

# **Dissection of the signaling mechanism for capsule detachment of lipid droplets in rat adrenocortical cells**

馮琮涵

Fong TH and Wang SM

摘要

## **Abstract**

In a previous study, we used a monoclonal antibody, A2, to demonstrate the presence of the lipid droplet-specific capsule in adrenocortical cells and the stimulation of steroid secretion with adrenocorticotrophic hormone (ACTH), resulting in the detachment of this capsule from the droplet surface into the cytosol. To investigate the signaling pathway for this event, we tested the role of adenylate cyclase, cAMP, and protein kinases A and C (PKA and PKC) in this response. ACTH-induced decapsulation of lipid droplets was blocked by either adenylate cyclase inhibitor or PKA inhibitor and stimulated by Bt2cAMP. We conclude that the signaling mechanism involved in lipid droplet decapsulation is the cascade consisting of adenylate cyclase activation, cAMP elevation, and subsequent PKA activation. Furthermore, the cytosolic detached capsular protein was able to relocate to the lipid droplet surface on cessation of ACTH or Bt2cAMP stimulation. In addition to PKA-mediated decapsulation, inhibition of PKC by calphostin C alone was enough to induce decapsulation, a process that was independent of PKA activity, whereas activation of PKC could prevent Bt2cAMP-induced decapsulation. A cAMP radioimmunoassay also confirmed that ACTH caused a marked increase in intracellular levels of cAMP, while PMA or calphostin C caused no significant changes. We conclude that PKA and PKC are reciprocally operated to regulate the decapsulation of lipid droplets, the same mechanism adopted in steroidogenesis. A time-course study also indicates that decapsulation of lipid droplets was accompanied by detectable changes in the size and the area of lipid droplets upon the stimulation of Bt2cAMP or calphostin C, implying a possible coupling between the capsule detachment and steroidogenesis. *J. Cell. Biochem.* 65:67-74. © 1997 Wiley-Liss, Inc.