

## **Major issues and perspective in regenerative biology** **: 재생생물학의 주요 과제와 전망**

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Living features experience rather continuous damage to their body part in their normal physiological daily life or from accidents. If the injury is limited, a population of reserved progenitor cells take part in repairing the injury. However, be the scale of injury broad, major cellular contribution comes through the dedifferentiation process by which postmitotic dormant cells re-enter the cell cycle. Recently, regenerative biology surfaces as a promising area of research fields in the life sciences of 21st century due to its potential for clinical application. One of the formidable questions in regenerative biology is why large scale of regeneration occurs in some but not all metazoan species. Is there permissive or inhibitory factor(s) operating in this puzzle? Regenerative biology covers the research areas focused on the understanding the mechanisms of innate regenerative ability in a variety of organisms. Some of the main research themes include 1) regulative mechanisms of differentiation in progenitor or stem cells in a specific direction, 2) mechanism of re-entry of differentiated cells into the mitotic cell cycle, 3) characterization of factors responsible for regeneration, and 4) distinction of repair and regeneration at molecular level. In relation to the above research themes, one must address questions in regards to extra- as well as intracellular environmental features after traumatic stress impinged upon tissues or organs. At cellular level, it is very important to understand how the mature cells regain proliferative ability in conjunction with dedifferentiation and transdifferentiation. Another critical research area is the mechanism of faithful restoration of missing structure. In this aspect, not only proper level of proliferative activity but precise tissue interactions are pivotal for the complete functional recovery of lost part. What is the mechanism(s)? Is it same as the ontogenic process? Even though we do not have definite answer yet, recent studies cast some promises to unravel the secrets of regeneration.