

Development of a Low Serum Medium For The Production of Monoclonal Antibody Against Congenital Adrenal Hyperplasia by Hybridoma Culture

Gek Kee Chua

Faculty of Chemical and Natural Resources Engineering, Universiti Malaysia Pahang, Kuantan, Pahang, Malaysia

ABSTRACT

Statistically designed experiments were used in developing a low serum medium for the production of a diagnostic monoclonal antibody against congenital adrenal hyperplasia using Hybridoma 192. A two-level half-fractional factorial design was used for screening six components (Minimum Essential Medium Eagle amino acids, 2-mercaptoethanol, ethanolamine, ferric citrate, zinc sulfate and sodium selenite). The experimental design was then augmented to central composite design. The basal Dulbecco's modified Eagle's medium (containing 4 mM L-glutamine, 1% antibiotic-antimycotic agent) supplemented with 0.4% by volume fetal bovine serum, 311.8 mM ferric citrate, 17.3 nM sodium selenite and 4.5 mM zinc sulfate (LSD), was found to support the growth of the hybridoma. Specific cell growth rate in the LSD ($0.033 \pm 0.001/h$) was slightly lower than in the control medium (i.e., basal DMEM supplemented with 2% FBS; $0.0045 \pm 0.003/h$). Nevertheless, the specific MAb production rate for LSD was higher (0.057 ± 0.015 pg/cell · h versus 0.004 ± 0.002 pg/cell · h in LSD and control respectively). The antibody produced in the LSD showed high specificity and no cross-reactivity with the other structural resemblance's steroid hormones, revealing no structural changes owing to the new medium developed. The new medium formulation effectively reduced the medium cost by up to 64.6%.

KEYWORDS: Congenital adrenal hyperplasia, hybridoma, medium development, monoclonal antibody, optimization, serum

DOI: 10.1080/10826068.2015.1135450