



# The 5th Symposium on Membrane Stress Biotechnology



Date : 2007.9.22 (Sat)

Place : Machikaneyama-Kaikan,  
Osaka Univ.(Toyonaka Campus)

<http://www.cheng.es.osaka-u.ac.jp/kuboilabo/MSB/>

## 9:20 Opening Remarks Membrane Stress Responsive Dynamics

**R. Kuboi**  
(Osaka Univ. Grad. Sch. Eng. Sci.)  
(Chairman T.Tsuchido)

- 9:30 Membrane Stress Research in Microorganism Control
- 9:40 Characterization of the Antimicrobial Resistant Mutant of *Escherichia coli*
- 10:00 Analysis of Membrane Stress Response of Bacterial Cells by Using GFP Variants
- 10:20 Adaptive Response of a Nonlinear Gene Network Utilizing Noise in Protein Expression
- 10:50 Neurotrophin-like Actions of Cyclic Phosphatidic Acid in Embryonic Hippocampal Neurons
- 11:20 Role of Liposome and Biomembrane on Stress-Induced Translocation of Proteins
- 11:40 Lunch

**T. Tsuchido**  
(Kansai Univ. Fac. Chem. Mat. Bioeng.)  
**Y. Matsumura**  
(Kansai Univ. Fac. Chem. Mat. Bioeng.)  
**J. Sakamoto**  
(Kansai Univ. Fac. Chem. Mat. Bioeng.)  
**T. Yomo**  
(Osaka Univ. Grad. Sch. Inf. Sci. Tech.)  
**Y. Kakiuchi / K. Murofushi**  
(Ochanomizu Univ. Grad. Sch. Sci.)  
**H. Umakoshi**  
(Osaka Univ. Grad. Sch. Eng. Sci.)

## Stress Responsive Dynamics of Model Biomembrane · Biomolecules

(Chairman: R. Kuboi)

- 12:50 Membrane Stress Biotechnology Based on LEM-Unit
- 13:00 Direct Observation of the Surface-Dependent Formation of Amyloid Supramolecular Assemblies
- 13:30 Microscopic Imaging of Phase-Separated Micro Domain as a Model of 'Raft' and Its Dynamical Change
- 14:00 Investigation of Lipid Domain Functions in Cell Membranes
- 14:30 Dynamics of Lipid Membrane Fluctuation ~ Hydrogen Bonding Stability in Model Biomembrane ~
- 15:00 Break

**R. Kuboi**  
(Osaka Univ. Grad. Sch. Eng. Sci.)  
**Y. Goto**  
(Osaka Univ. Inst. Protein Res.)  
**K. Ohki**  
(Tohoku Univ. Grad. Sch. Sci.)  
**K. Murase / T. Kobayashi**  
(RIKEN Discovery Research Institute)  
**T. Shimanouchi / S. Morita**  
(Osaka Univ. Grad. Sch. Eng. Sci.)

## New Aspect of Membrane Stress Responsive Dynamics (*in vivo* / *in vitro*)

(Chairman: H. Umakoshi)

- 15:10 Development of Nonionic Vesicles Prepared from Span80 and the Vesicle Application to DDS
- 15:40 Application of Transmembranous Peptides to Drug Delivery System for the Intracellular Recipient
- 16:00 Design and Development of Membrane Chip
- 16:20 Break

**K. Kato / Y. Omokawa**  
(Ehime Univ. Grad. Sch. Sci. Eng.)  
**Y. Mukai / S. Nakagawa**  
(Osaka Univ. Grad. Sch. Pharm.)  
**H. Ishii / T. Shimanouchi**  
(Osaka Univ. Grad. Sch. Eng. Sci.)

## Extension to Bioreaction Processes

(Chairman: T. Shimanouchi)

- 16:30 Cell Locomotion and the Membrane Dynamics
- 17:00 Applications of Liposomes to Bioreactors
- 17:20 Stability of Quaternary Structure and Enzymatic Activity of Catalase Entrapped in Liposome as a Bioreactor
- 17:40 Biosynthesis of Amino Containing Polysaccharides by *Acetobacter Xylinum*
- 18:00 Closing Remarks
- 18:30 Mixing with Poster Session (Flash Presentation of Poster Session)

**S. Ogihara** (Osaka Univ. Grad. Sch. Sci.)  
**S. Ichikawa**  
(Univ. Tsukuba Grad. Sch. Life Envir. Sci.)  
**M. Yoshimoto**  
(Yamaguchi Univ. Grad. Sch. Med.)  
**H. Tamura**  
(Kansai Univ. Sch. Chem. Mat. Bioeng.)  
**T. Tsuchido**  
(Kansai Univ. Fac. Chem. Mat. Bioeng.)

Supported by

Research Group on Membrane Stress Biotechnology,  
GCOE "Bio-Environmental Chemistry", JSPS,  
ΣMRL "Bio-Inspired Nano Chemical Factory"





# The 5th Symposium on Membrane Stress Biotechnology



日時：2007.9.22 (土)

場所：大阪大学豊中キャンパス 待兼山会館

<http://www.cheng.es.osaka-u.ac.jp/kuboilabo/MSB/>

## 9:20 Opening Remarks メンブレン・ストレス応答ダイナミクス

久保井 亮一 (大阪大・基礎工)  
(座長: 土戸 哲明)

9:30 微生物制御分野におけるメンブレン・ストレス研究の流れ

土戸 哲明 (関西大・化学生命工)

9:40 抗菌性界面活性剤耐性菌のゲノム工学的解析  
~ DNA チップを用いた変異部位特定 ~

松村 吉信 (関西大・化学生命工)

10:00 改変 GFP を利用した細菌におけるメンブレン・ストレスの解析

坂元 仁 (関西大・化学生命工)

10:20 揺らぎを利用した遺伝子ネットワークの適応的応答

四方 哲也 (大阪大・情報)

10:50 cPA による神経細胞の応答とその制御機構

垣内 康孝・室伏 きみ子  
(お茶の水女子大)

11:20 ストレス誘導型タンパク質膜透過現象に及ぼす  
リポソーム/生体膜の役割

馬越 大 (大阪大・基礎工)

11:40 Lunch

## モデル生体膜・生体分子のストレス応答ダイナミクス

(座長: 久保井 亮一)

12:50 LEM-Unit に基づくメンブレン・ストレスバイオテクノロジー

久保井 亮一 (大阪大・基礎工)

13:00 表面に依存したアミロイド超分子形成反応の直接観察

後藤 祐児 (大阪大・蛋白研)

13:30 モデル生体膜ミクロ相分離構造の蛍光顕微鏡観察  
~ 相分離構造と膜ダイナミクス ~

大木 和夫 (東北大・理)

14:00 細胞膜における脂質ドメインの機能の研究

村瀬 琴乃・小林 俊秀 (理研)

14:30 脂質膜ゆらぎのダイナミクス  
~ モデル生体膜における水素結合安定性 ~

島内 寿徳・森田 誠一  
(大阪大・基礎工)

15:00 Break

## DDS およびセンサチップの新たな展開 (in vivo / in vitro 複合)

(座長: 馬越 大)

15:10 Span ベシクルの開発と DDS への応用

加藤 敬一・重川 庸介  
(愛媛大・工)

15:40 細胞内薬物療法を目指した膜透過性ペプチドの  
DDS への展開

向 洋平・中川 晋作  
(大阪大・薬)

16:00 Membrane Chip の設計開発

石井 治之・島内 寿徳  
(大阪大・基礎工)

16:20 Break

## 生物反応プロセスへの展開

(座長: 島内 寿徳)

16:30 細胞運動と膜ダイナミクス

荻原 哲 (大阪大・理)

17:00 リポソームのバイオリクターへの応用

市川 創作 (筑波大・生命環境)

17:20 バイオリクターにおけるリポソーム内封入カタラーゼの  
多量体構造と活性の安定性

吉本 誠 (山口大・医)

17:40 酢酸菌によるアミノ多糖の生合成

田村 裕 (関西大・化学生命工)

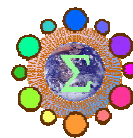
18:00 Closing Remarks

土戸 哲明 (関西大・化学生命工)

18:30 Mixing Party with Poster Session (Flash Presentation of Poster Session)

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# The 5th Symposium on Membrane Stress Biotechnology



## Poster Presentation / ポスター発表

場所：大阪大学豊中キャンパス 待兼山会館

<http://www.cheng.es.osaka-u.ac.jp/kuboilabo/MSB/>

- P01 大腸菌のストレス交差耐性化へのストレス関連シグマ因子の関与 細江 翔子, 井上 裕介, 坂元 仁, 土戸 哲明 (関西大学化学生命工学部)
- P02 GFP センサーを利用した枯草菌胞子の発芽および加熱損傷における胞子コア内変化のモニタリング 坂元 仁, 北村 直毅, 土戸 哲明 (関西大学化学生命工学部)
- P03 白色腐朽菌 *Phanerochaete chrysosporium* を用いた重金属のバイオソープションに及ぼすストレス作用の影響 中村 秀美, 中谷 泰治 (大阪府立大学大学院工学研究科)
- P04 Direct Interaction of Membranes Induced/Enhanced Protein Release from *S. griseus* Cells under Heat Stress Condition K.X.Ngo, H.Umakoshi, T.Shimanouchi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P05 Mechanism on Liposome Enhanced Gene Expression in Cell-Free System under oxidative stress condition B.T.Huong, H.Umakoshi, T.Shimanouchi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P06 The Mechanism of Liposome Enhanced Gene Expression in Cell Free Translation System M.Nishida, H.Umakoshi, B.T.Huong, T.Shimanouchi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P07 Lipid Membrane-Mediated Amyloid Formation of A $\beta$  A.Hiroiwa, T.Shimanouchi, H.Umakoshi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P08 Fibril Formation/Disaggregation of Amyloid Protein on Lipid Membrane D.Ishikawa, T.Shimanouchi, H.Umakoshi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P09 Surface Property of Amyloid  $\beta$  and Its Interaction with Lipid Membrane K.Nishiyama, A.Hiroiwa, T.Shimanouchi, H.Umakoshi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P10 Role of A $\beta$  Cross-Linked by Transglutaminase on Membrane S.Hamada, Y.Hirai, H.Umakoshi, T.Shimanouchi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P11 Oxidative Reaction of Catechol Derivatives by A $\beta$  (1-42)/Cu Complex on Liposome Membrane T.Matsumoto, T.Shimanouchi, N.Yoshimoto, H.Umakoshi, R. Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P12 Permeation Behavior of  $\beta$  Peptides across Liposome Membranes T.Shimanouchi, P.Walde, J.Gardiner, Y.R. Mahajan, D.Seebach, M.Voser, R. Kuboi (1: Grad. Sch. Eng. Sci., Osaka Univ., 2: ETH Zurich)
- P13 Design and Development of Membrane Chip ~Analysis of Membrane-Membrane Interaction~ H.Ishii, T.Shimanouchi, H.Umakoshi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P14 Immobilization of Lipid Membrane onto Quartz Crystal Microbalance for Detection of Proteins V.T.Huong, T.Shimanouchi, H.Umakoshi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P15 Application of Membrane Chip to Evaluation of Model Cell Membranes E.Ohyama, H.Ishii, T.Shimanouchi, H.Umakoshi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P16 Effect of Fatty acids on Interaction between Lipid Membrane and Amyloid  $\beta$ -peptide S.Morita, S.Yamashita (Dept. of Materials Science, Wakayama Nat'l Coll. Tech.)

- P17 An Application of Immobilized Intact Liposome on Pt Electrode Solid Surface For Bio-Thermochemical Sensor  
M.Noda, T.Shimanouchi, T.Asai, Y.Masuda, M.Okuyama, R.Kuboi (1: Grad. Sch. of Sci. Tech., Kyoto Inst. of Tech., 2: Grad. Sch. Eng. Sci., Osaka Univ.)
- P18 Separation Behavior of PEGylated Lysozyme in CIM-O3 Monolithic Column  
P.Akbarzaderaleh, M.Abe, N.Yoshimoto, S.Yamamoto (Grad. Sch. Med., Yamaguchi Univ.)
- P19 Apoptotic Activation in Colon26-Tumor Burden Mouse by Administering Span80 Vesicle Immobilized with Novel Lectin  
F.Moriki, T.Miyazaki, H.Osawa, M.Nose, K.Akiyama, S.Masuda, T.Sugahara, K.Kato (Grad. Sch. Sci. Eng., Ehime Univ.)
- P20 Activation of Antitumor Immunity by Administering Span80 Vesicle Immobilized with Novel Lectin to Mouse with Colon26 Tumor  
H.Osawa, T.Miyazaki, F.Moriki, M.Nose, S.Masuda, K.Akiyama, T.Sugahara, K.Kato (Grad. Sch. Sci. Eng., Ehime Univ.)
- P21 凍結によるベシクルの破壊に対する糖類の保護作用 - 蛍光消光による研究 -  
家根 尚子, 長澤 裕, 宮坂 博 (阪大院基礎工)
- P22 Vesicles as Templates for The Enzymatic Polymerization of Aniline  
Z.Guo, P.Walde (ETH Zurich)
- P23 Ultrasound-Induced Gelation of Organic Fluids with Metallated-Peptide: Control of Dimension and High-Order Structure of Transition-Metals  
H.Takaya, K.Isozaki, A.Nakatani, Y.Haga, T.Uesugi, T.Naota (Grad. Sch. Eng. Sci., Osaka Univ.)
- P24 Programmable Assembly for Porous Vapochromic Organic Crystals: Application to Chemical Sensor for Monitoring Sick-House Syndrome Gases  
E.Takahashi, H.Takaya, T.Naota (Grad. Sch. Eng. Sci., Osaka Univ.)
- P25 Temperature-Controlled Changeable Photooxygenation Selectivity with a Polymeric Photosensitizer as a Microreactor  
H.Koizumi, Y.Kimata, Y.Shiraishi, T.Hirai (Grad. Sch. Eng. Sci., Osaka Univ.)
- P26 Size Selective Synthesis of Dendron-Encapsulated Pd Nanoparticles for Catalytic Hydrogenation  
T.Mizugaki, M.Murata, S.Fukubayashi, T.Mitsudome, K.Jitsukawa, K.Kaneda (Grad. Sch. Eng. Sci., Osaka Univ.)
- P27 LIPOzyme: Design and Development of Artificial Chaperone/Enzyme for Membrane Stress Biotechnology  
H.Umakoshi, L.Q.Tuan, K.Morimoto, T.Shimanouchi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P28 Molecular and Metal-Chaperone-Like Function of Liposome: Activity of Fragmented SOD Recruited by POPC with Metal Ions ( $\text{Cu}^{2+}$  &  $\text{Zn}^{2+}$ )-  
L.Q.Tuan, H.Umakoshi, T.Shimanouchi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)
- P29 One-Pot LIPOzyme Elucidating Dual Activities of Antioxidative Enzymes  
K. Morimoto, H.Nagami, H.Umakoshi, T.Shimanouchi, R.Kuboi (Grad. Sch. Eng. Sci., Osaka Univ.)

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