New therapeutic strategies in the treatment of traumatic brain injury by targeting the LEctin Activation Pathway of complement, (LEAP)

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Traumatic Brain Injury (TBI) is a leading cause of death and of permanent disability worldwide. New approaches holding potential for novel therapies are urgently needed. Within minutes following the primary, biomechanical, irreversible trauma, TBI induces the activation of several injurious cascades that develop over time and account for the majority of brain damage. Among these, the Lectin complement activation Pathway (LP) has been identified to contribute to the detrimental outcome of TBI. This LP senses “danger signals” presented by damaged cells and is aimed at setting the body towards a state of alert and of clearing debris and dead or dying cells from the area of injury, thus fostering recovery. This response, however, can be too strong and result in the death of otherwise healthy cells, thus leading to further injury and worsening the overall clinical outcome of trauma pathology. The LEAP project is aimed at blocking specifically this injurious mechanism. The LEAP programme will first qualify and quantify this mechanism activated following TBI, studying both a mouse model of TBI and the disease events inTBI patients. LEAP will then test a few molecules and drugs that can block or modulate this pathway thus making it less injurious. Previous data obtained by the applicants in other pathological conditions have shown the therapeutic potential of these tools. LEAP will study their therapeutic properties in order to reduce TBI related morbidity and mortality.