

# Smart anticancer nanofibers that allows the simultaneous use of chemo- and thermotherapy

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During the past few years increased attention has been given to stimuli-responsive or smart polymeric nanofibers owing to their ability to act as an 'on-off' switch. Dynamically and reversibly tunable structures of smart nanofibers have the potential to be utilized for 'on-off' delivery of drugs or cells [1, 2]. Since smart polymers respond to small changes in external stimuli with large discontinuous changes in their physical properties, the incorporation of a further functionality such as self-heating properties into smart nanofibers opens novel opportunities in biomedical fields such as hyperthermic therapy and beyond. Here we report on hyperthermia nanofibers with both heat-generating and drug releasing abilities for improved hyperthermic chemotherapy (Fig.1a). The hyperthermia nanofibers are composed of magnetic nanoparticles (MNPs) and temperature-responsive polymers, which serve as a source of heat and a trigger of drug release, respectively (Fig.1b). We demonstrate that the heat-generating MNPs can induce collapse of the nanofiber networks followed by release of anticancer drug [3].

## References

- [1] Kim YJ et al., *Angew Chem Intl Ed.* 2012; 51: 10537-10541.
- [2] Kim YJ et al., *Sci Tech Adv Mater.* 2012; 13: 064203.
- [3] Kim YJ et al., *Adv Func Mater.* in press.

## Figures

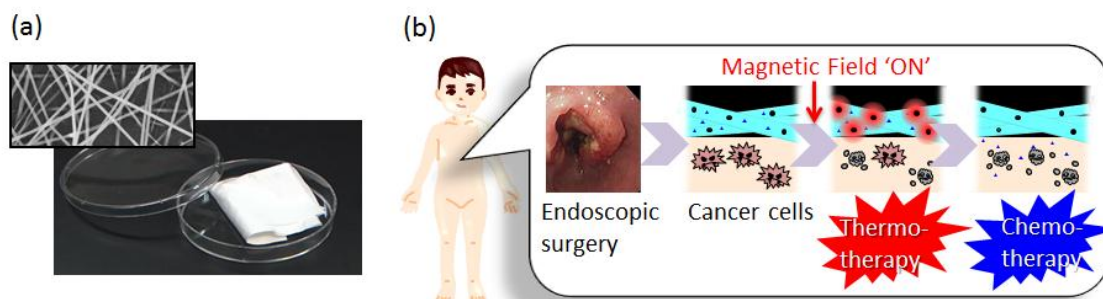


Fig 1: (a) Photographs of smart nanofiber mesh composed of magnetic nanoparticles and temperature-responsive polymers, which serve as a source of heat and a trigger of drug release, respectively. (b) Schematic illustration of the therapeutic strategy of cancers using the smart nanofiber mesh.