4Dcell
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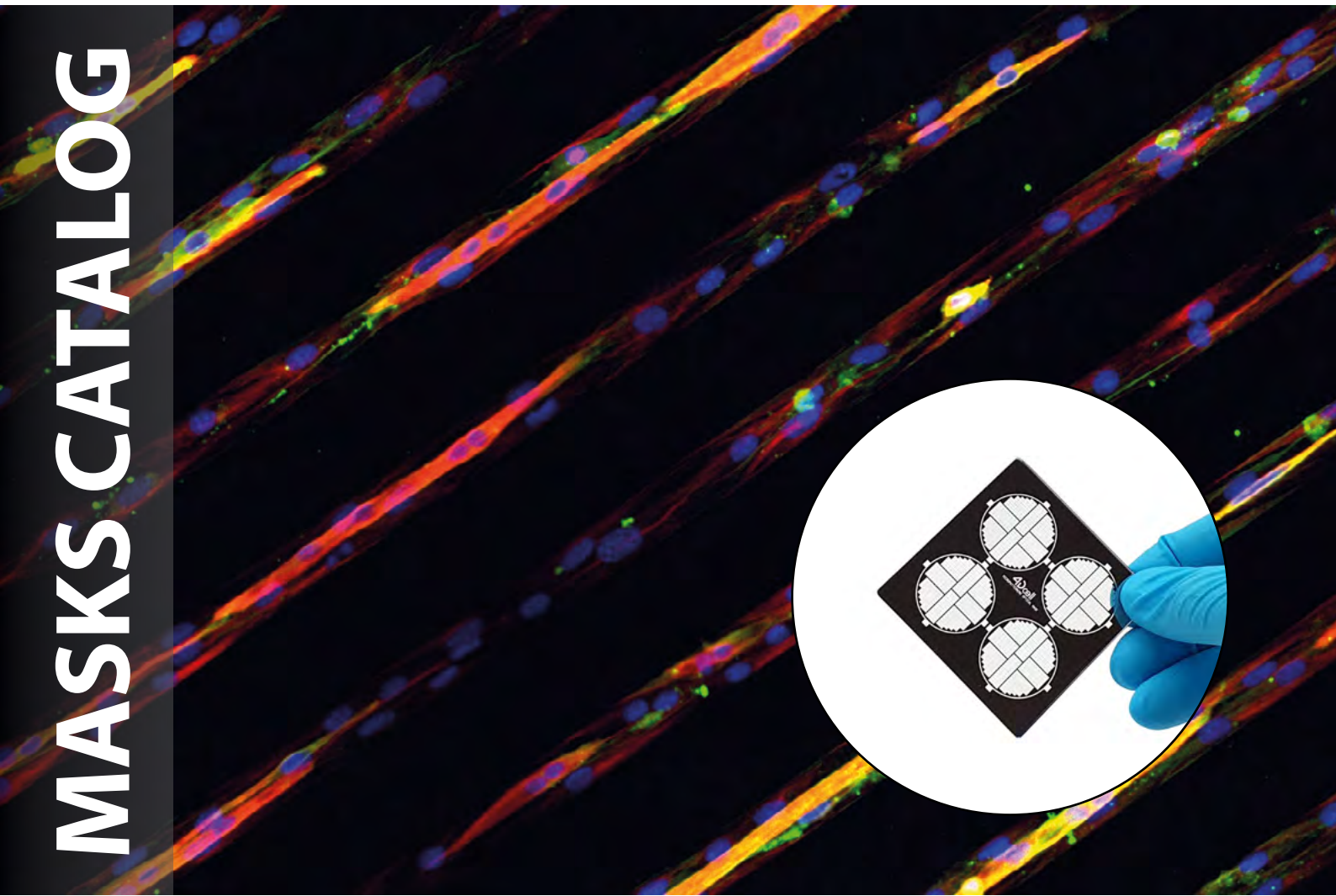
4Dcell photomasks for micropatterning
Sizes & shapes

Set of different shapes and sizes available
Customization of micropattern designs

High resolution imaging

MASKS CATALOG

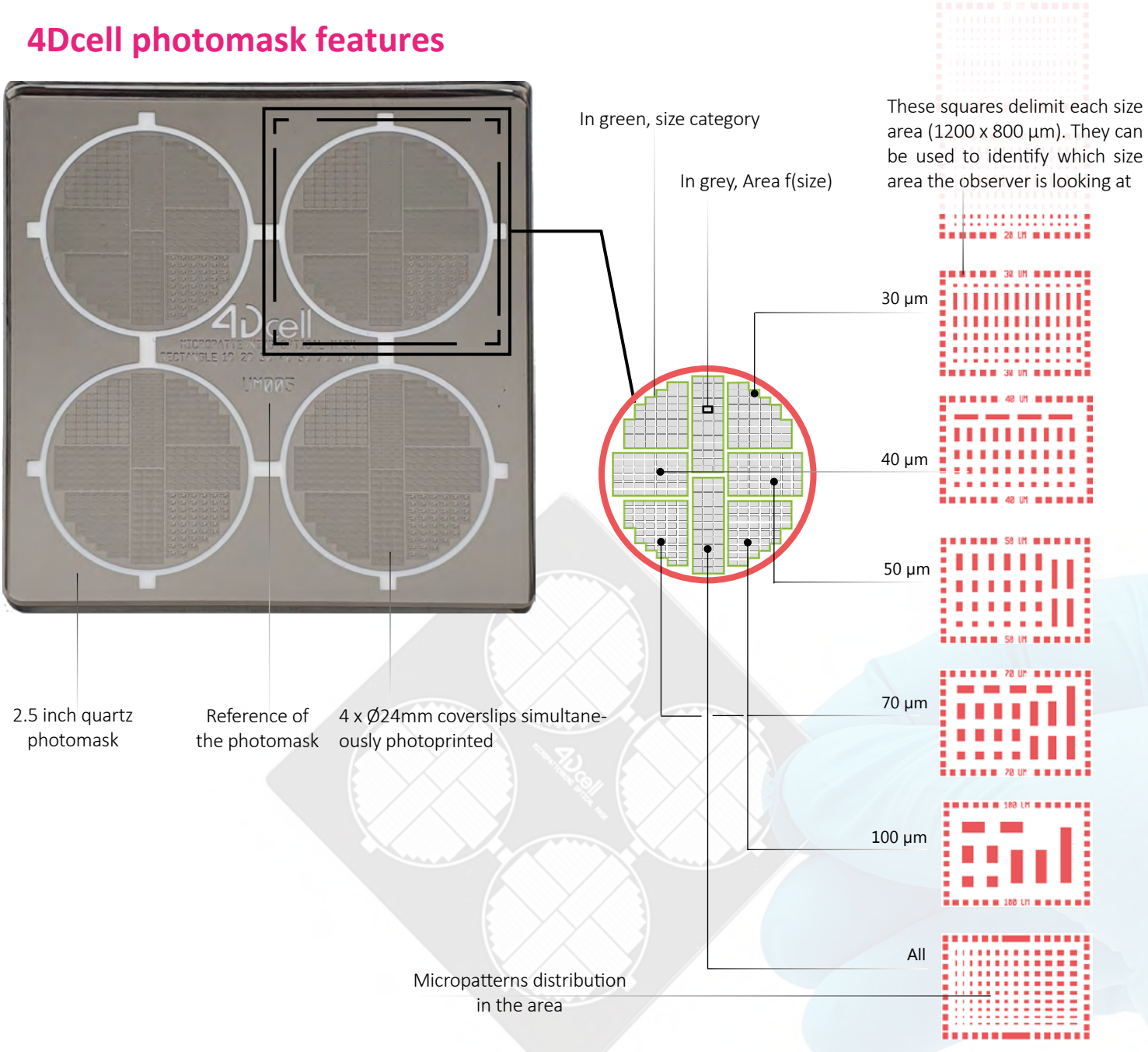


4Dcell photomask specifications

4Dcell 2.5 inches quartz photomasks (60x60 mm) allow photoprinting of 4 glass coverslips simultaneously. These photomasks are designed for **24mm diameter glass coverslips** (glass No. 1.5 / 0.13-0.17 µm). The photomasks are also compatible with other coverslip dimensions (e.g 18 and 12 mm round coverslips).
If the round formats do not fit your experiments, square and rectangular coverslips can also be printed.

4Dcell provides six standard designs: **disk (round), line, square, rectangle, triangle, grid**. Others designs for specific applications are also available (culture of spheroids, growth of neurons, etc.).

4Dcell photomask features



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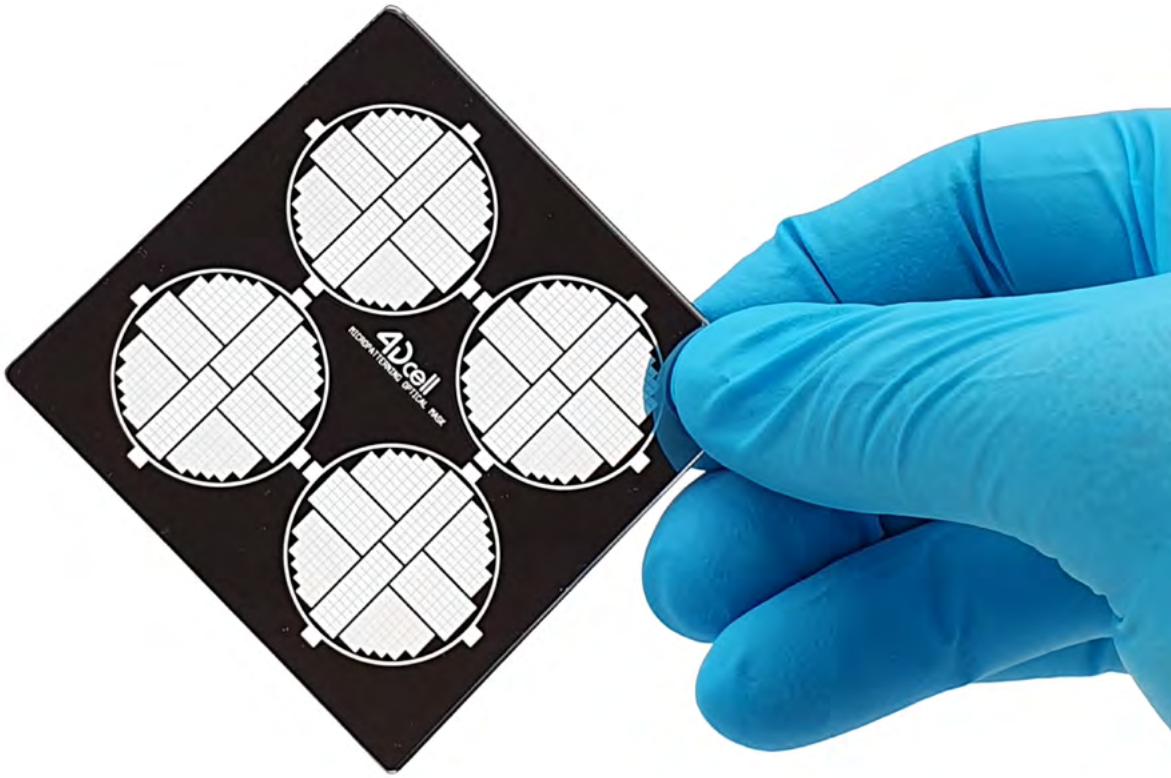


4DCELL STANDARD PHOTOMASKS

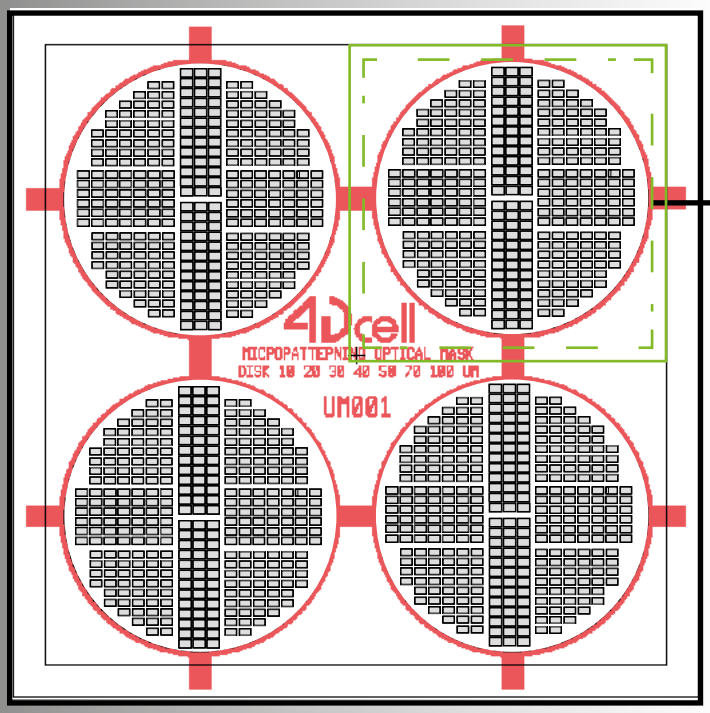
4Dcell Quartz photomask – Disk (round) Shape

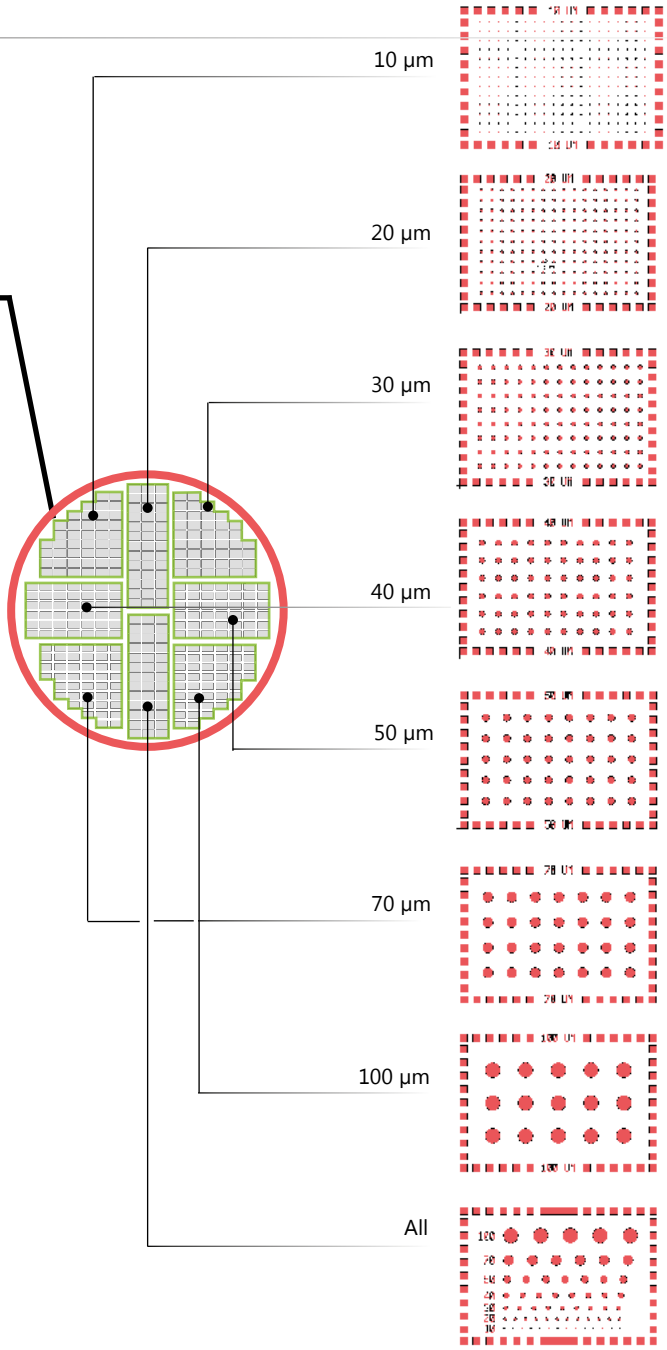
A. Example of applications of 'Disk (round)' **shaped micropatterns**
- Standardize cell shape
- Control the position of cells
- Control surface area of cell adhesion
- Free cell polarisation
- Cell chirality, Ciliogenesis ...
- Small patterns can be used to make attached quasi-spherical cells (mimic detached cells)

B. Line mask reference: **UM001**

C. Features of the patterns

UM001 : Disk (round)





Line width (µm)	# of rectangular areas per disk size	# disks per rectangular areas	Distance between disks (µm)
10	43	247	60
20	39	176	70
30	43	104	90
40	42	60	110
50	42	40	130
70	43	28	160
100	43	15	200
Mixed	39	61	From 60 to 200

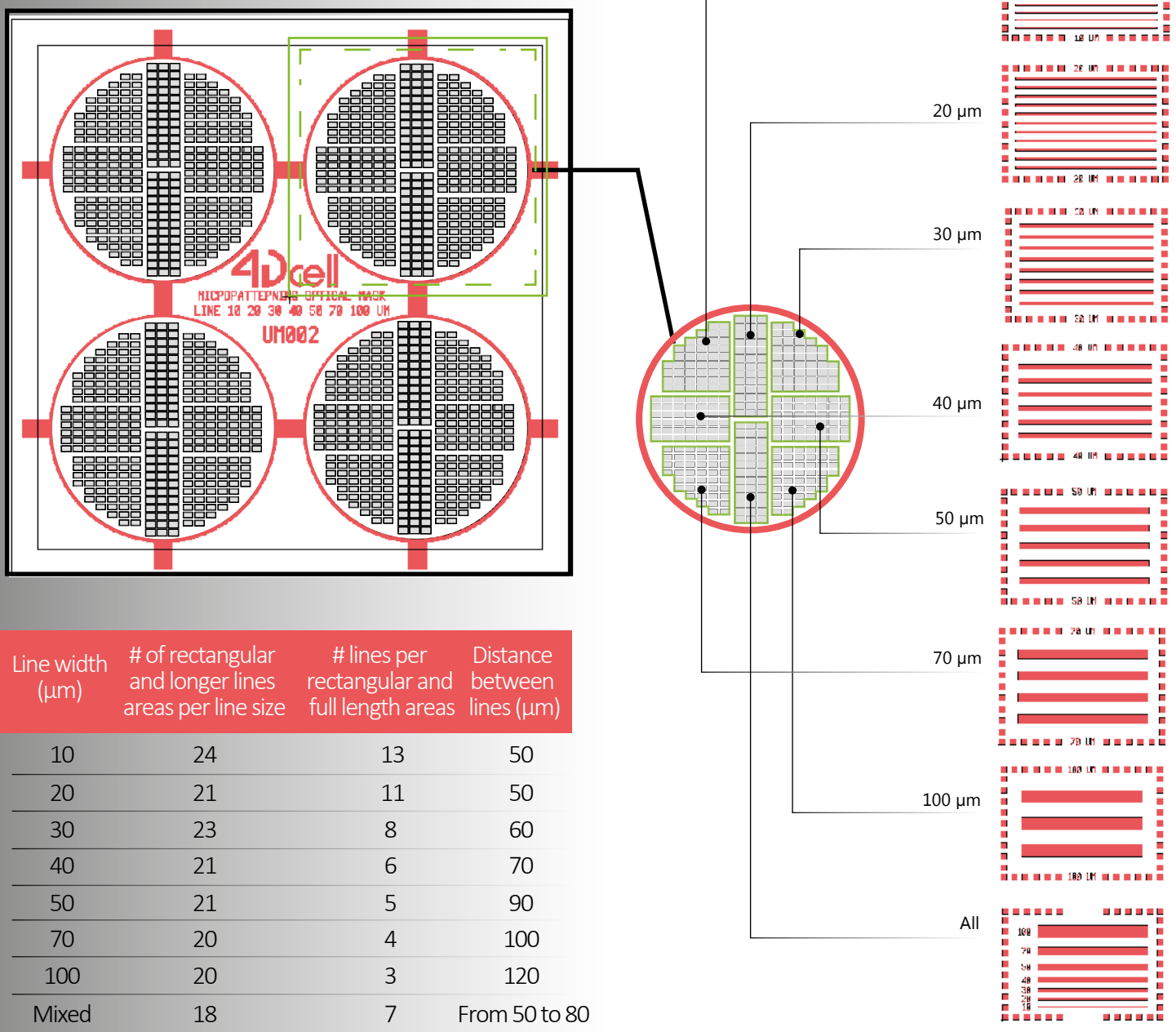
4Dcell Quartz photomask – Line Shape

A. Example of applications of 'Line' **shaped micropatterns**
- Cell migration
- Cell-cell interaction
- Culture of cardiomyocytes, and muscle cells for optimal differentiation
- Cell contractility

B. Line mask reference: **UM002**

C. Features of the patterns

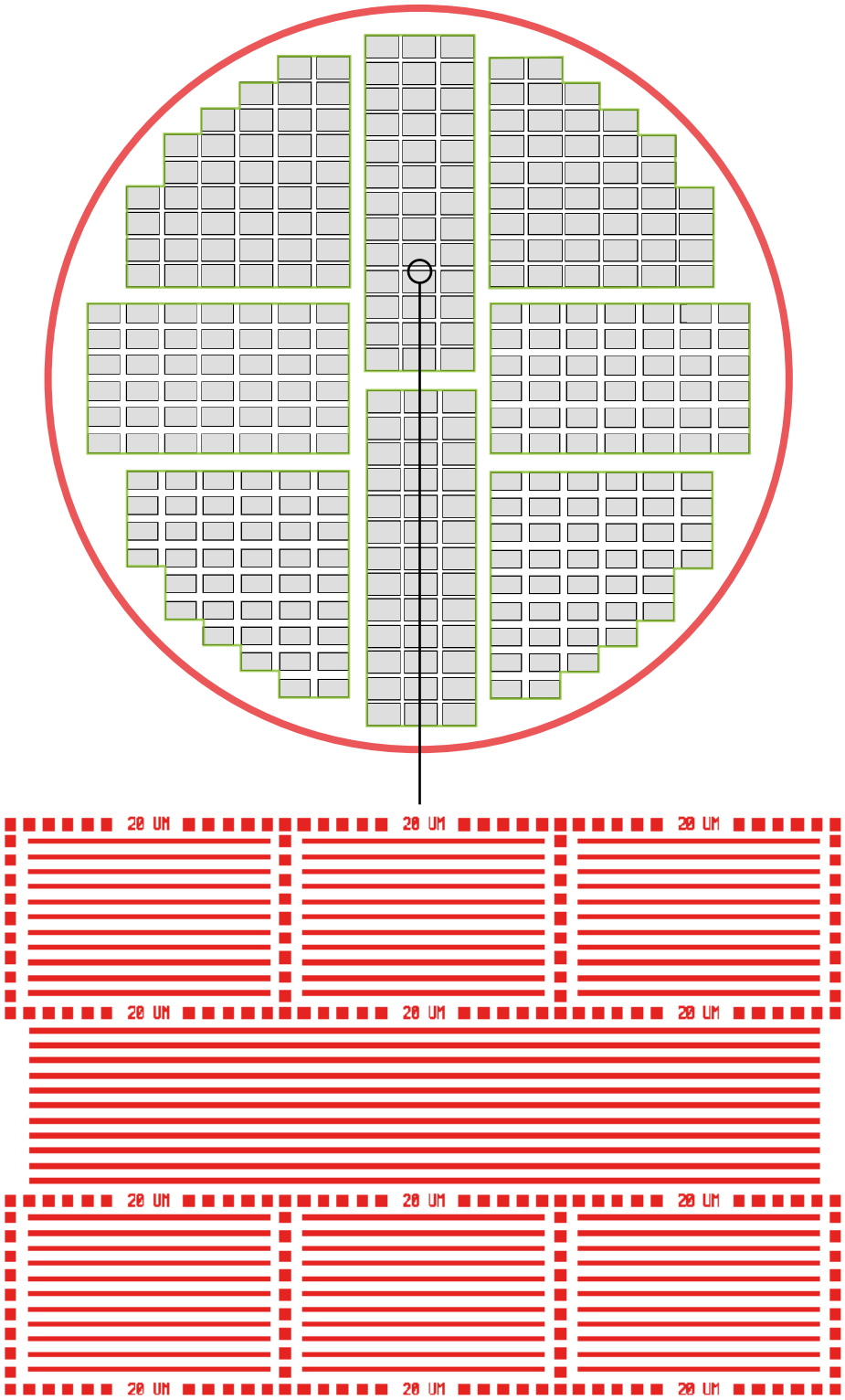
UM002 : Line



Line width (µm)	# of rectangular and longer lines areas per line size	# lines per rectangular and full length areas	Distance between lines (µm)
10	24	13	50
20	21	11	50
30	23	8	60
40	21	6	70
50	21	5	90
70	20	4	100
100	20	3	120
Mixed	18	7	From 50 to 80

Zoom in ...

Each size range has lines arranged in rectangular bundles of 1200 x 800 um followed by bundles of longer lines. This organization is applicable to all sizes.
The image below depicts the case of the 20 µm area: there are lines of a fixed length to fit a 10 x field of view, and there are areas with longer lines, to study, for instance, migration.



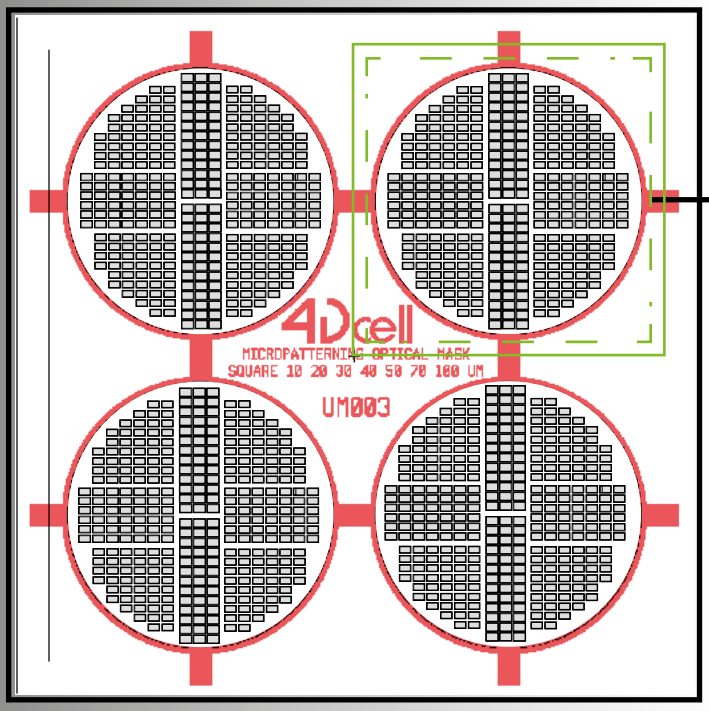
4Dcell Quartz photomask – Square Shape

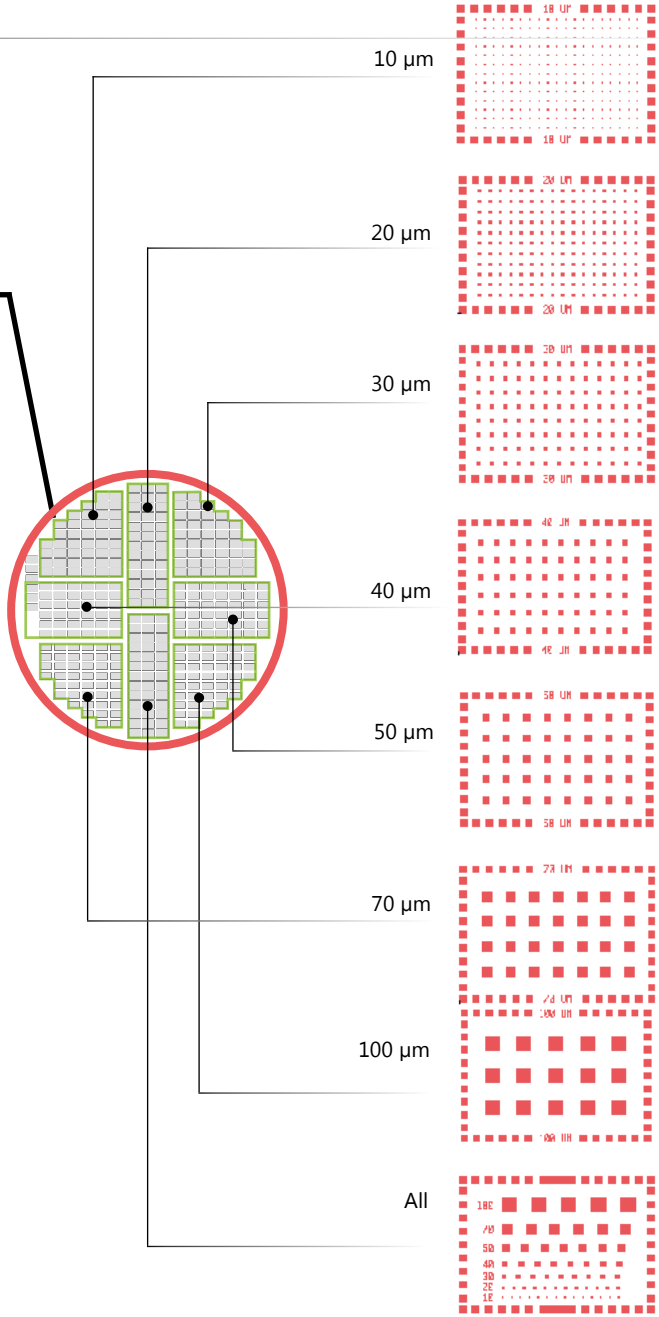
A. Example of applications of 'Square' **shaped micropatterns**
- Restricted area of migration for cells without imposing a shape (on large squares)
- Can impose specific axes to the cell division
- Study of cellular protrusions (lamellipoda, filipodia, and pseudopodia) at the tips of the squares

B. Line mask reference: **UM003**

C. Features of the patterns

UM003 : Square





Line width (µm)	# of rectangular areas per square size	# squares per rectangular areas	Distance between squares (L1, L2) (µm)
10	43	247	50, 50
20	39	176	50, 50
30	43	104	60, 65
40	42	60	70, 80
50	42	40	90, 90
70	43	28	90, 100
100	43	15	120, 120
Mixed	39	61	From 50 to 100

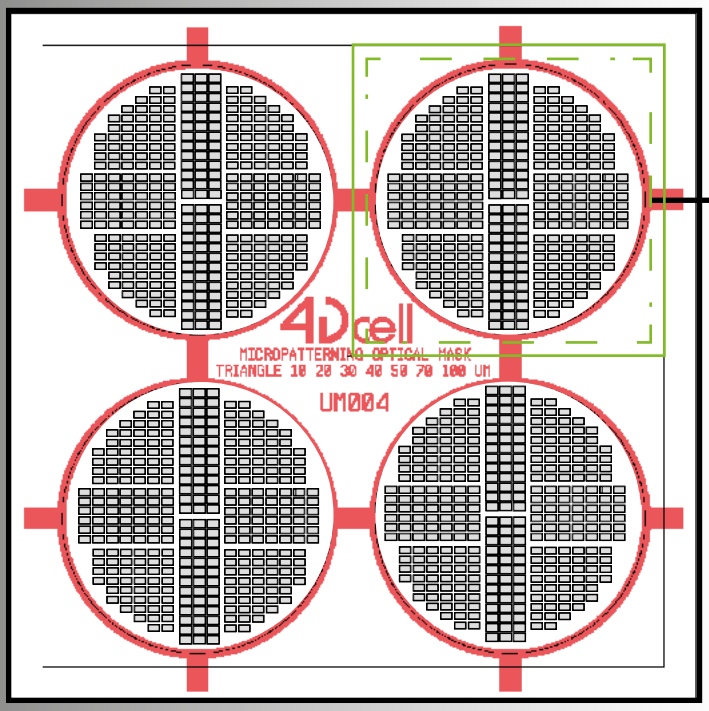
4Dcell Quartz photomask – Triangle Shape

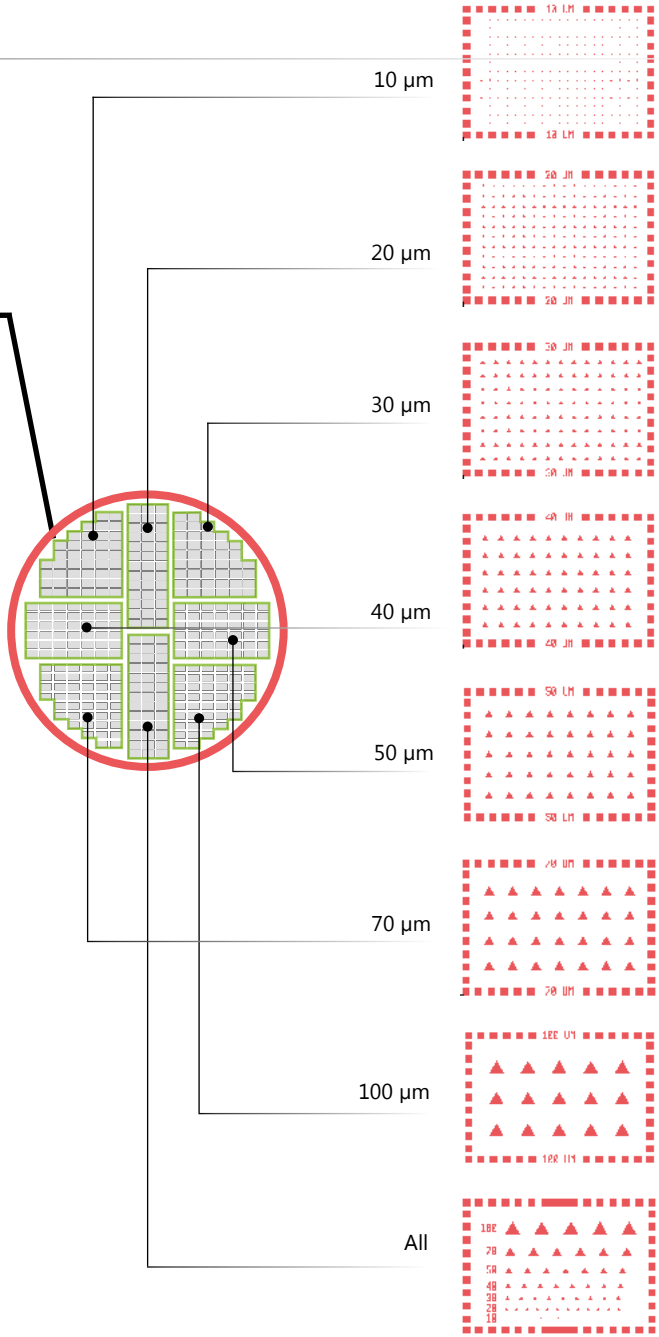
A. Example of applications of 'Triangle' **shaped micropatterns**
- Can impose specific axes of polarization to cells
- Can impose specific axes to cells during divison

B. Line mask reference: **UM004**

C. Features of the patterns

UM004 : Triangle





Triangle size (µm)	# of rectangular areas	# triangles per rectangular areas	Distance between triangles (L1, L2) (µm)
10	43	247	50, 50
20	39	176	50, 50
30	43	104	60, 70
40	42	60	70, 85
50	42	40	90, 100
70	43	28	90, 110
100	43	15	120, 130
Mixed	39	61	From 50 to 100

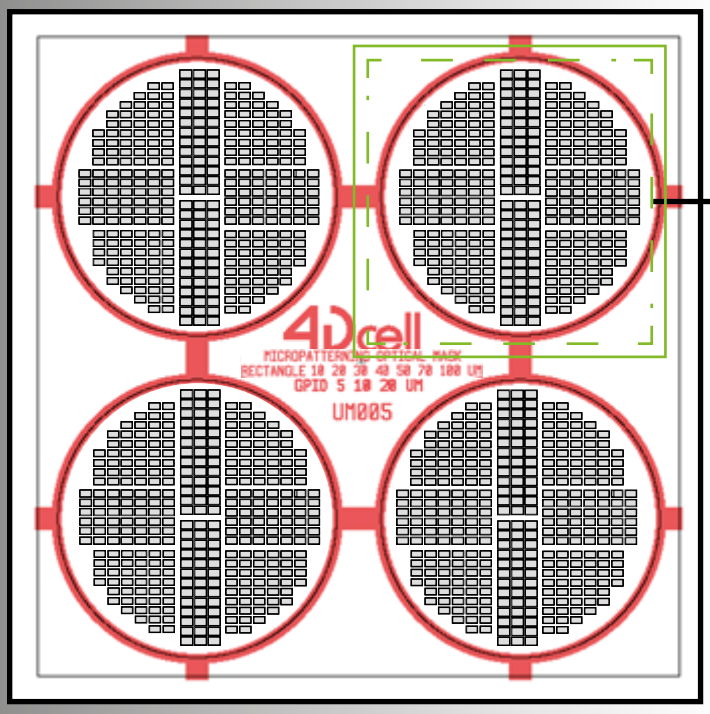
4Dcell Quartz photomask – Rectangle Shape

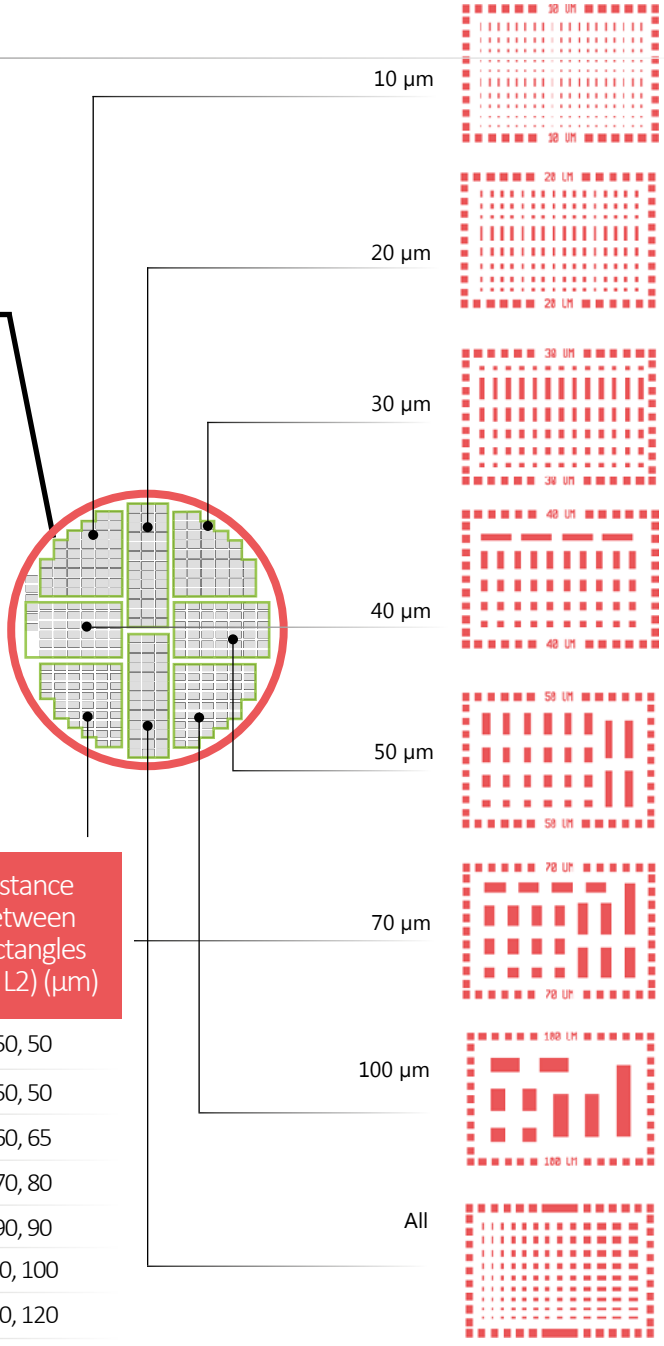
A. Example of applications of 'Rectangle' **shaped micropatterns**
- Restricted area of migration for cells without imposing a shape (on large rectangles)
- Culture of muscle cells
- Maturation of iPSC-cardiomyocytes
- Organelle positioning and morphology
- Cell polarization

B. Line mask reference: **UM005**

C. Features of the patterns

UM005 : Rectangle





Rectangle width (µm)	Rectangle length (µm)	# of rectangular areas per rectangle size	# rectangle per rectangular areas	Distance between rectangles (L1, L2) (µm)
10	10, 15, 20, 30, 50	43	190	50, 50
20	20, 30, 40, 60, 100	39	128	50, 50
30	30, 45, 60, 90, 150	43	78	60, 65
40	40, 60, 80, 120, 200	42	44	70, 80
50	50, 75, 100, 150, 250	21	28	90, 90
70	70, 100, 140, 210, 350	43	22	90, 100
100	100, 150, 200, 300, 500	43	9	50, 120
10, 15, 20, 25, 30, 35, 40, 45, 50	10, 15, 25, 30, 35, 40, 45, 50, 55, 60, 65	39	117	120

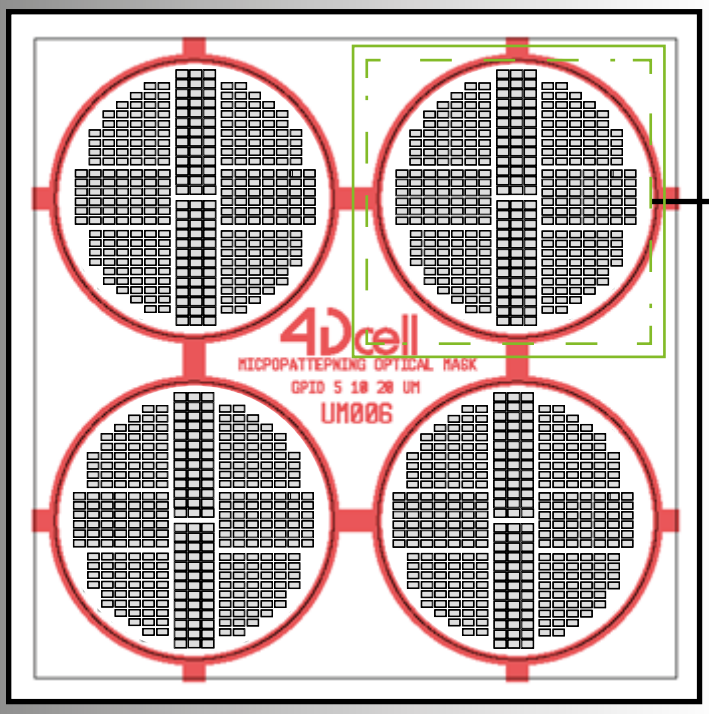
4Dcell Quartz photomask – Grid Shape

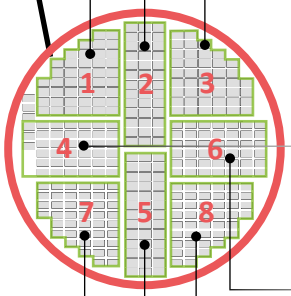
A. Example of applications of 'Grid' **shaped micropatterns**
- Cell migration
- Neuronal networks and synaptic connections

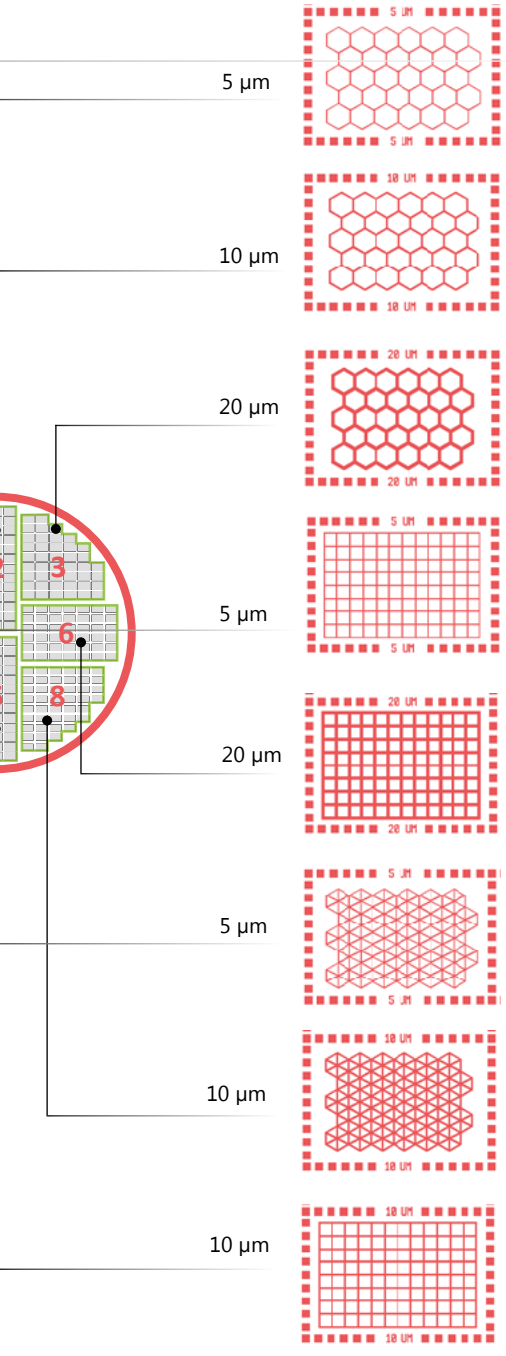
B. Line mask reference: **UM006**

C. Features of the patterns

UM006 : Grid







Area on the coverslip	# of rectangular areas per grid size	width of the lines within the grid (µm)
1	43	5
2	39	10
3	43	20
4	42	5
5	40	10
6	43	20
7	43	5
8	39	10

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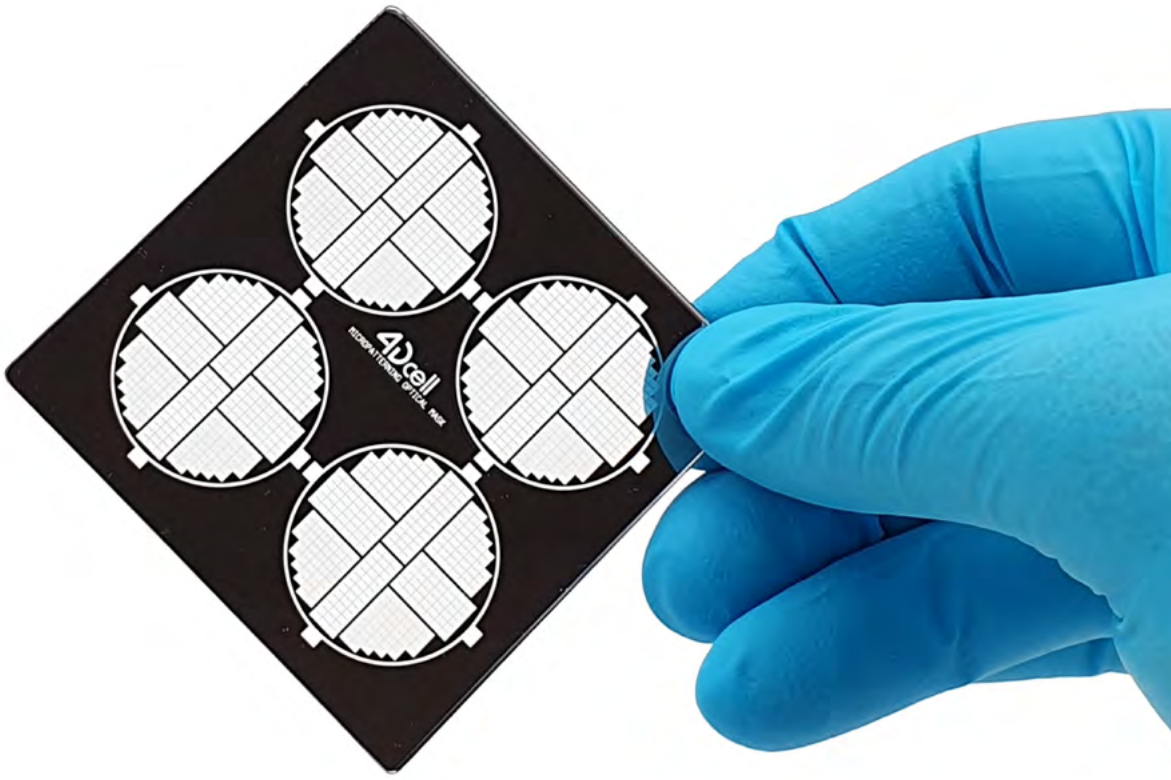


4DCELL SPECIFIC PHOTOMASKS

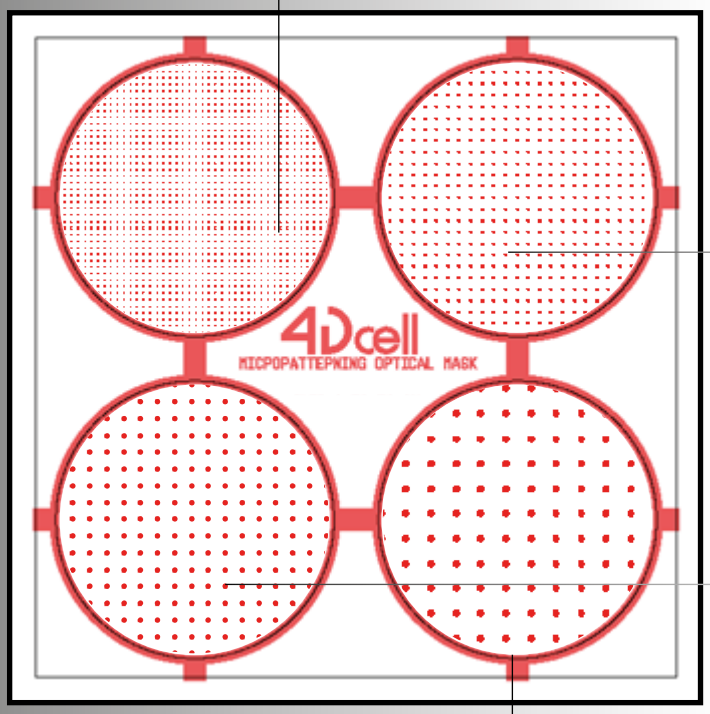
4Dcell Quartz photomask – Large disk Shape

A. Example of applications of 'Large disk' **shape micropatterns**
- Formation of spheroids
- Controlled cell migration with dynamic micropatterns

B. Line mask reference: **UM007**

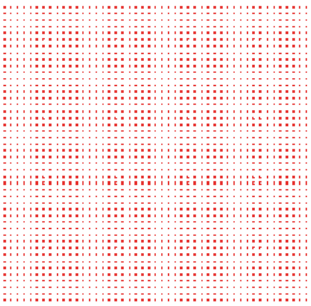
C. Features of the patterns

UM007 : Large disk

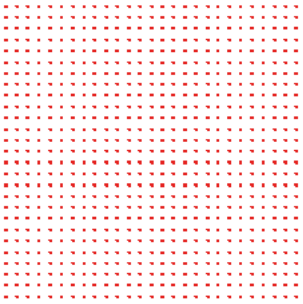


Disk diamater (µm)	Distance between disks (µm)
100	500
200	800
300	1200
500	1500

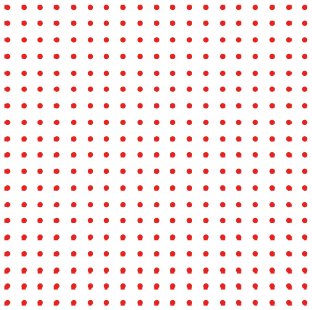
100 µm



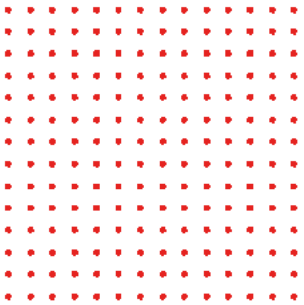
200 µm



300 µm



500 µm

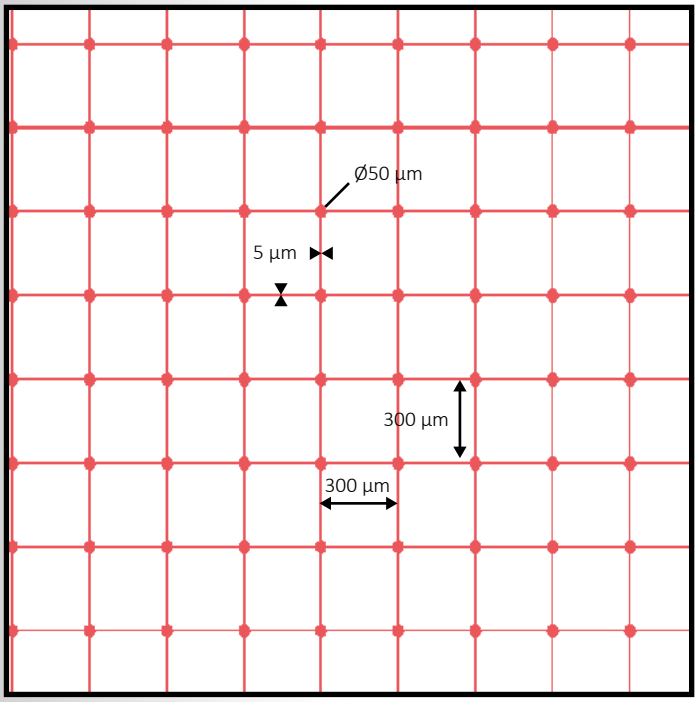


4Dcell Quartz photomask – Specific design Neurons

A. Features
Coverslip Format: from **10 mm to 24 mm** (round glass coverslips)
Coverslip thickness: **170 µm**
Disk diameter: **50 µm**
Line length: **300 µm**
Line thickness: **5 µm**

B. Line mask reference: **UMN50**

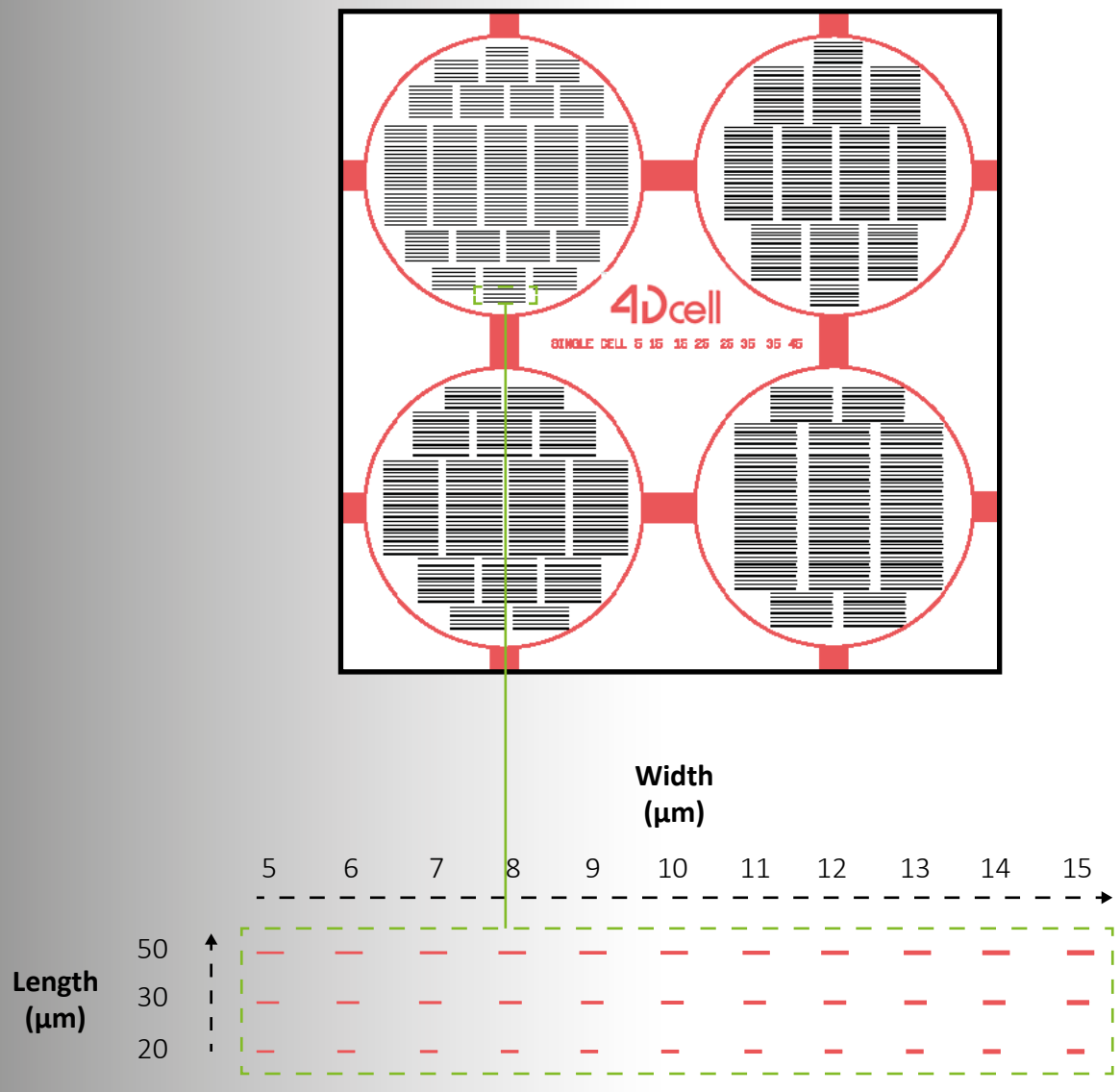
UMN50: Disks and lines



4Dcell Quartz photomask – Specific design Rectangles ‘5 to 15 µm’

A. Features
Coverslip Format: **24 mm** coverslips
Rectangle length: **20 µm, 30 µm, 50 µm**
Rectangle width: **5 to 15 µm**
Separation between patterns: **300 µm**
Number of patterns per coverslip: **2739**

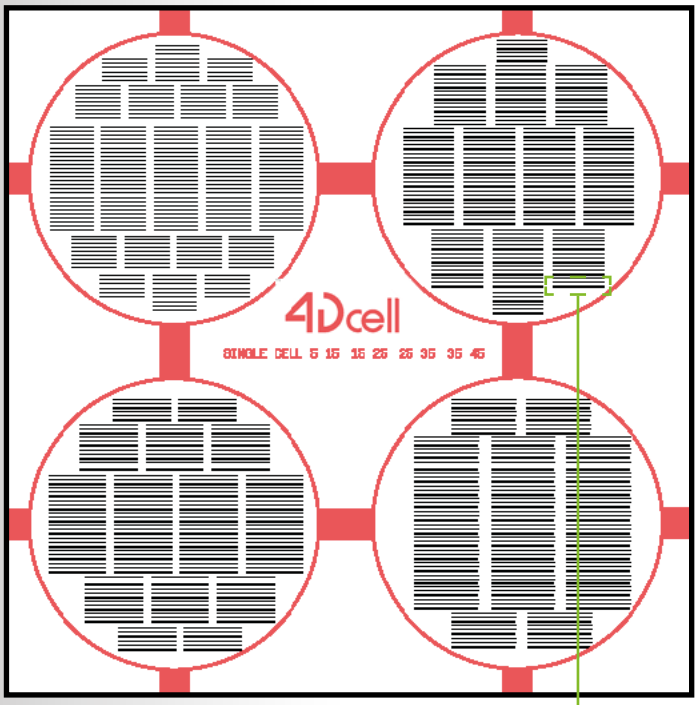
B. Line mask reference: **UMR05-15**

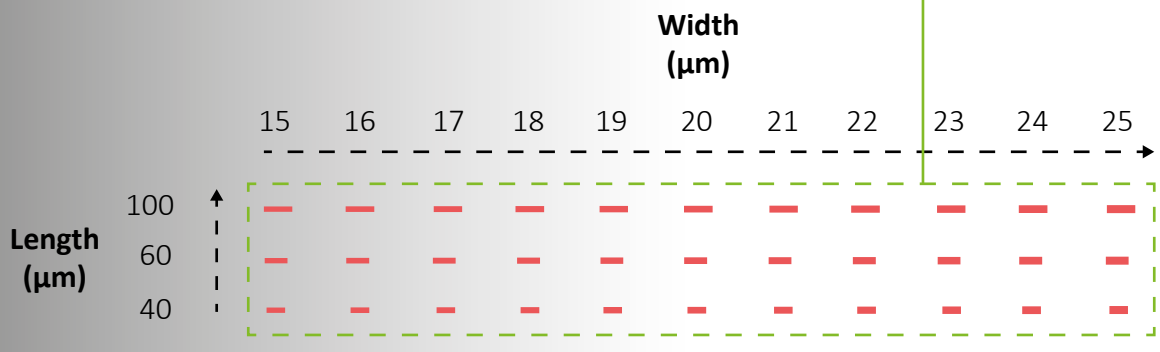


4Dcell Quartz photomask – Specific design Rectangles ‘15 to 25 µm’

A. Features
Coverslip Format: **24 mm** coverslips
Rectangle length: **40 µm, 60 µm, 100 µm**
Rectangle width: **15 to 25 µm**
Separation between patterns: **300 µm**
Number of patterns per coverslip: **2178**

B. Line mask reference: **UMR15-25**

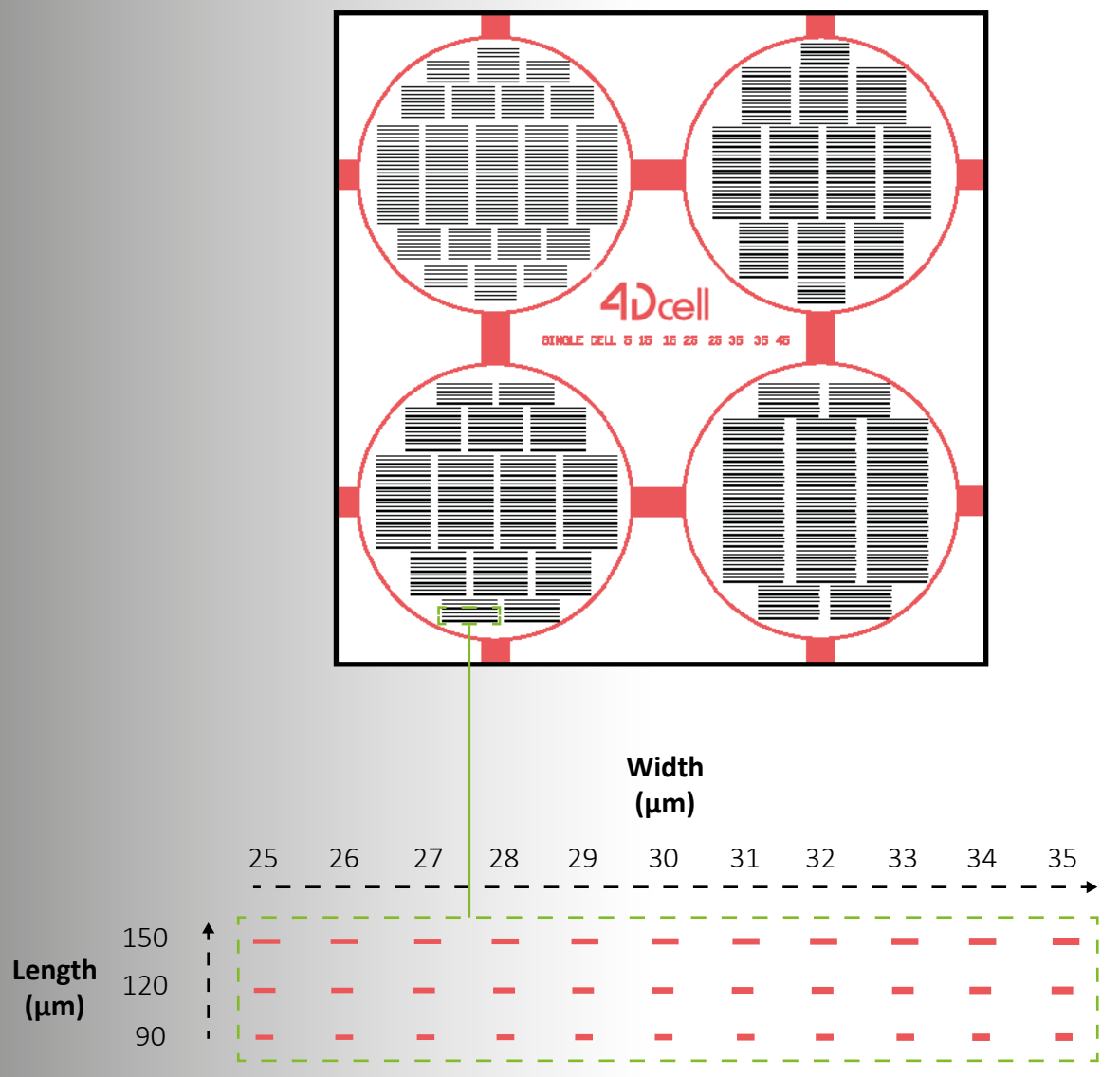




4Dcell Quartz photomask – Specific design Rectangles ‘25 to 35 µm’

A. Features
Coverslip Format: **24 mm** coverslips
Rectangle length: **90 µm, 120 µm, 150 µm**
Rectangle width: **25 to 35 µm**
Separation between patterns: **300 µm**
Number of patterns per coverslip: **2112**

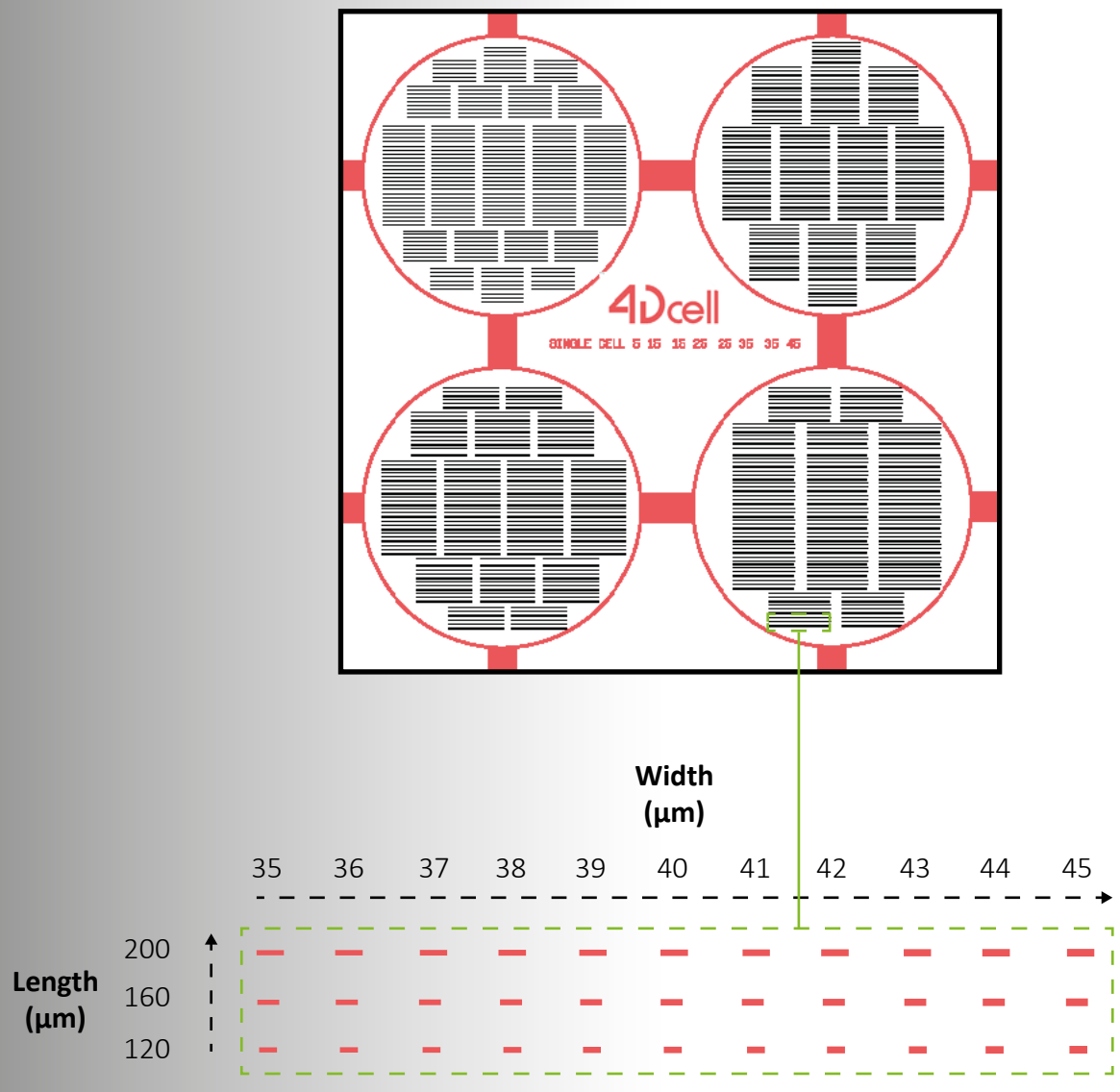
B. Line mask reference: **UMR25-35**



4Dcell Quartz photomask – Specific design Rectangles ‘35 to 45 µm’

A. Features
Coverslip Format: **24 mm** coverslips
Rectangle length: **120 µm, 160 µm, 200 µm**
Rectangle width: **35 to 45 µm**
Separation between patterns: **300 µm**
Number of patterns per coverslip: **1782**

B. Line mask reference: **UMR35-45**



The link between biophysics and biology

Based on the experience of the R&D team, 4DCell offers other a product whose innovation lies in its flexibility of use.

Our goal is to provide affordable biophysical tools adapted to customized applications, thus meeting your research needs. This is ensured without compromising quality, thanks to the extensive know-how the R&D team has and which we apply to select the best materials and methods to deliver perfect products fabricated to order, in-house in our labs in Montreuil, Paris, France.

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