

# Researchers develop new surgical technique for studying the thymus

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Elisa Oltra. Credit: Catholic University of Valencia

Elisa Oltra, head of the Genetic Expression and Immunity group of the Faculty of Medicine at the Catholic University of Valencia (UCV), and Alejandro Caicedo, professor of the Department of Medicine of the

University of Miami, have developed a surgical process which makes it possible to place functional fragments of the thymus in the anterior chamber of the eyes of mice. Details of the research have recently been published in the *Journal of Visualized Experiments*.

The technique, based on the adaptation of other processes that use this same area of the eye as an incubator chamber of tissues for the in vivo study of cells which produce insulin and other substances, makes it possible to obtain, for the first time, animated images of the migration of progenitors to the interior of the organ and of the return of mature T-lymphocytes to the [blood stream](#) from the organ.

Even though there are protocols for studying the thymus in three-dimensional structures that replicate the organ, such as cell reassembly or ex vivo tissue cuts, the lack of connection of these systems to the blood stream has heretofore limited the study of the essential events that condition the maturation of progenitors for the obtention of mature T-lymphocytes which depend of the vascular system.

The iris is a highly vascular and innervated tissue with the necessary characteristics to improve the study of this essential organ, as it can be observed directly given the transparency of this area of the eye. The possibility of interrogating the implanted organ without having to sacrifice the experimentation animal does not only reduce the number of animals needed for testing, but it also enables for the first time the longitudinal study of the involution of the [thymus](#), a process linked to ageing and cancer treatments, among others.

Moreover, the [technique](#) will make it possible to solve a number of medically-relevant questions related with the function of this organ, including the mechanisms involved in auto-immune, immunodeficiency and central tolerance processes, which are poorly defined to date. The specific detailing of the mechanisms that guide migration,

differentiation and lymphocyte selection will undoubtedly lead to the development of new therapeutic strategies for the treatment of numerous diseases which depend on the function of this organ.

Provided by Asociacion RUVID

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