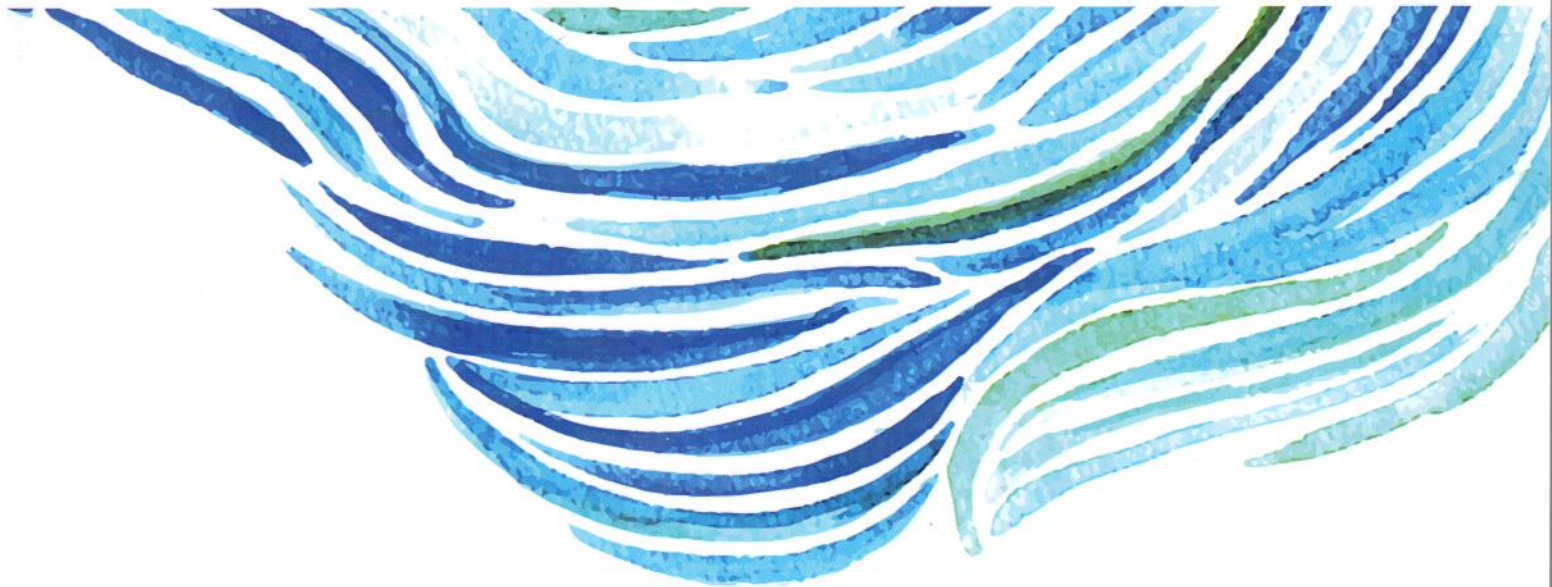


제33회 한국조류학회 학술발표대회 및 정기총회

2019 Annual Meeting of the Korean Society of Phycology




2019. 10. 24 ~ 10. 25

군산대학교 황룡문화관

주최:  **한국조류학회**
THE KOREAN SOCIETY OF PHYCOLOGY

 **FIRA** | 한국수산자원공단
KOREA FISHERIES RESOURCES AGENCY

주관:  **한국조류학회**
THE KOREAN SOCIETY OF PHYCOLOGY

후원:  **한국물학술단체연합회**
Korea Federation of Water Science and Engineering Societies

기조강연			황룡문화홀 (1층)
9:00~9:40	PL II	Benthic Dinoflagellates in the Coast of Jeju Island	좌장: 박명길
		이준백	

Break Time

신진연구자발표			황룡문화홀 (1층)
			좌장: 윤환수

9:50~10:10	AO-01	Algal genome evolution and environmental adaptation	
		JunMo Lee	
10:10~10:30	AO-02	Anthracene phytotoxicity in the freshwater flagellate alga Euglena agilis Carter	
		Jihae Park, Sreejith Kottuparambil	
10:30~10:50	AO-03	Ice-Binding Proteins of the Arctic Chloromonas induced by low temperature: its rarity and the association with the cold-signaling pathway	
		Sung Mi Cho, Sanghee Kim, Han-Gu Choi, Jungeun Lee	
10:50~11:10	AO-04	Sequencing the nuclear genome of Undaria pinnatifida and the future of mariculture industry	
		Louis Graf, Hwan Soo Yoon	

휴식 및 점심시간 (11:10 - 13:00)

특별세션		바다숲의 가치와 발전방향	황룡문화홀관 (2층)
SC-04			좌장: 김영식, 최한길

9:50~10:10	SC IV -01	우리나라 바다숲의 경제적 가치와 미래방향	
		강석규	
10:10~10:30	SC IV -02	바다숲 조성기법별 효과분석 및 향후 조성관리에 대한 고찰	
		박영철, 유재원, 정수영, 김성태, 오태건, 최미경	
10:30~10:50	SC IV -03	갯녹음 생태계 영향 연구	
		최창근, 정승욱, 김현우	
10:50~11:10	SC IV -04	"혁신산업기술 활용" 바다숲 해양 생태정보 무인탐색 시험연구	
		김현경, 최미경, 좌용현, 전병희, 하승연	

휴식 및 점심시간 (11:10 - 13:00)

특별세션		조류의 응용과 가치	강의실 (2층)
SC-05			좌장: 진연선

9:50~10:10	SC V-01	미세조류를 이용한 기체상 오염물질의 제거 기술	
		이기세	
10:10~10:30	SC V-02	미세조류 유글레나의 활용 방안 연구	
		최윤이	
10:30~10:50	SC V-03	Biorefinery products from Chlorella biomass: fuels, chemicals and carotenoids	
		You-Kwan Oh, Young-Eun Kim, Mikyoung Jung, Sungjun An	
10:50~11:10	SC V-04	Development of efficient transformation methods for Chlorella vulgaris and application for fish vaccine production	
		Min-Jeong Kim, Aryan Rahimi-Midani, Yelin Kim, Su-Hyun Kim, Da-Yea Moon, Najib Abdellaoui, Ki-Hong Kim, Tae-Jin Choi	

휴식 및 점심시간 (11:10 - 13:00)

[AO-03]

Ice-Binding Proteins of the Arctic *Chloromonas* induced by low temperature: its rarity and the association with the cold-signaling pathway

Sung Mi Cho¹, Sanghee Kim², Han-Gu Choi², and Jungeun Lee¹

¹Unit of Research for Practical Application, KOPRI, 21990, Incheon, Korea

²Department of Life Sciences, KOPRI, 21990, Incheon, Korea

Polar microalgae survive in extreme environments and play an important role as a primary producer in the regions. *Chloromonas* is abundantly found in the cryosphere but the cryoprotective mechanism and the cold signaling pathway of this genus are still obscure. Ice-Binding Proteins (IBPs) have been characterized by binding affinity to the ice surface, but the structure and mechanical activity of the proteins are diverse. In Chlamydomonadales, two kinds of IBPs are present: the general form (Type I IBP), which is conserved from prokaryotes to eukaryotes, and the rare form (Type II IBP), which limited to some *Chloromonas* species. In this study, we revealed six IBP genes (Type II IBP) in the Arctic *Chloromonas* sp. KNF0032 (called CmIBPs) were progressively expressed by temperature decreasing. These CmIBP proteins showed the effective ice recrystallization inhibition (IRI) activities *in vitro* as well as *in planta* expression system. It is the first example in which plant improves freezing tolerance by expressing the heterologous IBP proteins instead of cold acclimation. In addition, the *cis*-element analysis on the gene regulatory regions suggested that CmIBP protein induction could be regulated similarly to the plant cold-signaling pathway. Point to the rarity of these proteins, interestingly, the homologous sequences with CmIBPs were not found in any database, but we found that the AidA domain of Archaeal adhesin protein has a similar motif structure to CmIBPs (the repeated Thr-X-Thr), and these motifs also have effective IRI activity. This result gives an insight into that the engineering of this motif structure can fine-tune the strength of IRI activity. Possibilities of both CmIBP protein expression *in planta* system and fin-tuning of IRI activity are expected to be applicable especially crops and food industries.