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[26] Preparation of GPR55 nanoparticles for ligand binding studies

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GPR55 is a deorphanized G-protein-coupled receptor whose pharmacology is still controversial, having been either proposed as a cannabinoid or a lysophospholipid receptor. GPR55 plays an important role in several pathophysiological conditions, such as inflammatory and neuropathic pain, metabolic disorder, bone development, and cancer [1,2]. Further studies on GPR55 binding may therefore have a huge impact on the development of new therapeutic agents. This poster reports the outcomes of a joint project [3] towards the preparation of GPR55 nanoparticles for binding studies by isothermal titration calorimetry, circular dichroism, and surface plasmon resonance. HEK293 cells were stably transfected to obtain over-expression of hemagglutinin-tagged human GPR55 [4]. Two strategies for the preparation of GPR55 nanoparticles were developed: (a) solubilization of native lipodiscs from lysates using styrene-maleic acid co-polymers (SMA); (b) production of proteoliposomes using artificial POPC/POPG membranes for preparation of SMA lipid particles [5]. The pros and cons of these approaches are evaluated with respect to the analytical methods planned for subsequent ligand binding studies.

[1] Makide K et al, J Lipid Res 2014, 55:1986. [2] Lingerfelt MA et al, Biochemistry 2017, 56:473. [3] Italy-Poland Executive Programme for the Scientific and Technological Cooperation 2016-2018 (code PO16MO02). [4] Henstridge CM et al, FASEB J 2009, 23:183. [5] Dörr JM et al, Eur Biophys J 2016, 45:3.