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PRESS RELEASE

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Advanced online publication in *Cell Reports*: Researchers at the Université libre de Bruxelles, ULB uncover the number and clonal dynamics of cardiac progenitors during heart morphogenesis.

The heart is a complex organ that contains four different chambers and different cell types. It is the first organ formed during embryogenesis. During development, it is crucial that a precise number of cardiac progenitors are specified at the correct time, migrate at the correct place and proliferate to expand the pool of progenitors and ensure the harmonious morphogenesis and growth of the heart. Any defects during this critical stage of development will lead to congenital heart diseases, which represent the first cause of severe birth malformations.

In a new study published in *Cell Reports*, researchers led by Pr. **Cédric Blanpain**, MD/PhD, WELBIO investigator at the IRIBHM, Université libre de Bruxelles, Belgium, **have uncovered the number and clonal dynamics of early Mesp1 cardiac progenitors during mouse heart morphogenesis.**

Samira Chabab and colleagues performed a mosaic and a temporal clonal analysis of early cardiac progenitors combined with quantitative biophysical analysis to investigate their clonal behaviours during embryonic development. Using this multidisciplinary approach, they defined that about 250 cardiac progenitors, born during gastrulation, contribute to heart formation. « It will be now very interesting to assess the importance of specifying the correct number of progenitors during heart morphogenesis. In other words it would be interesting to address whether these progenitors are plastic and whether a minimum number is required for proper heart development. » comments Samira Chabab, the first author of this study.

In addition, the analysis of the shapes and sizes of the labeled clusters, that derive from the labeling of single progenitors, have provided interesting insights on the growth of these progenitors in the different regions of the heart. It revealed oriented modes of growth that are specific to the different regions of the heart and that changed during fetal heart

remodeling. Surprisingly, they found that despite their emergence at different time points during gastrulation and their differential contribution to different heart regions, the different subpopulation of cardiac progenitors share remarkably similar proliferative behaviour.

In conclusion, this work provides new insights into the number, the behaviours of cardiac progenitors during mammalian development and may have important implications for understanding the mechanisms underlying congenital heart defects and other organ malformations. « We developed a novel theoretical scheme very useful to interpret clonal and mosaic lineage tracing data sets, which can be translated to the study of the development and maintenance of other organs and tissues. We therefore believe that this approach will be of wider interest to the community, from developmental and stem cell biologists to physicist and mathematicians working in the field of biology» comments Pr Cédric Blanpain, the senior author of this study.

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Journalists should seek to credit ***Cell Reports*** as the source of the covered story.

Samira Chabab *, Fabienne Lescroart *, Steffen Rulands *, Navrita Mathiah, Benjamin D Simons and Cédric Blanpain. Uncovering the number and clonal dynamics of Mesp1 progenitors during heart morphogenesis.

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