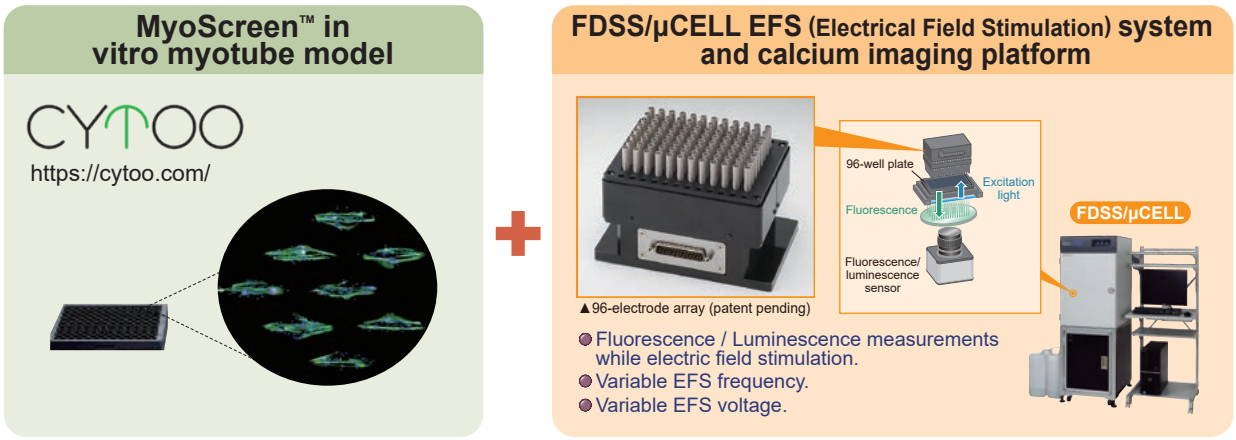
FDSS/μCELL

A new HTS platform (96-well plate) for early muscle drug discovery

The FDSS/μCELL from Hamamatsu was used to measure intracellular calcium transients in real-time, the response to electrical stimulation of MyoScreen™, a patient-derived skeletal muscle in vitro high-throughput platform, as well as the functionality of the excitation-contraction coupling (ECC) machinery were evaluated (Fig. 1, 2, 3). A novel stimulator of myofiber regeneration/repair, recently identified by CYTOO in an "in-house" drug screen, was further characterized on the FDSS-MyoScreen™ system. We found that the hit compound significantly increased levels of myoplasmic calcium compared to non-treated controls upon electrical stimulation (Fig. 4). Overall, the Hamamatsu FDSS/μCELL electrical stimulation and calcium imaging platform combined with the MyoScreen™ in vitro myotube model provides a relevant screening system for modulators of calcium levels in the context of skeletal muscle exercise and performance.



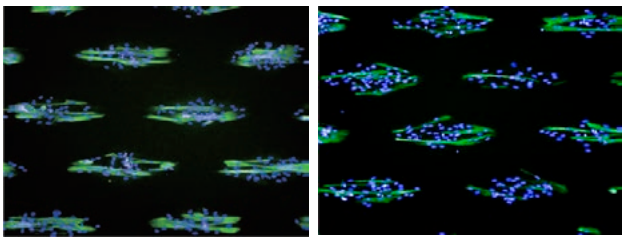
Hamamatsu FDSS/μCELL EFS system and calcium imaging platform combined with the MyoScreen™ in vitro myotube model

Calcium flux of MyoScreen™ using the FDSS/μCELL 96 ch EFS

MyoScreen™ responsiveness to electrical stimulation (Fig. 1)

Captured images of MyoScreen™

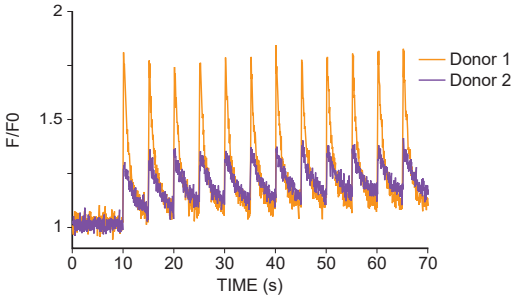
*Microscopy images offered by CYTOO.



Donor 1 (female) Donor 2 (female)

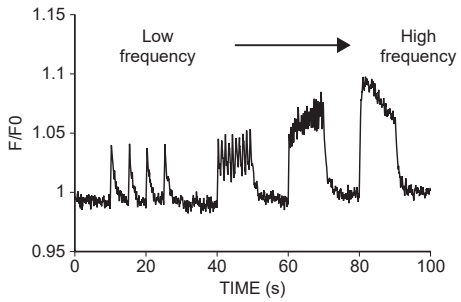
*Green: Troponin T/ Blue: Nuclei

Calcium flux recording with EFS (low frequency stimulation)



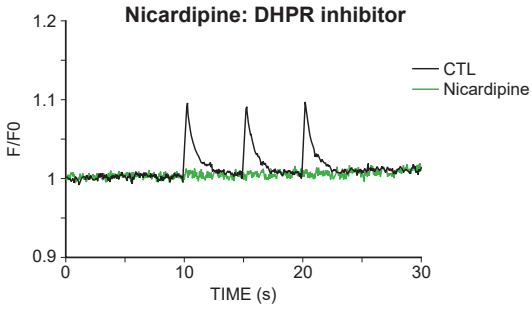
Responsiveness of two donors presenting different maturation stages were observed using the FDSS/μCELL system.

From twitch to tetanus states (Fig. 2)



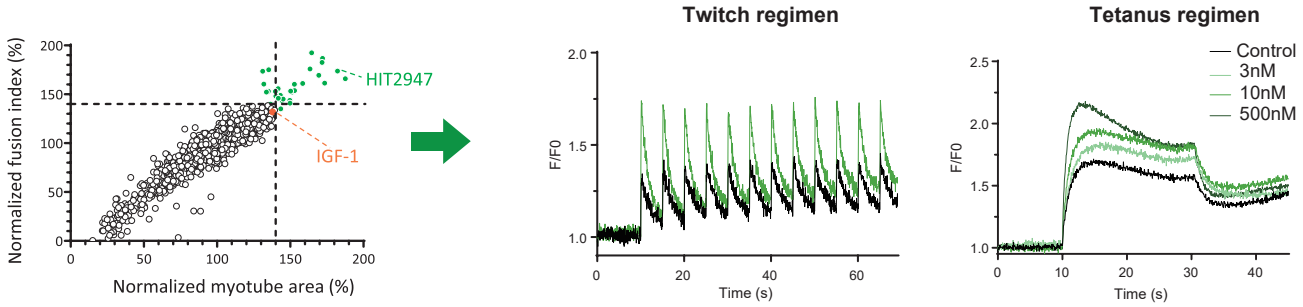
Increasing stimuli frequency results in wave summation and finally complete tetanus reflecting in vivo phenomenon.

Screening of calcium flux modulators (Fig. 3)



Calcium flux modulators can be easily assessed in a high throughput way.

MyoScreen™ drug screen hits identification and response to electrical stimulation (Fig. 4)



Out of 2560 pharmacologically active or FDA-approved drugs, 29 increased fusion index and/or myotube size by >40 %. Among them, a novel stimulator of myofiber regeneration/repair, HIT2947 was further characterized on the FDSS-MyoScreen™ system. We found that the hit compound significantly increased levels of myoplasmic calcium compared to non-treated controls upon electrical stimulation.

* The FDSS/μCELL EFS system should not be used for optically detecting/monitoring change in transmenbrane potential of the cells.
The FDSS/μCELL EFS system should not be used on any cell or cells in which the user or anyone else has expressed target ion channels.

HAMAMATSU PHOTONICS K.K. **www.hamamatsu.com**

Systems Division
812 Joko-cho, Higashi-ku, Hamamatsu City, 431-3196, Japan, Telephone: (81)53-431-0124, Fax: (81)53-433-8031, E-mail: export@sys.hpk.co.jp
U.S.A.: Hamamatsu Corporation: 360 Foothill Road, Bridgewater, NJ 08807, U.S.A., Telephone: (1)908-231-0960, Fax: (1)908-231-1218 E-mail: usa@hamamatsu.com
Germany: Hamamatsu Photonics Deutschland GmbH.: Arzbergerstr. 10, D-82211 Herrsching am Ammersee, Germany, Telephone: (49)8152-375-0, Fax: (49)8152-265-8 E-mail: info@hamamatsu.de
France: Hamamatsu Photonics France S.A.R.L.: 19, Rue du Saule Trapu, Parc du Moulin de Massy, 91882 Massy Cedex, France, Telephone: (33)1 69 53 71 00, Fax: (33)1 69 53 71 10 E-mail: infos@hamamatsu.fr
United Kingdom: Hamamatsu Photonics UK Limited: 2 Howard Court,10 Tewin Road, Welwyn Garden City, Hertfordshire AL7 1BW, UK, Telephone: (44)1707-294888, Fax: (44)1707-325777 E-mail: info@hamamatsu.co.uk
North Europe: Hamamatsu Photonics Norden AB: Torshamnsgatan 35 16440 Kista, Sweden, Telephone: (46)8-509 031 00, Fax: (46)8-509 031 01 E-mail: info@hamamatsu.se
Italy: Hamamatsu Photonics Italia S.r.l.: Strada della Moia, 1 int. 6, 20020 Arese (Milano), Italy, Telephone: (39)02-93 58 17 33, Fax: (39)02-93 58 17 41 E-mail: info@hamamatsu.it
China: Hamamatsu Photonics (China) Co., Ltd.: 1201 Tower B, Jiaming Center, 27 Dongsanhuan Beilu, Chaoyang District, 100020 Beijing, P.R. China, Telephone: (86)10-6586-6006, Fax: (86)10-6586-2866 E-mail: hpc@hamamatsu.com.cn
Taiwan: Hamamatsu Photonics Taiwan Co., Ltd.: 8F-3, No.158, Section 2, Gongdao 5th Road, East District, Hsinchu, 300, Taiwan R.O.C. Telephone: (886)3-659-0080, Fax: (886)3-659-0081 E-mail: info@hamamatsu.com.tw

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