Non-functioning pituitary adenomas (NFPA)s are epithelial tumors that, although benign in nature, frequently present local invasiveness that strongly reduces neurosurgery success. Medical therapy is still under debate, although evidences indicate that dopamine (DA) receptor 2 (DRD2) agonists induce tumor shrinkage in some patients, and inhibit in vitro proliferation of NFPA cultured cells. Aims of this study were: 1) to evaluate the effect of DRD2 agonist BIM53097 on migration and invasion of NFPA cells, and 2) to investigate the molecular mechanisms regulating the motility of these cells, focusing on the role of cofillin, a protein controlled by small GTPases of the Rho family and involved in actin reorganization.

1. DRD2 agonist reduced NFPA cells migration and invasion

2. DRD2 agonist increased cofillin phosphorylation in NFPA cells

3. ROCK inhibitor Y27632 reversed the ability of BIM53097 to increase cofillin phosphorylation and to reduce cell migration

4. The overexpression of wt or phospho-deficient (S3A) cofillin increased HP75 cell migration

5. Cofilin phosphorylation is reduced in invasive NFPA cells

Conclusions

- DRD2 agonist reduces migration and invasion of NFPA cells through a molecular mechanism that involves ROCK-dependent phosphorylation of cofillin
- NFPA invasiveness is associated with low phosphorylation levels of cofillin, suggesting that cofillin phosphorylation status might be a molecular marker associated with the invasive behaviour of NFPA cells.