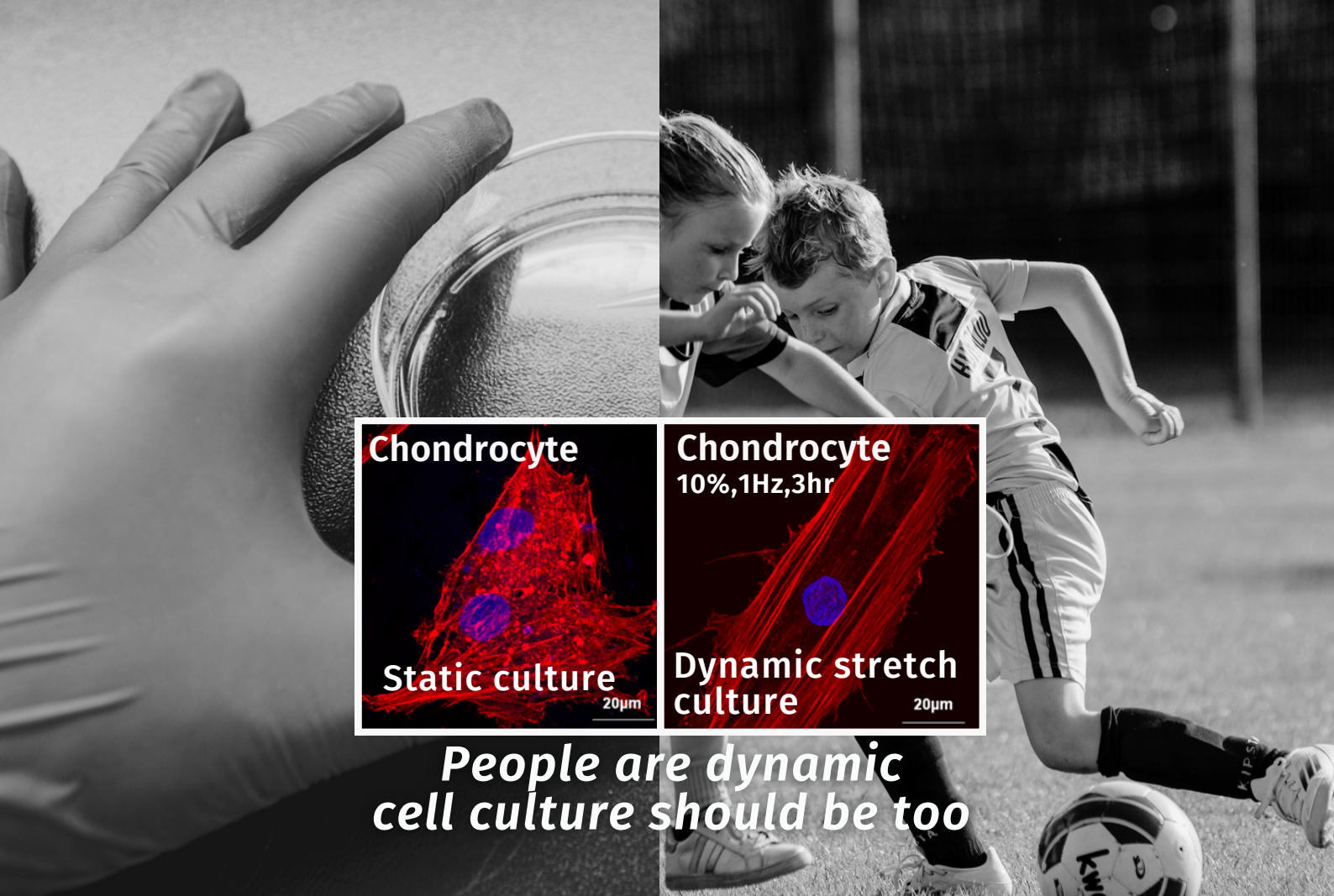




Chondrocyte

Static culture

20µm

Chondrocyte

10%, 1Hz, 3hr

Dynamic stretch culture

20µm

People are dynamic
cell culture should be too

Life
Dynamic



1950s



2D
Static Culture



2026s



2D
Static Culture ?



Animal testing



Physics &
chemistry



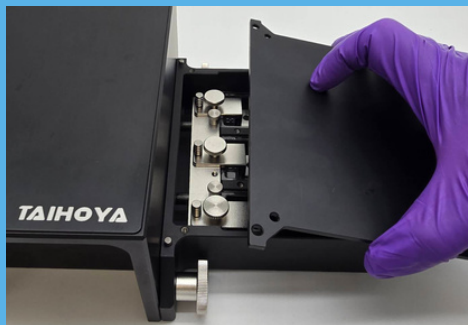
Dynamic
Culture



ATMS Dynamic Culture

It is time to usher in the future

- Produce valuable preliminary data in a rapid manner.
- Generate relevant data before *in vivo* experiments, reducing costs.
- A rapid *in vitro* model for drug testing and study of different diseases.
- Investigate the impact of dynamic stretching on biomaterials and cells.
- Before implantation, adapt stem cells to body tension.



One machine multiple functions



Large PDMS
membrane stretch



Small PDMS
membrane stretch



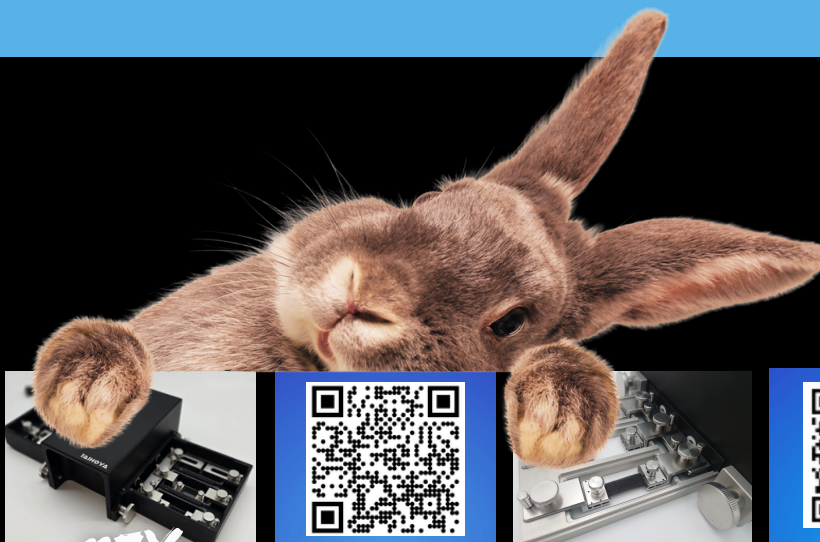
3D scaffold
stretch



3D scaffold
compression



Biopsy stretch



Cyclic Stretch
Triggers VSMC
Overgrowth
via cPLA2
Activation.



115X

The secret to the
remarkable 115-
fold enhancement
in extracellular
vesicle yields.



The model is
capable of
stretching
cells on a
PDMS
membrane.



The model
enables the
stretching of
biomaterials
containing
cells.



The model is
capable of
stretching
living tissue
samples.



The model is
capable of
compressing
biomaterials
containing cells.



Stretching induces a
columnar transition in
MDCK epithelial cells
via Piezo1.

doi10.1016/j.celrep.20
25.115662



Electrical and
mechanical stimulation
promotes
chondrogenesis of stem
cells.

PMID: 37523499



STRETCH VS. ANIMAL TESTING

Joint Overload Study:
24h Stretch Closely
Matches 6w Animal
Results

PMID: 39710977



taihoya

doi:10.1002/advs.20 2411559 PMID: 39173665

PMID: 35450439

doi:10.1016/j.mat
des.2020.108982

doi.org/10.1371/jour
nal.pone.0204603 PMID: 32409092