

Relationship between differentiation of cells in wheat callus and their surface potential

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In wheat callus the relationship between the changes of the electric potential of cells and their differentiation was investigated. The study was performed on calluses of various differentiation ability: from immature inflorescence, leaf bases and from young stem nodes. In non differentiating tissues more than 90% of cells showed the potential ranging from -1 to -10 mV. The formation of the clumps of embryoidogenic cells was accompanied by the appearance of cells of the potential ranging from -10 to -20 mV, and in the region of macroscopical centres of differentiation the potential decreased to values ranging from -20 to -40 mV. The rate of the accumulation of cells of low potential was related to the differentiation ability of the callus: it was maximal in the callus from inflorescence, slower in the callus from leaf basis and the least in the callus from intercalary tissue. Cooling of the callus resulted in decrease of the share of cells of low surface potential. This could be observed during next two weeks and was especially pronounced in callus of lower morphogenic ability. However, about three weeks after cold treatment its stimulative effect disappeared. Our results support the assumption that electric relations in callus differentiating by way of organogenesis seem to differ from those in the embryoid forming callus. However, the presence of some amount of low potential cells also in tissues unable of differentiation indicates that the decrease of the potential is not an absolute marker of the differentiation process, but can indicate rather potential differentiation ability of the callus. These results, however, do not support the assumption that the potential changes initiate the differentiation processes.