Screening of photoactivated adenylyl cyclases encoded by *Naegleria gruberi* strains NEG-M and EG

Ayaka KITA[1], Takatsugu KAJINO[2], Baku YAMAMORI[2], Kenji YAGITA[3] and Hiro YASUKAWA[2]

([1]Fac. Engn., Univ. Toyama, [2]Grad. Sch. Sci. Engn., Univ. Toyama, [3]Dept. Parasitol., Nat. Inst. Infect. Dis.)

SUMMARY

Screening in databases has revealed that the free-living amoeba *Naegleria gruberi* NEG-M encodes photoactivated adenylyl cyclases (PACs) designated NgPAC1 (consisting of 390 aa), NgPAC2 (392 aa) and NgPAC3 (498 aa). Each of the *Naegleria* proteins bears a "sensors of blue -light using FAD" domain (BLUF domain) and an adenylyl cyclase domain (AC domain). *Escherichia coli* expressing NgPAC1, NgPAC2 or NgPAC3 showed increased sensitivity to fosfomycin when incubated under blue light (470 nm), indicating that these proteins increased cellular cAMP levels when irradiated by the light. NgPACs are promising tools in molecular and cellular biology for photomanipulation of the intracellular cAMP level in bacterial systems. We screened orthologs of NgPAC in *N. gruberi* EG by PCR and found that the organism encodes at least five proteins similar to NgPAC.