on NK cells, we aimed to construct LAIR-1 over-expressed NK-92 cells with which STATs related analysis was performed.
**Methods** Lentivirus-mediated transfection was used to construct LAIR-1 over-expressed NK-92 cells. The expression of LAIR-1 in the constructed NK-92 cells was identified by QPCR and Western blot analysis. Immunofluorescence test was also used to observe the efficiency of lentivirus-mediated expression of LAIR-1 in NK-92 cells. The LAIR-1 over-expressed NK-92 cells were cultured in the IL-2 free medium for 48 hours and then different concentrations of IL-2 were added into the culture system and the cells were collected after 30 mins. The expression of STAT1, p-STAT1, STAT4, and p-STAT4 were analysed by Western blot analysis.
**Results** QPCR and Western blot analysis results showed the over-expressed LAIR-1 in NK-92 cells. Immunofluorescence result showed high efficiency of LAIR-1 lentiviral infection. Western blot results showed IL-2 could increase the phosphorylation of STAT1 in a dose-dependent manner, but not STAT4.
**Conclusion** LAIR-1 over-expressed NK-92 cells were constructed successfully and the IL-2 treatment experiment showed different roles of STAT1 and STAT4 in the regulation of NK cells.
**Acknowledgements** Supported by a project grant from the Natural Science Foundation of Shandong Province (ZR2015JL027) and National Natural Science Foundation of China (81370730, 81571512, 81273200, and 31300751).

## 05 CORE-SHELL MEDICATED NANOPARTICLES PREPARED USING COAXIAL ELECTROSPRAY FOR FAST DISSOLUTION OF PARACETAMOL

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10.1136/jim-2017-MEBabstracts.5

**Background** The dissolution of insoluble drugs is one of the most intractable challenges in pharmaceutics, particularly for those used to rapidly bring down a fever or stop pain. Advanced technologies are frequently introduced into this field for developing nano drug delivery systems (DDS) for this purpose.
**Methods** Coaxial electrospray is a popular advanced process for creating core-shell micro-/nano-structures. Here, a core-shell nano DDS was fabricated and characterised in detail for enhancing the fast dissolution of paracetamol. A surfactant solution (consisting of 0.5% w/v Triton X-100% and 10% w/v polyvinylpyrrolidone (PVP) K10 in ethanol) and a drug solution (composed of 5% w/v paracetamol and 10% w/v PVP K10 in ethanol) were exploited.
**Results** Under the selected conditions (an applied voltage of 20 kV, a collecting distance of 15 cm, and a shell-to-core fluid flow rate ratio of 0.5/1.5 mL/h), uniform core-shell nanoparticles were stably and continuously fabricated. Owing to the secondary interactions between PVP and paracetamol, the particles were amorphous composites, as verified by the XRD patterns and attenuated total reflectance–FTIR spectra. The nanoparticles could release the loaded cargoes within one minute after they were placed into the dissolution media.
**Conclusion** Core-shell medicated nanoparticles prepared using coaxial electrospray can be an alternative approach for improving the dissolution rate of insoluble drugs.
**Acknowledgements** Supported by the National Natural Science Foundation of China (No. 51373101).

## 06 HEMICELLULOSE-BASED MAGNETIC HYDROGEL FOR ENZYME DRUG IMMOBILISATION

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10.1136/jim-2017-MEBabstracts.6

**Background** In recent years, magnetic hydrogels have attracted much attention and have been used in remote controlled drug release and cancer treatment.
**Methods** Hemicellulose/PAAc semi-IPN magnetic hydrogel was synthesised from wheat straw hemicellulose and $Fe_3O_4$ nanoparticles using $H_2O_2$-Vc as redox initiator system. The $Fe_3O_4$ nanoparticles were prepared via the solvothermal method and modified with triethoxyvinylsilane. The magnetic hydrogels were characterised by FT-IR, SEM and VSM, and the swelling property and enzyme immobilisation of the hydrogels were also studied.
**Results** The result demonstrated that the magnetic hydrogels had excellent pH sensitivity and magnetic properties, and the M-H hysteresis curve showed the superparamagnetic property of the magnetic hydrogels. The adsorption isotherm study of lysozyme demonstrated that both the Freundlich and Temkin isotherm models are suitable for describing the adsorption of lysozyme on HC/PAAc semi-IPN magnetic hydrogels.
**Conclusion** The swelling property and high immobilisation capacity of HC/PAAc semi-IPN magnetic hydrogel could expand its applications in drug delivery.
**Acknowledgements** Supported by Natural Science Basic Research Plan in Shaanxi Province of China (No. 2017JM2003), and the Seed Foundation of Innovation and Creation for Graduate Students in Northwestern Polytechnical University (No. Z2017204).

## 07 THE APPROACH TO GENERATE ONCOLYTIC ADENOVIRUS BY siRNA MEDIATED E1B SILENCING

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10.1136/jim-2017-MEBabstracts.7

**Background** Adenovirus is a gene transfer vehicle used in anticancer biotherapy. Oncolytic adenoviruses are prepared so that the recombinant viruses possess more potent cytotoxicity to target cells. E1B is an anti-apoptotic protein encoded by adenovirus. In the present study we tested whether the potential antitumor activity of BLU recombinant adenovirus of tumour suppressor BLU could be enhanced by silencing E1B with siRNA.
**Methods** The shuttle plasmid of BLU was constructed as described, and was assembled to be recombinant adenovirus. siRNAs against adenoviral E1B were designed by locating oligonucleotides downstream of AA dinucleotides within the genomic DNA sequence and chemically synthesised. Their ability to silence the expression of E1B was tested by transfection and anti-E1B Western blotting. The potential of BLU to inhibit in vitro and in vivo tumour cell growth was compared between siRNA transfected cells and controls.
**Results** Up to 6 strains of siRNAs were designed and synthesised. They silenced the expression of E1B to different extents, and remarkably reduced the cell viability and formation of xenograted tumours in nude mice.