A modular soft manipulator with variable stiffness for minimally invasive surgery

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Minimally Invasive Surgery

- Laparoscopic surgery
- Laparo-endoscopic single site surgery
- Natural Orifice transluminal endoscopic surgery

Vitiello, V.; Su-Lin Lee; Cundy, T.P.; Guang-Zhong Yang, "Emerging Robotic Platforms for Minimally Invasive Surgery," *Biomedical Engineering, IEEE Reviews in*, vol.6, no., pp.111,126, 2013
Biological and bioinspired manipulators

The key aspect: manipulate objects while controlling the stiffness of selected body parts and being inherently compliant when interacting with objects.
High dexterity
• Multi directional bending
• Elongation
• Precise maneuvers

Controllable stiffness
Adaptation of compliance to different organs

Force
for reliable traction

NOTES and Single port procedures
• Squeezability
Thanks for your attention


M. Cianchetti and T. Ranzani, G. Gerboni, T. Nanayakkara, K. Althoefer, P. Dasgupta, A. Menciassi. SOFT ROBOTICS TECHNOLOGIES TO ADDRESS SHORTCOMINGS IN TODAY’S MINIMALLY INVASIVE SURGERY: THE STIFF-FLOP APPROACH. Accepted for publication on Soft Robotics (SoRo) 2014

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