Sensing technologies integrated in biorobotic platforms: what and why

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Soft robotic systems often present bio-mimicking designs that resemble actuation mechanisms of certain biological organisms, as for example in swimmers resembling fish or flagellated organisms. However, some unique properties from living organisms that are specially challenging to obtain in their artificial counterparts, such as self-healing, adaptability, or bio-sensing capabilities.[1] Several bio-hybrid robotics platforms across different scales had been developed,[2] but the ones based on living muscles has attracted increasing attention.[3] 3D printing technologies allowed the fabrication of advanced living robots based on skeletal muscle cells,[4] exploring new designs that are not bio-mimetic but really efficient, but also integrating nanomaterials for enhanced force output.[5] The integration of sensors in such platforms is key to envision a better understanding of the undergoing biological events, as well as going towards local actuation for improved guidance and manipulation. The key feature when designing these new generation of robots using living components as an active material coupled to sensing elements will be discusses, as well as the main challenges and applications, both in the biomedical and the environmental field

References

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