

Memberships:

Member of

- 1) Botanical Committee of Hungarian Academy of Sciences
- 2) Founding member of Hungarian Plant Physiological Society
- 3) Founding member of Hungarian Algological Society

Awards:

Knight's Cross of Merit of the Republic of Hungary (2003)

Work interests:

The main interests and results of G. Borbely are as follows:

- They obtained first the Shine – Dalgarno sequence at the 3' end of 16S rRNA which was one of the proofs beyond question for the prokaryotic nature of cyanobacteria.
[Borbély, G., Simoncsits, A. (1981) *Biochem. Biophys. Res. Comm.* 101. 846-852.]
- Borbely and his laboratory paid a widespread attention to cyanobacterial stress responses like heat shock, heavy metal ion poisoning and nutritional starvation stresses. In stressed cells, the stringent control system (ppGpp) is induced and in those cells phosphorylated dinucleotides (Ap4A, Ap4G, Ap3A, Ap3G, Ap3Gp2) termed "alarmones" are synthesized which are modulated by the energy availability. The cyanobacterial heat shock response, heat shock induced protein pattern was described by him. Cyanophage infection, which is considered as a "physiological stress" process, specifically inhibits the electron flow of photosystem II.
[Borbély, G., Surányi, G., Korcz, A. and Pálfi, Z. (1985) *J. Bacteriol.* 161. 1125-1130.; Surányi, G., Korcz, A., Pálfi, Z., Borbély, G. (1987) *J. Bacteriol.* 169. 632-639.; Borbély, G., Surányi, G., Kós, P. (1990) *FEMS Microbiol. Ecol.* 74. 141-152.; Pálfi, Z., Surányi, G., Borbély, G. (1991) *Biochem. J.* 276. 487-491.; Borbély, G. and Surányi, G. (1988) *Meth. Enzymol.* 167. 622-629.]
- Borbely found a new subunit of cyanobacterial DNA dependent RNA polymerase enzyme which was named γ -subunit in cooperation with the Haselkorn Laboratory at Chicago, US.
[Schneider, G.J., Turner, N.E., Richaud, C., Borbély, G. and Haselkorn, R. (1987) *J. Biol. Chem.* 262. 1433-1439.; Borbély, G., Schneider, G. (1988) *Meth. Enzymol.* 167. 592-599.]
- The common nature of cyanobacterial and chloroplast carbohydrate metabolism is the redox regulation of key enzymes. Borbely's laboratory actively studied those processes.
[Udvardy, J., Borbély, G., Juhász, A., Farkas, G.L. (1984) *J. Bacteriol.* 157. 681-683.; Udvardy, J., Borbély, G., Juhász, A., Farkas, G.L. (1984) *FEBS Lett.* 172. 11-16.; Juhász, A., Csizmadia, V., Borbely, G., Udvardy, J., Farkas, G.L. (1986) *FEBS Lett.* 194. 121-125.; Juhász, A., Csizmadia, V., Borbély, G., Udvardy, J. (1987) *Biochem. Biophys. Acta* 916. 119-127.; Teklemariam, T. A., Demeter, S., Deák, Z., Surányi, G. and Borbély, G. (1990) *FEBS Lett.* 270. 211-215.]
- The nutrient loadings of freshwater bodies have been increasing all over the world leading to artificial eutrophication of aquatic ecosystems. As a consequence, "blooms" may develop sometime toxic ones. Borbely's laboratory made a special emphasis on studying cyanotoxin and plant interactions. They have isolated microcystin and cylindrospermopsin producing strains of Hungarian origin and developed a special plant assay system to replace the intraperitoneal mouse assay in cyanotoxin (microcystin and cylindrospermopsin) analysis. The capillary electrophoretic approach is a useful method to analyze and understand how environmental factors alter the production of cyanotoxins and the laboratory performed some pioneering work for simultaneous analysis of cyanotoxins.
[Máthé, Cs., M-Hamvas, M., Grigorszky, I., Vasas, G., Molnár, E., Power, J.B., Davey, M.R., Borbely, G. (2000) *Plant Cell, Tissue Organ Res.* 63. 81-84.; Vasas G., Gáspár A., Surányi Gy., Batta Gy., Gyémánt, Gy., M-Hamvas M., Máthé Cs., Grigorszky I., Molnár E., Borbély G. (2002) *Anal. Biochem.* 302. 95-103.; M-Hamvas M., Máthé Cs., Molnár E., Vasas G., Grigorszky I., Borbély Gy. (2003) *Aquatic Toxicology*, 62. 1-9.; Vasas G., Gáspár A., Páger C., Surányi Gy., M-Hamvas M., Máthé C., Molnár, E., Borbély, G. (2004) *Electrophoresis* 25. 108-115.; Máthé, C., M-Hamvas, M., Vasa, G., Surányi, G., Bácsi, I., Beyler, D., Tóth, S., Tímár, M., Borbély, G. (2007) *New Phytol.* 176. 824-835.]