Cell culture

Culturing cells with Gibco ITS Select Supplements

Introduction

Cell culture requires a properly formulated complete culture medium that contains a wide variety of vitamins, proteins, salts, buffers, and more. Sometimes, protein components for cell culture media are derived from animal-based sources. Insulin, transferrin, and selenium are three important components of complete media that promote growth and proliferation of cells through several mechanisms and are traditionally provided as a combined supplement.

ITS Select for AOF applications

To support applications requiring a reduction or removal of animal-origin components in cell culture media, we offer Gibco™ ITS-G and ITS-X Select Supplements. The components of these 100X supplements are animal origin–free and can be included in a complete culture medium to support the growth and culture of many cell types.

ITS Select supplements can be used to support cell growth

To demonstrate the effectiveness of Insulin-Transferrin-Selenium (ITS) Select supplementation as part of a complete growth medium, we cultured quail myoblast (QM7) cells and adipose-derived human mesenchymal stromal cells (hMSCs) in appropriate basal media and varying concentrations of Gibco™ Fetal Bovine Serum (FBS) for several days. QM7 medium with ITS-G Select Supplement boosted proliferation under reduced-serum conditions, on par with original Gibco™ Insulin-Transferrin-Selenium (ITS-G) (Figure 1A), when compared to no supplementation. hMSC medium with ITS-X Select Supplement also boosted proliferation under reduced-serum conditions, on par with original Gibco™ Insulin-Transferrin-Selenium-Ethanolamine (ITS-X) (Figure 1B). To further demonstrate comparability between ITS Select and original ITS formulations, we cultured QM7 cells and hMSCs for 3 passages in reduced-serum media with either ITS-G Select or original ITS-G supplementation. QM7 cells cultured with 2% FBS (Figure 2A) and hMSCs cultured with 4% FBS (Figure 2B) demonstrated comparable cell yield, viability, and morphology after three passages of growth with both supplements.

Summary

These studies demonstrate that ITS Select supplements can be used in place of original ITS supplements as part of complete media formulations to provide support for cell growth in reduced-serum applications.

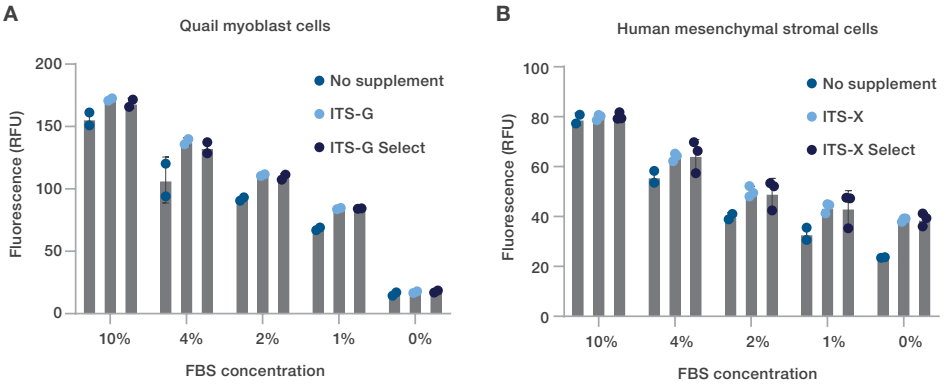

Figure 1. ITS Select supplements support cell growth under reduced-serum conditions. **(A)** QM7 cells were grown in Gibco™ Medium 199 (with Earle's salts and L-glutamine), 10% tryptose phosphate broth, and 0–10% FBS with or without original ITS-G or ITS-G Select supplementation in a Thermo Scientific™ Nunclon™ Delta 48-well plate. Viable cells were measured after 3 days of growth by the fluorescence readout from Invitrogen™ PrestoBlue™ Cell Viability Reagent (n = 2 per condition). **(B)** Adipose-derived hMSCs were grown in Gibco™ DMEM (high glucose, GlutaMAX™ Supplement, pyruvate) and 0–10% FBS with or without original ITS-X or ITS-X Select supplementation in a Nunclon Delta 48-well plate. Viable cells were measured after 4 days of growth by the fluorescence readout from PrestoBlue Cell Viability Reagent (n = 2–3 per condition).

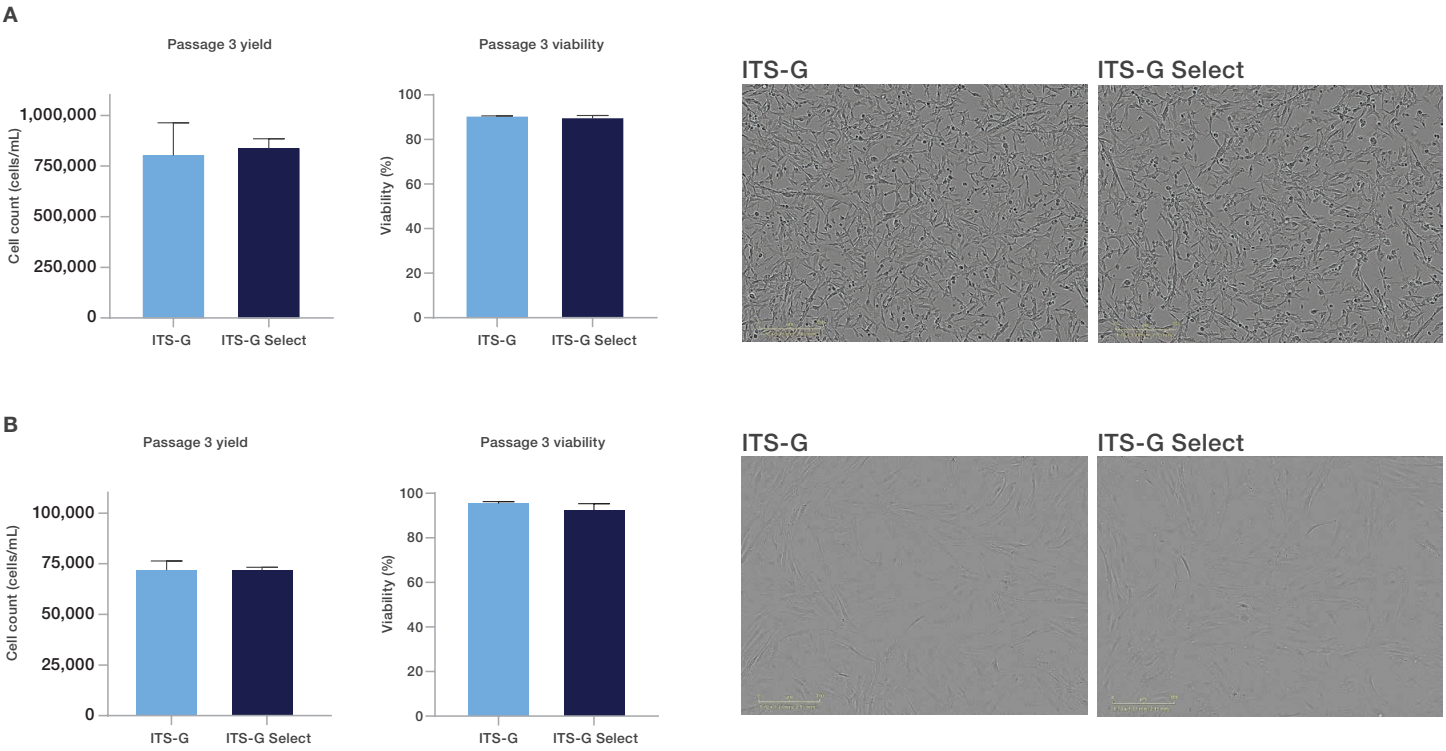

Figure 2. ITS-G Select supplement supports cell growth similarly to the original ITS-G supplement. (A) Cell yield, viability, and morphology of QM7 cells at the end of 3 passages of growth in Medium 199 (with Earle's salts and L-glutamine), 10% tryptose phosphate broth, 2% FBS, and either original ITS-G or ITS-G Select supplementation (n = 3 per condition). **(B)** Cell yield, viability, and morphology of hMSCs at the end of 3 passages of growth in DMEM (with GlutaMAX Supplement), 4% FBS, and either original ITS-G or ITS-G Select supplementation (n = 2 per condition). Scale bar in all images is 300 µm.

Ordering information

Description	Volume	Cat. No.
Insulin-Transferrin-Selenium (ITS-G) Select Supplement (100X)	10 mL	A4000046501
Insulin-Transferrin-Selenium (ITS-G) Select Supplement (100X)	100 mL	A4000046502
Insulin-Transferrin-Selenium-Ethanolamine (ITS-X) Select Supplement (100X)	10 mL	A4000046401
Insulin-Transferrin-Selenium-Ethanolamine (ITS-X) Select Supplement (100X)	100 mL	A4000046402
Insulin-Transferrin-Selenium (ITS-G) (100X)	10 mL	41400045
Insulin-Transferrin-Selenium-Ethanolamine (ITS-X) (100X)	10 mL	51500056
DMEM, high glucose, GlutaMAX Supplement, pyruvate	500 mL	10569010
RPMI 1640 Medium, GlutaMAX Supplement	500 mL	61870036
Medium 199, Earle's Salts	500 mL	11150059
Tryptose Phosphate Broth	100 mL	18050039
Fetal Bovine Serum, Premium Plus	10 x 50 mL	A3840002
GlutaMAX Supplement	100 mL	35050061
TrypLE Express Enzyme (1X), no phenol red	100 mL	12604013
TrypLE Select Enzyme (1X), no phenol red	100 mL	12563011
PBS, pH 7.4	500 mL	10010023
MEM Non-Essential Amino Acids Solution (100X)	100 mL	11140050

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