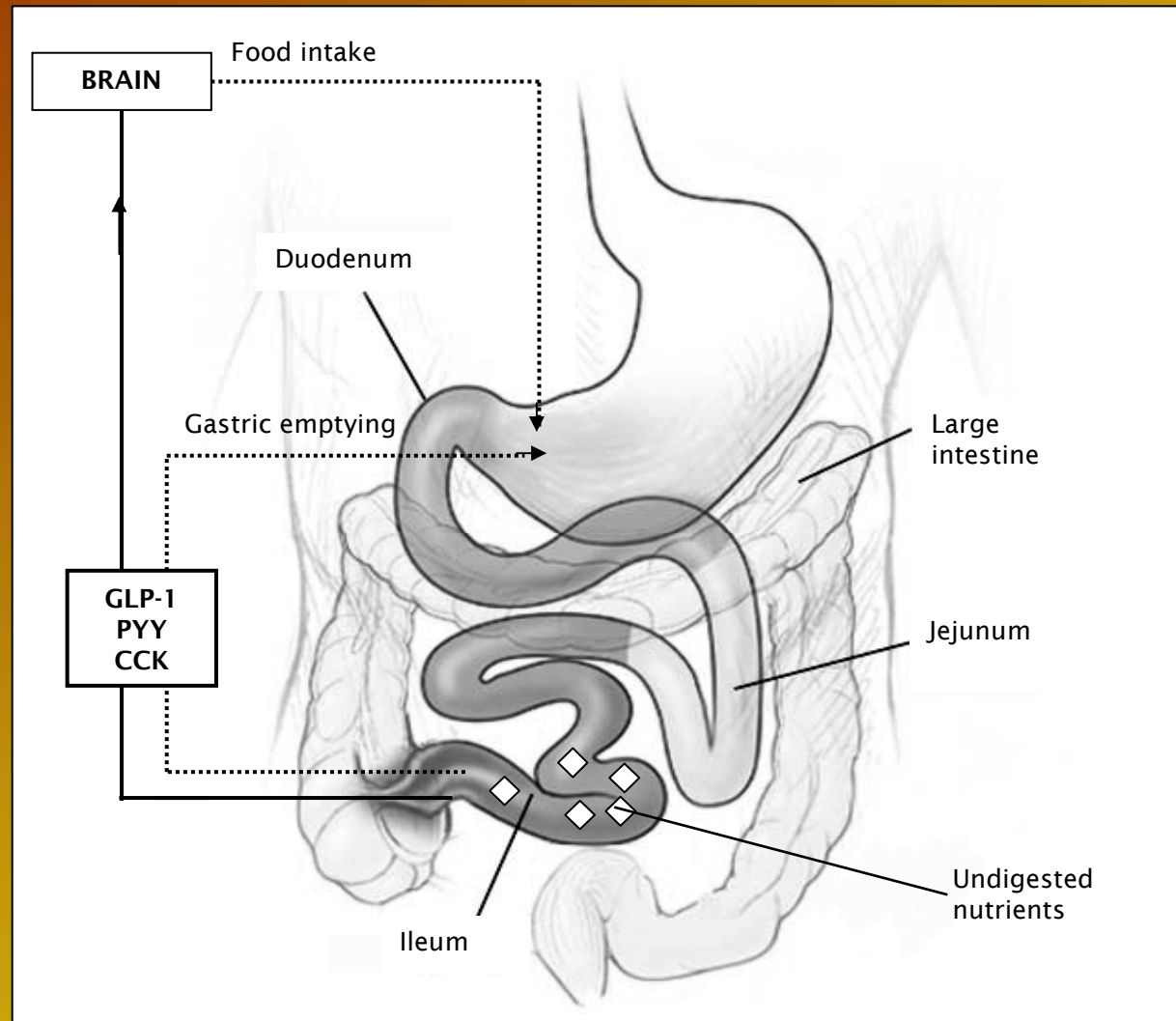


Satiety hormones - GLP-1

- Inhibition of food intake
- Stimulation of insulin secretion
- Inhibition of glucagon secretion
- Released upon food intake
- GLP-1 levels fall rapidly, due to renal clearance and breakdown by dipeptidyl peptidase IV (DPP-IV)
- Inhibitors for DPP-IV are chemical products
- New treatments for diabetes: GLP-1 analogs and DPP IV inhibitor



'Ileal Brake'

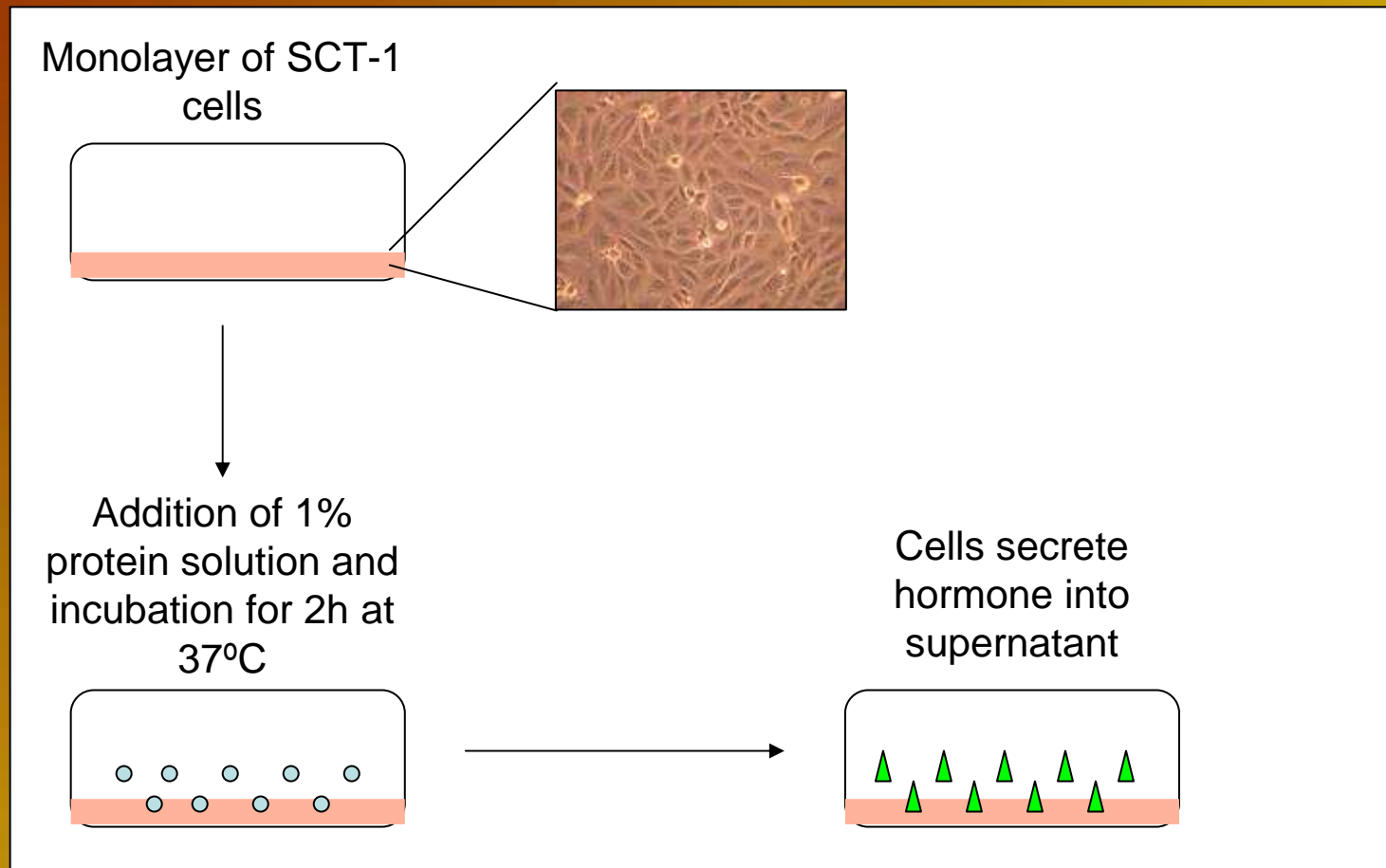


Hypothesis

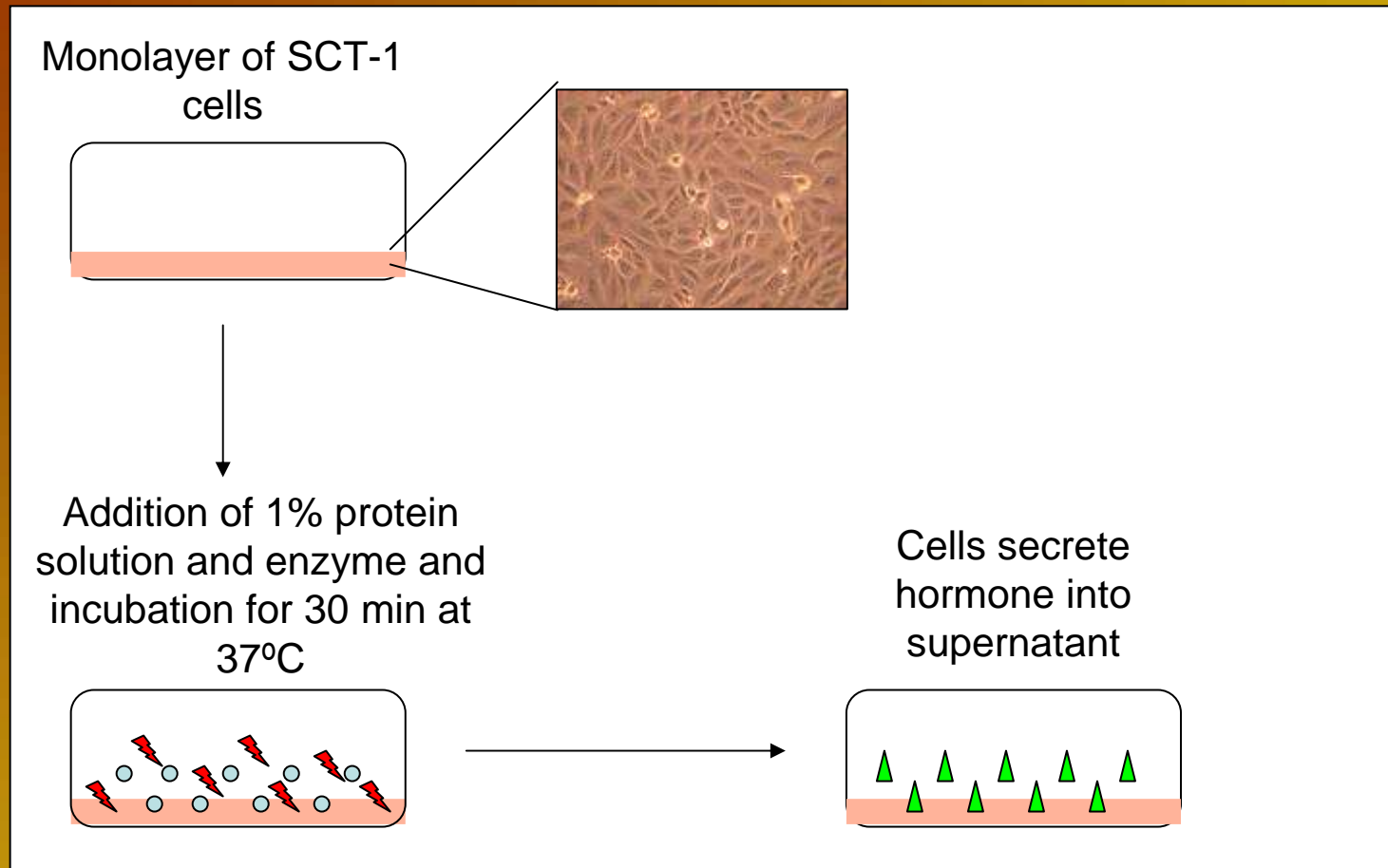
**Dietary proteins are able to increase the release
of satiety hormones through inhibition of
serine proteases**



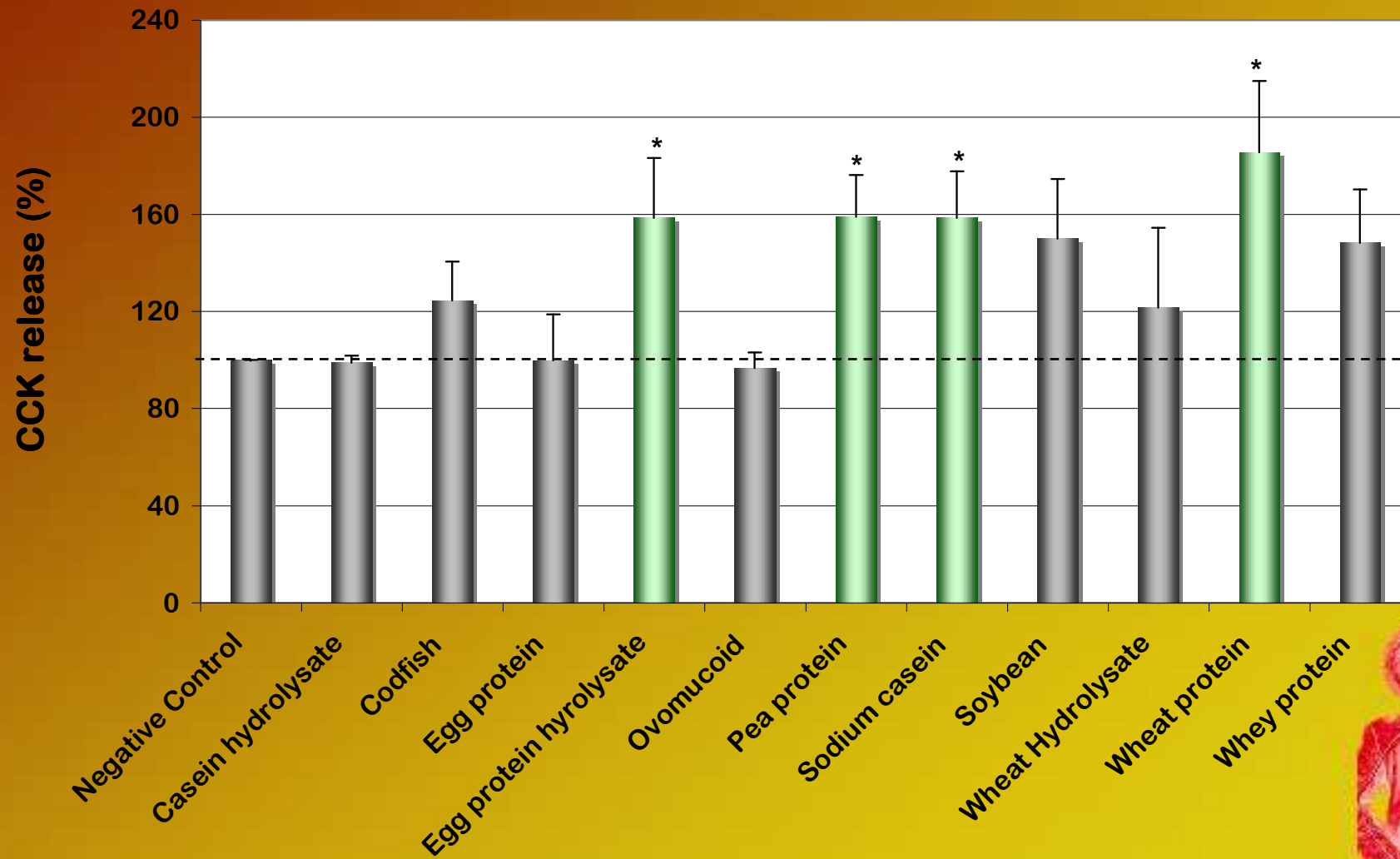
Direct effects



Indirect effects



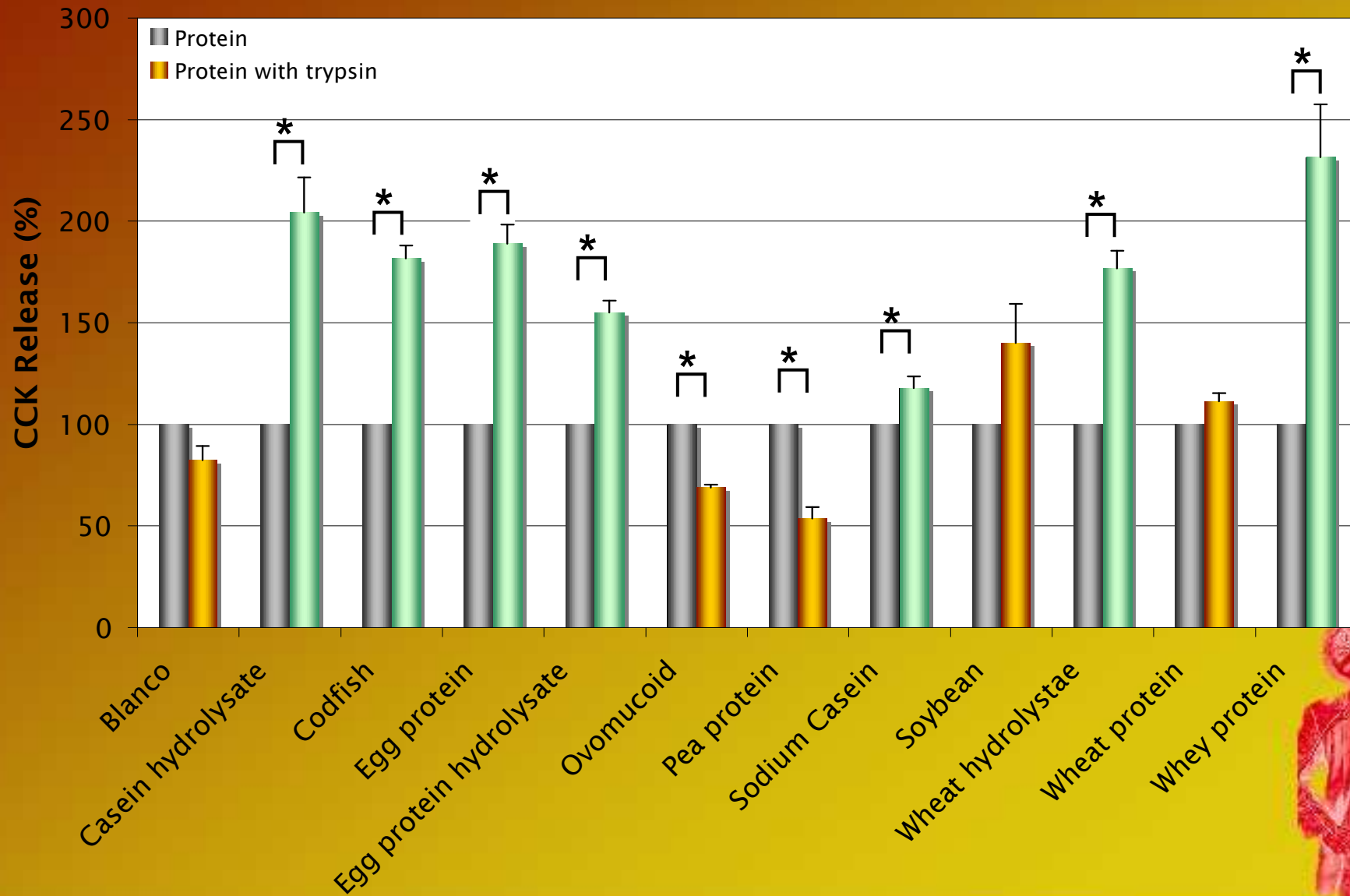
Direct effects on CCK release



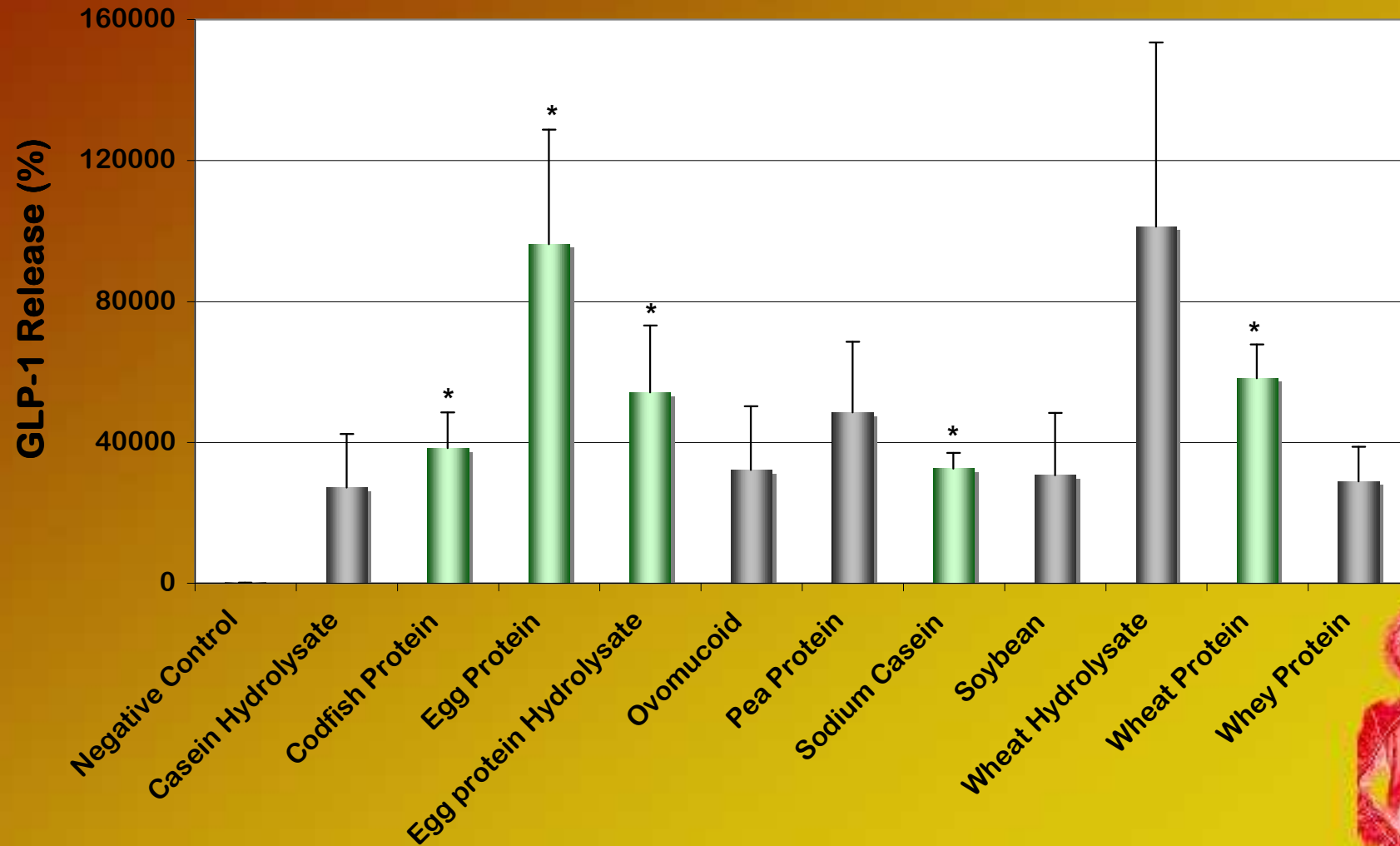
* $p \leq 0.05$



Indirect effects on CCK release in combination with trypsin



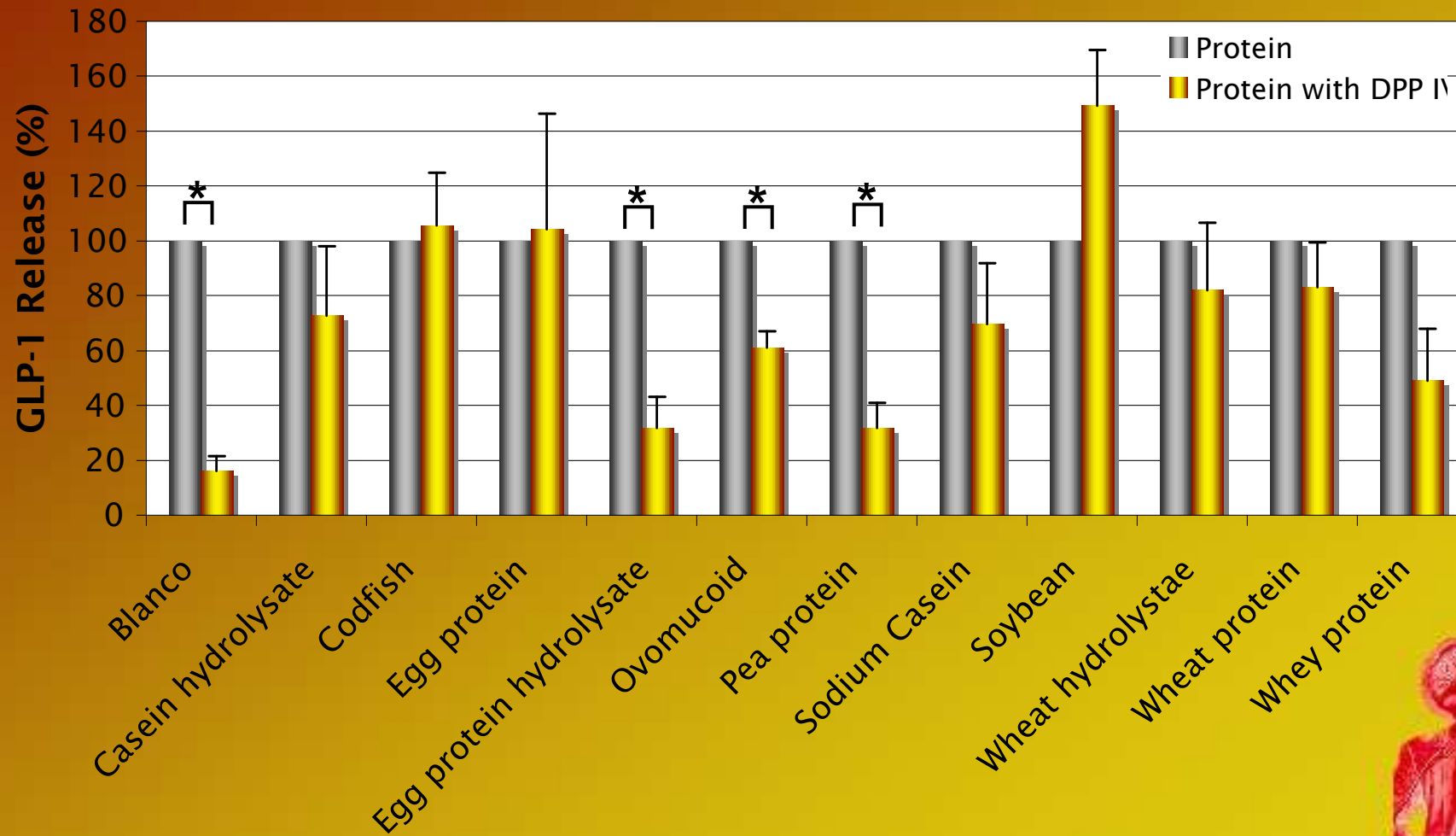
Direct effects on GLP-1 release



* $p \leq 0.05$



Indirect effects on GLP-1 release in combination with DPP IV



Discussion

- Cells are very sensitive, release of satiety hormones fluctuate every day --> using a standard control each measurement
- Addition of trypsin to negative control did not result in decreased levels of CCK --> use of human trypsin
- RIA used for GLP-1 measurements was the total GLP-1 assay, in stead of the active GLP-1 RIA



Conclusion

In a series of ten frequently used dietary proteins and hydrolysates, wheat, codfish, egg, egg hydrolysate, and sodium casein seem to be most potent proteins to be used as dietary ingredients in the treatment of obesity



Objectives

- *Ex vivo* measurements of effects of the most potent proteins on human biopsies and animal tissue
- *In vivo* experiments of the effects of the most potent proteins on satiety, satiety hormone levels, and food intake



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Questions?

