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A Kappa model for hepatic stellate cells activation by TGFB1

Matthieu Bouguéon, Pierre Boutillier, Jerome Feret, Octave Hazard, Nathalie Theret

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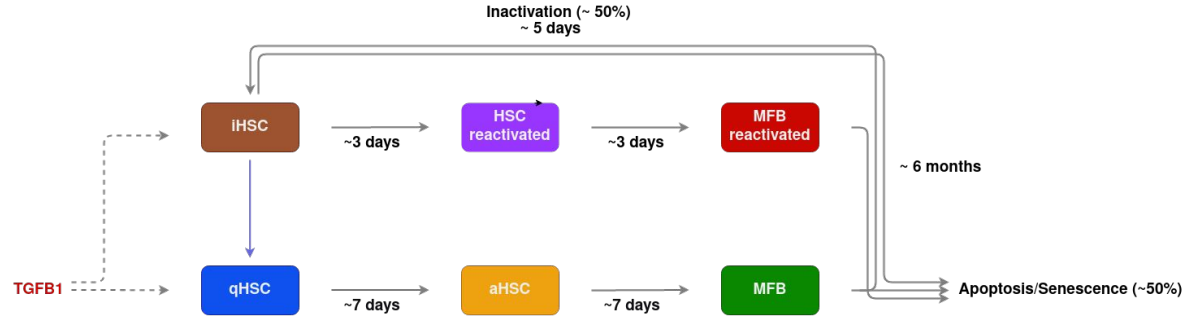
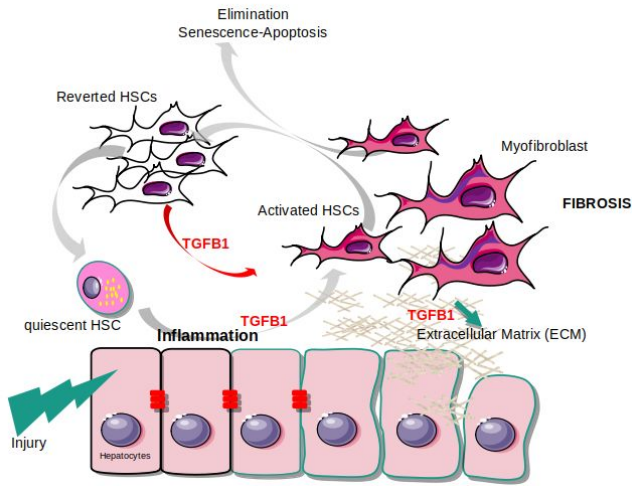


A Kappa model for hepatic stellate cells activation by TGFB1

^{1,2,3}
Matthieu Bouguéon, Pierre Boutillier, Jérôme Feret, Octave Hazard and Nathalie Theret.



Hepatic Stellate Cells ; the drivers of tissue repair and fibrosis

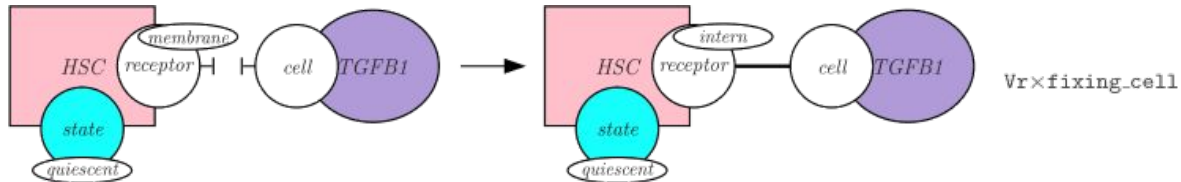


Kappa

Rule-based language for modeling systems of interacting agents (<https://kappalanguage.org/>)

Entities are graphical structures, rules are graph-rewrite directives.

Rules locally modify the state of a system

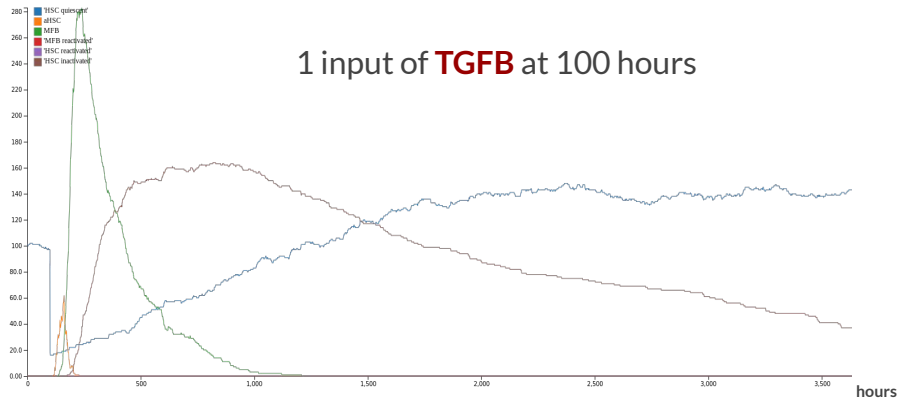


```
'HSC(state{quiescent} TGFB1_2[membrane][.]), TGFB1(cell[.], state{active}) -> HSC(state{quiescent} TGFB1_2[intern][1]), TGFB1(cell[1] state{active}) @ 'Vr' * 'fixing_cell'
```

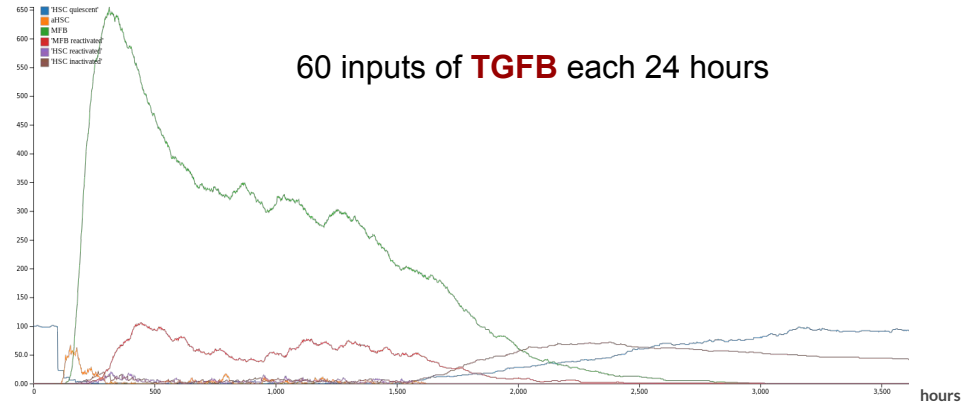
Acute simulation



Number of occurrences



Number of occurrences

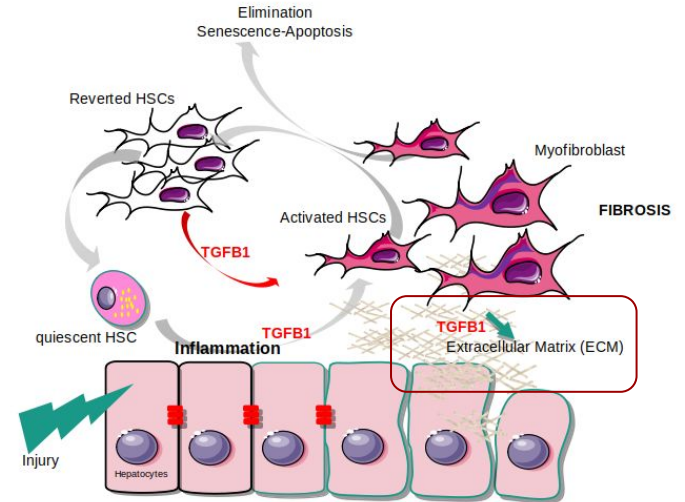


Conclusion

- ❖ reverted HSC (iHSC) are key regulators
- ❖ **TGFB1** is necessary to induce HSC activation but doesn't allow to reach a fibrotic state characterised by persistent high level of MFB

Hypothesis ; extracellular matrix contribute to the sustained activation of HSCs ?

A New model to develop !





Thank you for your attention