Qkine

FGF2-G3

Thermostable FGF-2 for enhanced stem cell culture

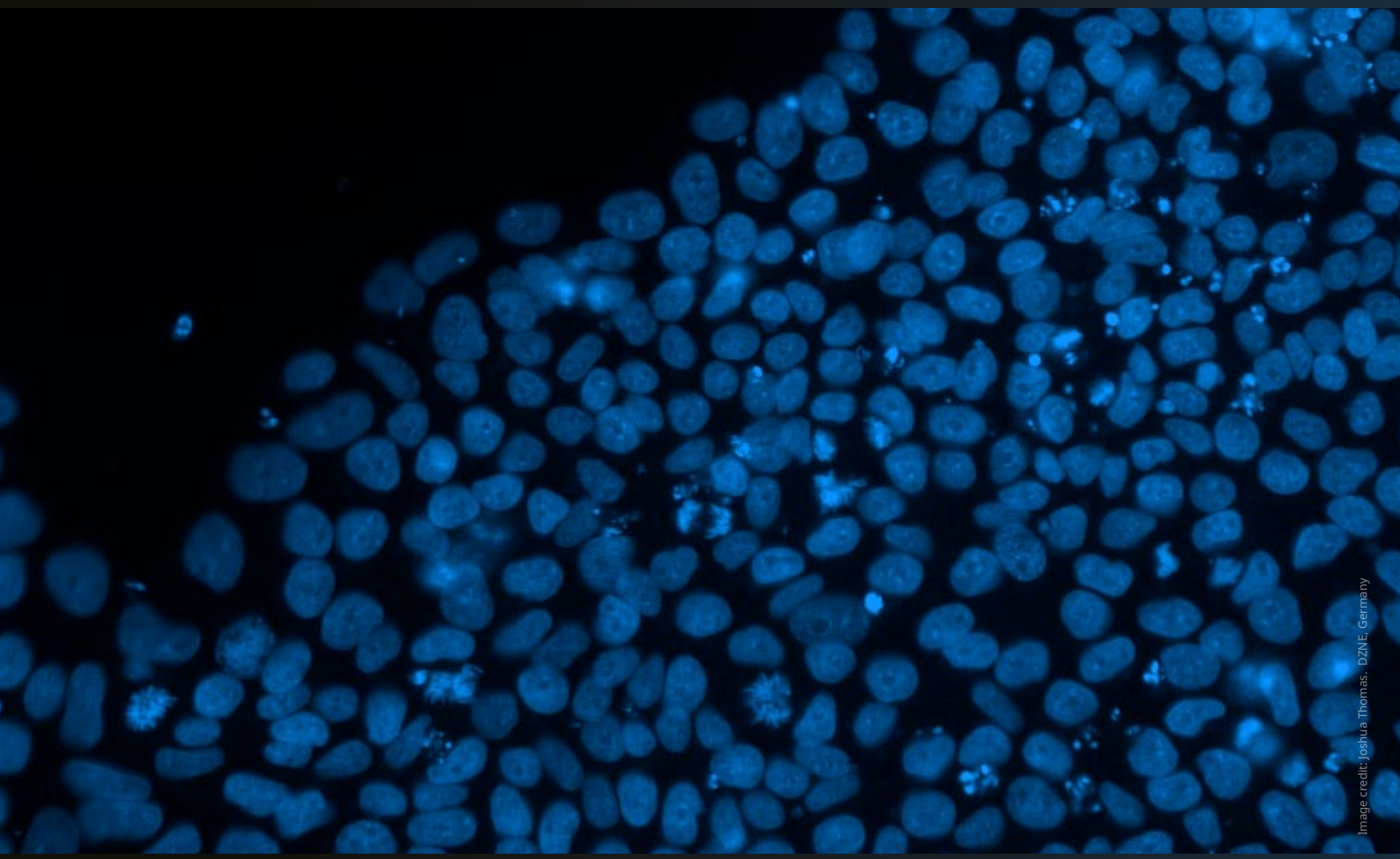

Image credit: Joshua Thomas, DZNE, Germany

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Enhanced reproducibility

Protein innovation

Bioactivity. Guaranteed.

Manufactured in Cambridge, UK

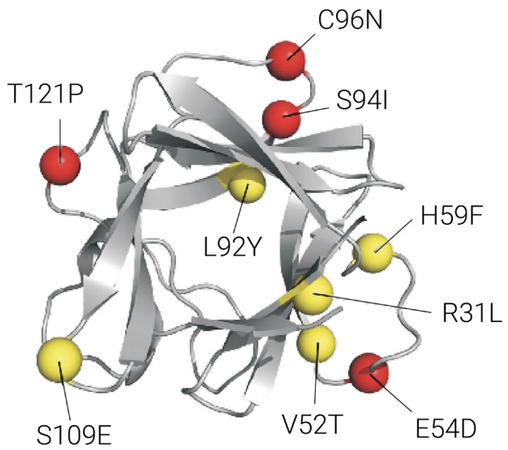
Introducing Qkine thermostable FGF2-G3

FGF2-G3 is a highly bioactive and thermostable (heat stable) engineered form of FGF-2, used to support homogeneous and reproducible stem cell culture while preventing the need for frequent media changes. Wild-type FGF-2 is inherently unstable and prone to proteolytic degradation and aggregation, leading to a short half-life in culture media (<10h), frequent media changes, and variations in culture. FGF2-G3 has been engineered with nine amino acid substitutions to enhance stability without impacting bioactivity. This increases the functional half-life of the protein from <10h (wild-type) to >7 days (FGF2-G3) in culture media.

The use of thermostable FGF2-G3 offers an improved alternative solution that saves researchers valuable time and budget by reducing media changes.

Innovation & engineering

FGF2-G3, or FGF2-STAB®, was developed by Dvorak and colleagues at Masaryk University using computer-assisted protein engineering to identify an optimal set of nine amino acid substitutions that stabilize FGF-2. The patented FGF2-G3 technology from Enantis/Masaryk University was combined with our protein manufacture expertise to make an animal-free, carrier protein-free growth factor with no His-tag, enabling the translation from research to clinical or scale-up applications.



Further reading

Dvorak P, Bednar D, Vanacek P, et al. (2018) Computer-assisted engineering of hyperstable fibroblast growth factor 2. Biotechnol Bioeng. 115(4):850-862.

Kuo HH, Gao X, DeKeyser JM, et al. (2019) Negligible-Cost and Weekend-Free Chemically Defined Human iPSC Culture. Stem Cell Reports. 14(2):256-270.

Benington L, Rajan G, Locher C, Lim LY. (2020) Fibroblast Growth Factor 2-A Review of Stabilisation Approaches for Clinical Applications. Pharmaceutics. 12(6):508.

Designed to help process development and scale-up

Enjoy weekend-free stem cell culture with thermostable FGF2-G3. Qkine FGF2-G3 can replace wild-type FGF-2 in different applications. It can be used with common media formulations including mTeSR, StemPRO, and E8, for the regulation of key cellular processes and improved maintenance of pluripotency.

Thermostable and high efficacy

Bioactive protein

High purity and protein-tag free

AOF

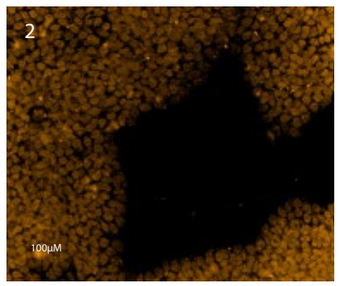
Animal-free and carrier protein-free

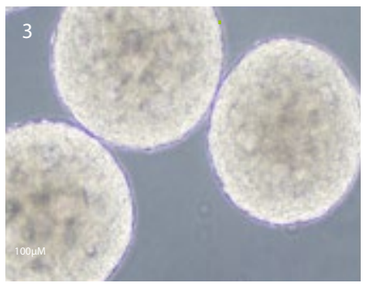
Weekend-free cell culture

145aa and 154aa forms of FGF-2

FGF2-G3 for weekend-free culture

In collaboration with DZNE, Germany, the effects of FGF2-G3 were investigated in iPSC culture. The stability of iPSCs with FGF2-G3 was examined in conditioned media for 72 hours and showed a sustained proliferative state with enhanced colony health without daily media changes (Fig.1). FGF2-G3 was also shown to maintain pluripotency with fewer media changes based on pluripotency marker Oct4 expression level (Fig.2). Finally, the formation of embryoid bodies was demonstrated using FGF2-G3 and a weekend-free cell culture method (Fig.3).



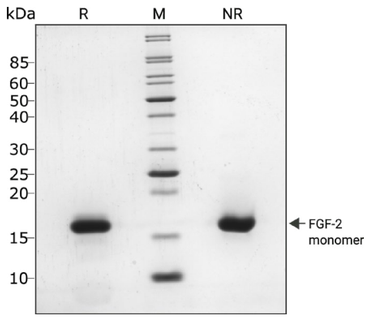


1. iPSCs cultured in mTeSR™1 medium + Qkine FGF2-G3 for 3 days without a media change.
2. Oct4+ iPSCs cultured in mTeSR™1 medium + Qkine FGF2-G3 for 5 days without a media change.
3. Embryoid bodies formation in mTeSR™1 medium + Qkine FGF2-G3 for 3 days without a media change.

Image Credit: Joshua Thomas & Felix Buchner, Deutsches Zentrum für Neurodegenerative Erkrankungen (DZNE), Germany

Application note:
Bioactive thermostable (heat stable) FGF2-G3 growth factors for iPSCs cultures

In collaboration with Joshua Thomas, Felix Buchner & Natalia Rodriguez-Muela from DZNE

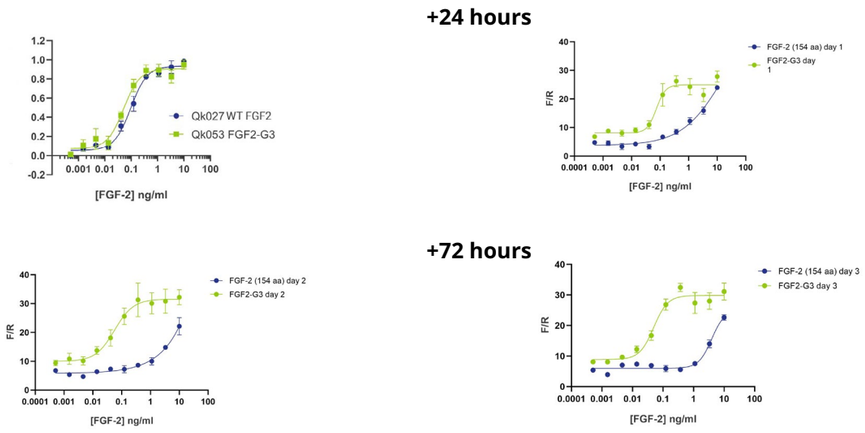


SDS-PAGE of FGF2-G3 in reduced and non-reduced conditions.
Purified recombinant protein (3 µg) was resolved using 15% w/v SDS-PAGE in reduced (+β-mercaptothanol, R) and non-reduced (NR) conditions and stained with Coomassie Brilliant Blue R250. Recombinant FGF2-G3 migrates as a major band at 17 kDa in non-reducing (NR) conditions. Upon reduction (R), only the 17 kDa band is visible. No contaminating protein bands are present highlighting the purity of the protein. Data from Qk053 lot #104340.

Protein stability without compromise

Thermostable FGF2-G3 retains wild-type bioactivity in conditioned media at 37 °C for more than 7 days. This allows for reproducible and homogeneous, weekend-free stem cell culture. All proteins at Qkine are tested for bioactivity using a quantitive luciferase reporter assay to define the complete dose-response curve for the protein of interest and define its EC50 value.

Fig 1.



Thermostable FGF-2 / bFGF (FGF2-G3) retains activity after pre-incubation with conditioned media at 37°C for > 7 days. Wild-type FGF-2 (Qk027) (blue) or FGF2-G3 (Qk053) (green) were untreated (a) or diluted into conditioned media and incubated at 37°C (b-d). Samples were taken at 24 h intervals and FGF-2 activity assayed in triplicate using the Promega serum response element luciferase reporter assay (*) in transfected HEK293T cells. Firefly luciferase activity was normalized to the control Renilla luciferase activity.

Cells are treated in triplicate with a serial dilution of FGF2-G3 for 3 hours. Firefly luciferase activity was measured and normalized to the control Renilla luciferase activity.

Orders and support

Product code	Description
Qk052	Recombinant FGF2-G3 145 aa protein
Qk053	Recombinant FGF2-G3 154 aa protein

Also available for cultured meat media optimization:

Product code	Description
Qk080	Recombinant bovine/porcine FGF2-G3 145 aa protein
Qk081	Recombinant bovine/porcine FGF2-G3 154 aa protein

We're here to help you achieve successful and stress-free science
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FS 747253

Bioactivity. Guaranteed.

Stringent quality control at every step

All our growth factors are manufactured within a stringent quality framework and adhere to our Nine-point Quality Commitment. As part of our Bioactivity Guarantee, we conduct comparative quantitative bioactivity studies with dominant suppliers to ensure the bioactivity of all our proteins is equivalent or greater. Higher compliance protein documentation, including detailed lot-specific CoO, CoA, and animal-free (AOF) certification are available. Please email customerservice@qkine.com to request these.

Raising the standard in bioactive protein manufacturing and innovation

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