Granulocyte colony-stimulating factor (G-CSF) quantified in individual follicular fluids (FF) appeared in previous experiments as a non-invasive biomarker of the oocyte quality. Concentrations of individual FF G-CSF appeared to be correlated with the potentiality of birth of corresponding fertilized oocytes evaluated among morphologically selected transferred embryos. The present study is a proof of concept that aims at evaluating the impact of FF G-CSF quantification as a new tool to select among cohorts of embryos generated after IVF/ICSI those with the highest potentiality of pregnancy.

FF G-CSF has been quantified in 523 individual follicular fluids corresponding to 114 fresh transferred embryos, 278 frozen embryos and 131 destroyed embryos among 78 patients undergoing ICSI. Follicular G-CSF was highly predictive of subsequent implantation with a discriminative power to predict ongoing pregnancy in multivariate logistic regression analysis of 0.77 ([0.69-0.83]; p<0.001) using the ROC curve methodology. FF G-CSF and morphology scored on day-3 appeared to be independent markers of implantation. Embryos were classified according to their FF G-CSF concentrations into three categories: class I: >30 pg/ml (highest positive predictive value for implantation), class II: from 30 to 18.4 pg/ml and class III < than 18.4 pg/ml (highest negative predictive value). Embryos from class I follicles had an implantation rate (IR) of 36%, significantly higher than those of category II (16.6%) and III (6%) (p< 0.001).

To conclude, FF G-CSF monitoring, through a better selection of embryos with a maximal potentiality for implantation, may improve both efficiency and time required to obtain a pregnancy.