

The FEBS Journal



Volume 284 Supplement 1 September 2017 | ISSN 1742-464X

www.febsjournal.org

42ND FEBS CONGRESS

FROM MOLECULES TO CELLS AND BACK

10-14 September, 2017 | Jerusalem, Israel



yeast – a sequence with its own signal peptide (SP) and without SP. For this study we chose the yeast vector pINA1296, which contains a strong hybrid promoter hp4d and a secretion signal (XPR2 pre region). To clone the phytase gene, restriction sites KpnI and SfiI were used. Restricted vector and gene sequences were ligated. The resulting ligation constructs pINA1296/agpP (with SP) and pINA1296/agpP(without SP) were transformed into *E. coli* DH5 α cells. Transformants were examined for the presence of the phytase gene by PCR and restriction analysis which was confirmed by sequencing. Resulting plasmids were isolated and linearized by *NotI* restriction enzyme prior to transformation. *Y. lipolytica* strain Pol g was used for transformation by electroporation. Transformants were selected on the medium containing no leucine. Integration of the bacterial phytase gene into the *Y. lipolytica* genome was confirmed by PCR analyses. Expression of AgpP phytase in yeast is now being studied.

This work was supported by the Russian Foundation for Basic Research (project no. 16-34-60191). This work was performed in accordance with the Russian Government Program of Competitive Growth of the Kazan Federal University.

P.Mis-039

Diversity of microbial siderophores excreted by electrogenic bacteria in microbial fuel cells treating swine wastewater

I. Khilyas¹, A. Sorokin^{2,3}, M. Sharipova¹, M. Cohen^{4,5}, I. Goryanin^{6,7,8}

¹Institute of Fundamental Medicine and Biology, Kazan, Russia, ²Moscow Institute of Physics and Technology, Dolgoprudnyi, Russia, ³Institute of Cell Biophysics Russian Academy of Science, Pushchino, Russia, ⁴Okinawa Institute Science and Technology, Okinawa, Japan, ⁵Department of Biology, Sonoma State University, Rohnert Park, United States, ⁶Okinawa Institute of Science and Technology, Okinawa, Japan, ⁷Tianjin Institute of Industrial Biotechnology, Tianjin, China, ⁸University of Edinburgh, Edinburgh, United Kingdom

Bio-electrochemical systems such as microbial fuel cells (MFCs) are promising new technologies for efficient removal of organic compounds from industrial wastewaters, including that generated from swine farming. Inside the confined anaerobic chamber of an MFC a consortium of bacteria catalyze oxidation reactions, depositing electrons on the anode by a variety of means, including directly via outer membrane proteins or conductive pili or indirectly via secretion and recycling of redox-active molecules. We inoculated two pairs of laboratory-scale MFCs with sludge granules from a beer wastewater treating anaerobic digester (IGBS) and from sludge taken from the bottom of a tank receiving swine wastewater (SS). Using a metagenomic approach we describe the microbial diversity of the MFC planktonic and anodic communities derived from the different inocula. Among the class *Deltaproteobacteria*, *Geobacter*, which produce electron-transferring pili, was identified as the most highly abundant genus on the anodes of both MFCs. The most abundant genera of *Archaea* were *Methanosarcina* on the anode of the SS-MFCs and *Methanothermobacter* on the anode of the IGBS-MFCs. We further carried out functional analysis to identify genes encoding for the production of a diversity of potential low weight redox active mediators, such as siderophores. We found that the most abundant types of siderophore producing genes were fluorescent siderophores, such as pyoverdinin and pyochelin, in anodic and planktonic communities of both MFCs. Additionally, genes encoding for production of catechol-type siderophores like enterobactin and bacillibactin were identified. Genes for hybrid NRPS-PKS siderophores were represented by yersiniabactin in the anodic and planktonic communities of both MFCs. Thus,

despite the fact that dominant bacterial genus was *Geobacter*, it is likely that the variety of redox active mediators excreted by other abundant species contribute to electricity generation in the MFCs.

P.Mis-040

Mortality and developmental delay of marsh frog (*Rana ridibunda*) embryos exposed to oil

L. Sutuyeva, T. Shalakhmetova, M. Suvorova, D. Kakabayev
al-Farabi Kazakh National University, Almaty, Kazakhstan

The decrease of biodiversity and population of aquatic animals can be connected with contamination of the environment with oil and oil products. Therefore, the study of impact of water-soluble fraction of oil (WSFO) on the early developmental stages of *R. ridibunda* was carried out. To obtain eggs, 5 sexually mature specimens of *R. ridibunda* were used: 2 females with body length of 110 \pm 2.5 mm and body weight of 150 \pm 6.2 g and 3 males with body length of 102 \pm 2.7 mm and body weight of 115 \pm 5.4 g. The animals were intraperitoneally injected with hormonal preparation consisting of des-Gly10, D-Ala6, Pro-NHEt9-GnRH (GnRH-A) and metoclopramide HCL (MET) at a dose of 5 μ l/g of body weight. 4800 fertilized eggs were placed into experimental 20 L aquaria containing dechlorinated water. The water temperature was maintained at 23 \pm 0.5°C. Exposure to the WSFO (Dunga oil field, Mangystau region, Kazakhstan) was started when all eggs reached gastrulation stage, which corresponds with Gosner stage (GS) 10. WSFO was obtained by mixing 100 ml of oil with 900 ml of distilled water for 48 h with following filtration. In total there were 3 replicates for each experimental group containing 400 eggs which were exposed to: I – control (pure water), II – 0.05% of WSFO, III – 0.5% of WSFO, IV – 1% of WSFO. The development of eggs was observed using stereoscopic microscope Motic (China). In 24, 48, 72 and 96 h mortality was checked, and photographs of embryos were also taken to measure morphometric parameters. Mortality in control groups was 6% ($P \geq 0.05$), and 17% ($P \geq 0.05$) among embryos of group II, mortality of embryos at higher concentrations in groups III and IV was 46% ($P \geq 0.01$) and 80% ($P \geq 0.01$), respectively. Also among the surviving embryos in groups III and IV, their smaller size and developmental delay and abnormalities were noted compared to the control group. Thus, oil pollution can cause high mortality, morphological disruptions and suppress development rate of amphibians.

P.Mis-041

Self-assembling triton-based micellar clusters: formation features and modification strategies for new functional materials creation

A. Solomonov^{1,2}, Y. Marfin²

¹Weizmann Institute of Science, Rehovot, Israel, ²Ivanovo State University of Chemistry and Technology, Ivanovo, Russia

Low aqueous solubility of many compounds is usually a major obstacle in the development of therapeutic agents, drug delivery, sensing or during investigation of properties of materials. There many approaches commonly used to enhance the solubility of poorly soluble drugs exist. Micellar solubilization is a widely used alternative for the dissolution of many hydrophobic compounds. However, not always using of pure micellar aqueous solutions is suitable for solubilization. The concept of micellar conjugation followed by clusters formation showed a great potential in the aspect of hydrophobic compounds solubilization beyond their solubilization limit. With the aim to extend the application fields of micellar clusters, we developed new schemes for micellar

Author Index

- Skorokhod, O., 184
 Skowronek, E., 207
 Skrbic, R., 163
 Skrynnikov, N., 212, 215, 311
 Skrypkina, I., 168
 Skup, A., 179
 Sládková, V., 250
 Slavikova, V., 290
 Slavnova, E.N., 275
 Slebe, J.C., 146, 348
 Slipchenko, L., 311
 Slocinska, M., 162
 Slominskyi, Y., 307
 Slomka, S., 236
 Sluchanko, N., 182
 Slugina, M.A., 293
 Slusher, B., 344
 Slusher, B.S., 344, 345
 Smagina, L., 382
 Smailbegovic, H., 329
 Smetana Jr, K., 291
 Šmidova, A., 194
 Smiech, M., 218
 Smirnov, I., 313, 314, 384
 Smirnov, S.A., 324
 Smirnova, A., 384
 Smirnova, E., 158
 Smirnova, I., 323, 338
 Smirnova, J., 337
 Smirnova, V., 167, 294, 296
 Smola, M., 107, 129
 Smolko, L., 337
 Smolková, R., 337
 Smolyakov, A., 345, 347
 Snezhkina, A., 270
 Snezhkina, A.V., 275
 Snigir, E., 169
 Snigir, E.A., 169
 Snigiryova, G., 283
 So, I., 158, 159
 Sofia, A., 307
 Soanes, K., 360
 Soares, C.M., 307
 Sobol, M., 250
 Sobolewska-Wlodarczyk, A., 122
 Socolov, D., 222, 225
 Soghomonyan, D., 337
 Soifer, I., 235
 Sojka, D., 300
 Sokolov, A., 202
 Sokolov, M., 247
 Sokolov, S., 158
 Sokolova, O., 191
 Sokolovic, D., 163, 164
 Sokolovskaya, A., 265
 Sokuev, R., 323
 Sokurenko, Y., 278
 Soldatenko, A., 377
 Soldatkin, A., 248
 Soldatkin, O., 248
 Soliman, C., 309, 387
 Solomadin, M., 130
 Solomonov, A., 385
 Solovjeva, L., 370, 371
 Somech, O., 390
 Somov, A., 258
 Sone, E.D., 321
 Sonenshein, A.L., 367
 Song, K.S., 264
 Songailiene, I., 167
 Sonmez, D., 392
 Sonmez, E., 120
 Soomets, U., 146
 Sorek, R., 390
 Soreq, H., 143
 Soriano, E., 198
 Sorokin, A., 308, 385
 Sorokina, A.V., 361
 Sosnin, I., 355
 Sosnovtseva, O., 229
 Sosoi, P.P., 219
 Soucy, S., 389
 Sousa, M., 349, 363
 Sozen, E., 155, 306, 357
 Spahn, P., 172
 Špaková, I., 137
 Spasic, M., 233
 Spector, I., 258
 Sperling, J., 172
 Sperling, R., 172
 Spichal, L., 155
 Spidlen, V., 260
 Spiegel, S., 287
 Spiers, A., 358
 Spisni, A., 204, 372
 Spitsyn, M., 283
 Spochacz, M., 162
 Srivastava, G., 196
 Srp, J., 299
 Stamsás, G.A., 379
 Stanchev, S., 335
 Stanciu, A.E., 280
 Stanciu, M.M., 280
 Stanic-Vucinic, D., 189
 Starczak, M., 221
 Starek, G., 140
 Starkova, T., 228
 Stasyk, O., 276
 Stavaru, C., 123
 Steen, H., 123
 Štefanciková, L., 255
 Stefanova, N., 136
 Stefanovska, A., 163
 Stehberg, J., 253
 Steiert, F., 208
 Steinberg, A., 304
 Steinberger, J., 112
 Stenkova, A., 375
 Stepanenko, O., 214
 Stepanov, A., 270
 Stepanov, G., 274
 Stepanov, G.A., 167
 Stepanova, A., 313, 314, 384
 Stepanyan, A., 241
 Štepa, K., 255
 Steranka, A., 218
 Sterba, J., 290
 Stern, A., 388
 Stern-Ginossar, N., 142, 171, 173
 Stintzi, A., 175
 Stofik, M., 256
 stoger, R., 148
 Stoika, R., 340
 Stojanovic, M., 124
 Stokes, J., 346
 Stopp, M., 151
 Storublevtsev, S., 344
 Stranova, M., 379
 Straume, D., 379
 Stridsberg, M., 146
 Strisovsky, K., 335
 Strnad, H., 278
 Stroka, D.M., 283
 Stroylov, V., 214
 Stroylova, Y., 214
 Struhárnanská, E., 105
 Štrukelj, B., 183
 Strutynska, N.A., 352
 Strzalka, K., 206
 Strzeszewska, A., 111
 Stuchlík, S., 105, 105
 Stukacheva, E., 266
 Stulik, J., 119, 120, 360
 Šubr, V., 340
 Suchankova, D., 120
 Sudarikova, A., 157
 Suder, P., 134, 247, 271
 Suh, Y., 282
 Suhorutshenko, M., 134
 Sukhikh, G., 383
 Sukhorukov, G., 170
 Sukovas, A., 281
 Sulatskaya, A., 213
 Suleimanova, A., 384, 387, 392
 Suleimenova, A., 121
 Sulimenko, T., 250
 Sulimenko, V., 250
 Sumbayev, V., 280, 291
 Sun, Y., 275
 Surdina, A., 141, 377
 Suslova, M., 127
 Suslova, O., 358
 Sutuyeva, L., 385
 Suvorova, M., 385
 Svehlova, K., 335
 Sverdlov, E., 266
 Sverdlov, E.D., 267
 Svetlova, M., 370, 371
 Syatkin, S., 247, 276, 277, 323, 338, 383
 Syatkin, S.P., 305, 373
 Syed, M., 204
 Symonenko, Y., 167
 Syroeshkin, A., 288
 Sytykiewicz, H., 150
 Szabó, E., 254
 Szabo, G., 221
 Szabo, P., 291
 Szaefer, H., 341, 342, 368
 Szanto, A., 221
 Szczelkun, M., 205
 Szczepanowicz, K., 341
 Szczepanowska, J., 367
 Szczepanski, K., 199
 Szczesniak, M., 171
 Szekely, P., 275
 Szekvolgyi, L., 221
 Szelazek, B., 145
 Szenkier Garcia, N., 303, 303
 Szewczyk, A., 153, 179
 Szpak, K., 268
 Szpila, A., 221
 Szpotan, J., 221, 226
 Szweykowska-Kulinska, Z., 166, 168
 Szymanski, J., 199, 367
 Tabach, Y., 112, 280
 Tacal, O., 242
 Taglicht, D., 171, 173, 384
 Tagore, S., 235
 Tai-Schmiedel, J., 173
 Takenaka, M., 178
 Tal, O., 204
 Taliansky, M., 169, 356
 Taliansky, M.E., 169
 Talyor, P., 300
 Talyzina, A., 194, 203
 Tamburini, G., 253
 Tamkovich, S., 258
 Tamura, Y., 302
 Tanase, C., 135, 193, 273
 Tang, X., 300
 Tanko, G., 132
 Tantale, K., 169
 Tantini, B., 349
 Tarasenko, E., 276
 Tarasov, A., 203
 Tarasova, N., 130, 354
 Tarkovská, D., 359
 Tarkowski, P., 359, 371
 Tarlykov, P., 224
 Tarnavskiy, S., 325
 Tars, K., 132
 Taseva-Mineva, T., 222
 Taspinar, M., 354
 Tastan, O., 250
 Tatalovic, N., 164, 233
 Taurate, D., 341, 343
 Tawil, S., 115
 Taylan, E., 298
 Taylor, P., 390
 Teino, I., 254
 Teisinger, J., 157, 215
 Tekin, G., 329, 391
 Telegina, D., 128
 Telysheva, E., 283
 Tenora, L., 344, 344, 345
 Tepp, K., 254, 282
 Terasmaa, A., 146
 Terekhov, S., 384
 Terenin, I., 294, 296
 Tereshina, M.B., 155
 Ter-Markosyan, A., 153
 Tesarova, M., 137
 Teulade Fichou, M.P., 386
 Tevyashova, A., 339
 Thalheim, T., 236
 Thapa, A., 199
 Therville, N., 261
 Thimiri Govinda Raj, D.B., 320
 Thomas, A., 172
 Thomsen, M., 246
 Ticha, A., 335
 Tichy, A.M., 104
 Tich, T., 344
 Tieleman, D.P., 312
 Tietzel, M., 199
 Tikhonov, M., 168
 Svetlova, M., 370, 371
 Tikhonova, A.O., 304, 388
 Tikhonova, E., 219
 Tikhonova, O., 235
 Tillement, O., 255
 Tímár, J., 285, 285
 Timin, A., 170
 Timmusk, T., 145
 Timofeev, V., 194, 195, 310, 318
 Timofeyeva, N.A., 109
 Timohhina, N., 282
 Timohina, N., 254
 Tishina, S., 214
 Tishkov, V.I., 199, 213, 324
 Titova, V., 209
 Tittmann, K., 199
 Tkachuk, V., 153
 Tkachuk, Z., 307
 Tok, O.E., 306
 Tokmakov, A., 305
 Toliuisis, P., 205
 Tombola, F., 160
 Tomecková, V., 123
 Tomishige, K., 353
 Tonelli, M., 200
 Tong, J., 300
 Tonoli, E., 244
 Tonoyan, L., 374
 Topcu, C., 392
 Topel, H., 262, 350
 Topkaya, C., 392
 Topolcan, O., 260
 Topunov, A.F., 176
 de la Torre, M., 376
 Torres, A., 289
 Tortolero, M., 298
 Toth, D., 129
 Tögu, V., 337
 Towers, R., 173
 Toymentseva, A., 392
 Toymentseva, A.A., 304, 388
 Trantírek, L., 274, 286
 Trantírek, L., 386
 Trchouňan, A., 156, 229, 256, 257, 326, 337, 378
 Treshalina, H., 331
 Tretter, J., 263
 Trifonova, E., 121, 377
 Tripati, S., 290
 Trizna, E., 374
 Troshagina, D., 384, 387
 Trumbeckaite, S., 281
 Trushina, N., 158
 Trusova, S., 175
 Trutneva, K., 374
 Truu, L., 282
 Tsakanova, G., 241
 Tselepis, C., 258
 Tsentlovich, Y., 258
 Tsfadia, Y., 197
 Tsidulko, A., 111
 Tsokolaeva, Z., 225, 362, 363
 Tsukerman, A., 225
 Tsuvariev, O., 308
 Tsvetkov, V., 193, 220, 227, 336
 Tubon, I., 127
 Tucureanu, C., 123
 Tudor, S., 325
 Tugaeva, K., 182
 Tukalo, M., 293
 Tuller, T., 217
 Tuna, G., 115
 Tural, R., 112
 Turchaninova, M., 238
 Turgan, N., 288
 Turgeman-Grott, I., 389
 Turishchev, S., 203
 Turna, J., 105, 105
 Turoverov, K., 213, 214
 Tushinsky, C., 227
 Tusnady, G.E., 312
 Tutanov, O., 258
 Tworowski, D., 198, 310
 Tzfati, Y., 115
 Tzimmer, A., 275
 Uçkan Çetinkaya, D., 134
 Uebe, R., 185
 Uegaki, K., 187
 Ugurlu, A., 246
 Uhlemann, E., 200
 Ulakoglu Zengin, E., 338
 Ulbrich, K., 340