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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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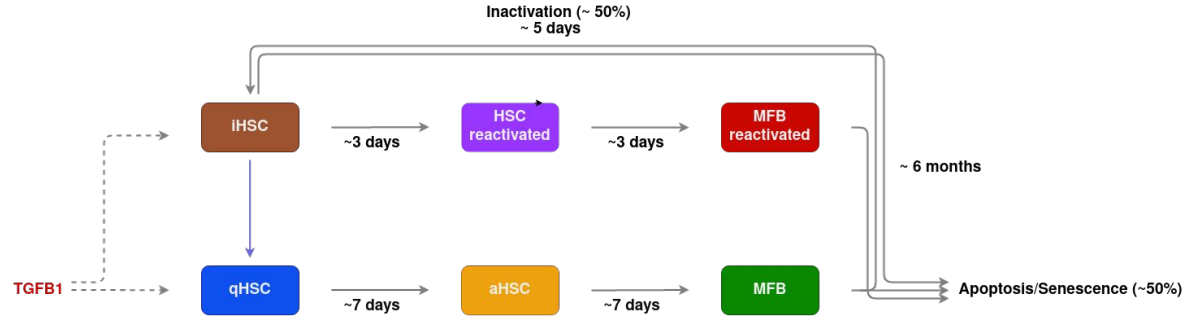
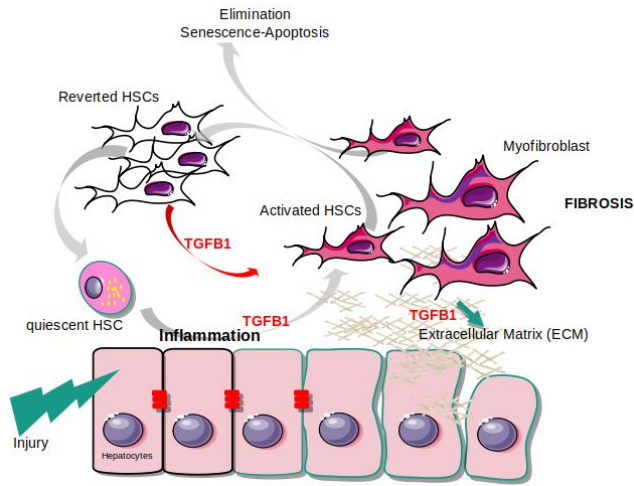


# A Kappa model for hepatic stellate cells activation by TGFB1

<sup>1,2,3</sup>  
Matthieu Bouguéon, Pierre Boutillier, Jérôme Feret, Octave Hazard and Nathalie Theret.



# Hepatic Stellate Cells ; the drivers of tissue repair and fibrosis

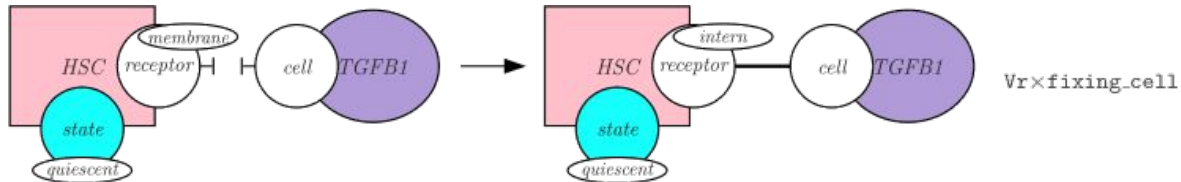


# Kappa

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

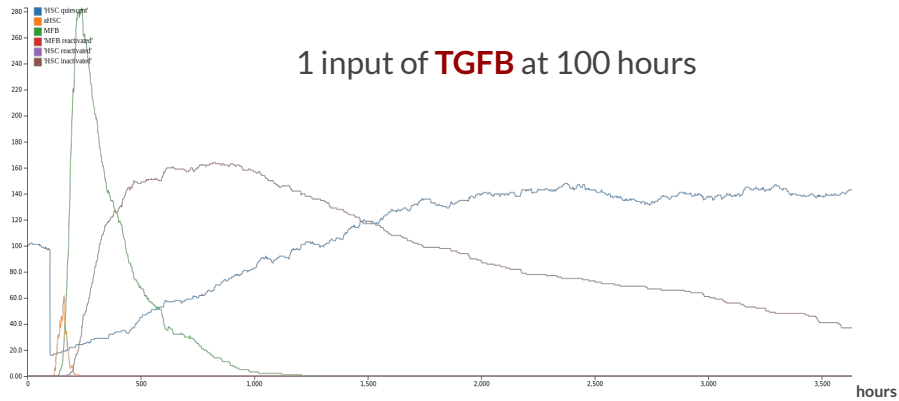


```
'HSC(state{quiescent} TGFB1_2{membrane}[.]), TGFB1(cell[.], state{active}) -> HSC(state{quiescent} TGFB1_2{intern}[1]), TGFB1(cell[1] state{active}) @ 'Vr' * 'fixing_cell'
```

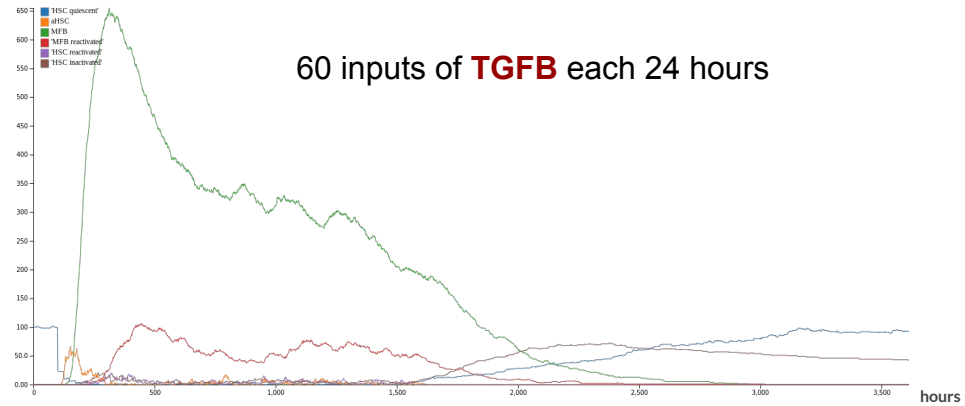
# Acute simulation



Number of occurrences



Number of occurrences

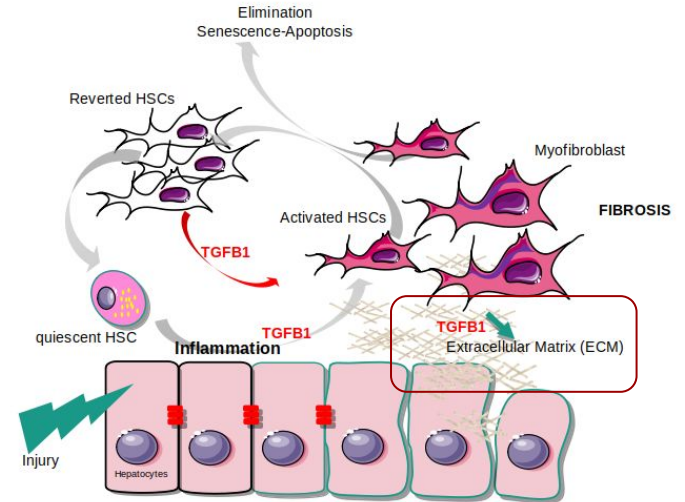


# Conclusion

- ❖ 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