

## **Master Project : Stimulation of compensatory growth in lung and kidney regeneration**

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1 out of 4 deaths are due to lung failure, 1 out of 6 to kidney failure. There is a medical demand for techniques which could regenerate organs, or stimulate the growth of the existing organ, if some part, such as one lung lobe, is still present. Similar demands exist for hands or limbs aplasias, such as Holt Oram syndrom or hand hypoplasia in children : techniques to increase the size, and rescue the normal size of the limb are lacking. Recently, we have shown that physical stimulation may accelerate embryo development by a factor of 5 to 15 transiently. Especially, the development of the limb could be transiently accelerated by an unexpected large factor. We propose to study the development of chicken and mice kidneys and lungs with physical stimulation, and measure the acceleration of organ growth, using the contra-lateral organ as control. The workflow consists in building up instruments to stimulate and monitor the development of the lungs or kidneys of mice or chicken embryos both in vitro and in vivo. The starting work consists in improving existing organotypic cultures of isolated lungs or kidneys. In a second step, to build miniature instruments based on tiny arduinos carried by the mice or rats, that stimulate organ development. This work is based on positive existing preliminary results, and is supported by a grant which aims at industrial development. The laboratory is located at the Ecole de Médecine, Université de Paris, Campus Saint Germain des Prés.