

EFFECT OF INCUBATOR OXYGEN LEVELS ON EMBRYO DEVELOPMENT AFTER IN VITRO FERTILIZATION

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Abstract Body

OBJECTIVE: There is debate in the literature about the effect of incubator O₂ level on embryo development and quality. The potentially damaging effect of free oxygen (O₂) radicals to cultured embryos may be reduced by decreasing the O₂ level in the incubator from atmospheric (21%) to physiologic (5%). The objective of this study was to determine if O₂ level in incubators (5% vs 21%) affects the percentage of good-quality usable blastocysts that develop after IVF. **DESIGN:** Retrospective descriptive study set at a university-affiliated fertility center between 2016-2018. **MATERIALS AND METHODS:** Two-pronuclear (2pn) zygotes from IVF patients aged 22-38 were cultured in 21% or 5% O₂ incubators. Embryos from 739 patients were cultured in a 5% O₂ incubator, and embryos from 500 patients were cultured in a 21% O₂ incubator. Blastocysts were graded on day 5 and day 6 of culture using the Society for Assisted Reproductive Technology (SART) standardized system. The primary outcome measured was % usable blastocysts, which was defined as the % of 2pn zygotes that developed into good-quality blastocysts and were transferred to the uterus or frozen. Data were analyzed using an independent statistician using a two sample t-test with unequal variances. Statistical significance was set at P<0.05. **RESULTS:** Embryos cultured in the 5% O₂ incubators resulted in 47.0% usable blastocysts. Embryos cultured in the 21% O₂ incubators resulted in 41.2% usable blastocysts. A statistically significant difference was found (t-distribution=3.51, degrees of freedom=1136, p-value=0.001). Embryos cultured in 5% O₂ incubators yielded a significantly higher percentage (at least 3.07% higher) of good-quality usable blastocysts than those cultured in 21% O₂ incubators. **CONCLUSIONS:** Embryos cultured in low-oxygen (5%) incubators yielded a significantly higher percentage of good-quality usable embryos compared to those embryos cultured in incubators with atmospheric (21%) oxygen levels. Further studies are needed to determine the mechanisms by which oxygen levels affect embryos in vitro.