

## EM·X GOLD stimulates fruiting body formation in cellular slime mold *Dictyostelium discoideum* through modulation of cAMP synthesis

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**Objectives:** EM·X GOLD is a soft drink produced by using “Effective Microorganisms(EM)”, a microbial consortium consisting mainly of yeast, lactic acid bacteria and photosynthetic bacteria. Over the years, EM has proved effective in improving farming soil as well as in cleaning rivers and lakes. More recently, lines of evidence have been accumulated regarding therapeutic effects of EM·X GOLD for human diseases. How it functions, or what is the cellular target towards EM·X GOLD, however, still remains an enigma. **Methods:** In an attempt to get a clue for its action mechanism, we adopted, as a model, cellular slime mold *Dictyostelium discoideum*. This organism possesses multifaceted life cycle, such as growth as single amoeboid cell, aggregation by autonomous cAMP production, and differentiation phase, which leads to formation of multicellular structure, the fruiting body. These features enable us to focus the analytical window on a specific phase of life cycle. We report here the stimulating effect of EM·X GOLD on fruiting body formation through modulation cAMP synthesis. A defined number of amoeba cells were spotted, in step-wise dilutions, onto agar containing no or a certain % of EM·X GOLD. **Results:** Visual inspection revealed longer aggregating-streams in EM·X GOLD group, suggesting the elevated cAMP production and relaying. Also found was that, in the presence of EM·X GOLD, fruiting bodies were generated from fewer number of amoeba cells. The direct measurement of cAMP production was carried out with amoeba cell suspension culture. The oscillation profile of cAMP production was observed as expected but with a slight increase of the base line. More remarkably, however, the cycle time of oscillation was found to be significantly shortened from its control 7 minutes to 6 minutes in EM·X GOLD group. **Conclusions:** Based on the hypothesized multigene network regulating periodic cAMP production, we are currently trying to pin down which member(s) of these players is responsible for producing the observed effect. We presume EM·X GOLD exerts its effect through epigenetic modulation of gene(s) involved in cyclic oscillation of cAMP synthesis.