Aarhus University Network for Interdisciplinary Drug Resistance Research – IDRRES

Summary of the 3rd 2015 meeting in the network, 13 March 2015

Thematic focus on experimental approaches to drug-resistance research

Presentations by Tina Sørensen Dalgaard and Thomas-Vorup Jensen

Minutes

Participants	*Tina Sørensen Dalgaard, Svend Ellermann-Eriksen, Niels Brimnes, Mikala Wang, Thomas Vorup-Jensen, Jens Seeberg, Martin D. Larsen (ref.)*
Presentations on 'experimental approaches to drug-resistance research'	
	Thomas Vorup-Jensen presented research on the polyvalent binding in immune recognition of surfaces, i.e. the formation of structural, topological patterns 'made' by molecules/ligands that are able to 'hook up to' bacterial cell walls – e.g. on the surface of S. aureus. Experiments show that the curvature (and the size) of nanoparticles may affect the structure of bound, polyvalent molecules. Cf. annex 1. **Tina Sørensen Dalgaard** presented the veterinary angle on experimental resistance research, i.e. work done by herself and fellow researchers at the Department of Animal Science. The focus was on the use of antibiotics in Danish agriculture, MRSA contagion among farm animals and humans, immunology in relation to pigs and chickens, and mucosal MBL. Furthermore, examples of detection methods were presented, e.g. the oCelloScope, which allows real-time optical bacterial growth kinetics, and flow cytometry. Finally, the presentation touched upon the use of alternative, 'natural' substances with anti-microbial effect(s). Cf. annex 2.
Key points from presenters & discussion	
	In relation to cell division **Thomas Vorup-Jensen** concluded that

	fragments from cell walls have a great influence on the immune system (i.e. being able to 'trick' the immune system), and on the ability of molecules to bind on multiple areas of a given cell wall. It was asked whether this was evolutionary or not. Thomas responded that many circumstances indicate that it is; therefore, it is suggested to be virulence factor. A question was raised concerning variation of bacterial attacks on cell walls. Thomas told that tests have been done on the same strain; there have not been any tests on staphylococci – *but* that could be done, and it would be a potential project! In relation to **Tina Sørensen Dalgaard's** presentation on MBL (which is an important serum protein): it was asked what kind of infections it relates to. The answer is; both bacterial and virus, but there hasn't been much research on virus infections in this regard. Basically, a lot of research on MBL has been done, but currently not on that many other types of proteins. About the oCelloScope: there are about 7 of these in DK at the moment (price: approx. DKK 300.000). The other machine; the flow cytometry is able to measure 10.000 cells per second (incl. the measurement of 18 parameters in each cell).
Reflections on research projects	Jens Seeberg mentioned two different (but not necessarily mutually exclusive) models that the IDRRES network could decide to pursue: 1. <u>A scientific, epistemological model</u> that could be used to work with specific research applications: By sharing reflections on the meaning(s) and interrelation(s) of what culture/society means to the work and research done in the natural sciences, and vice versa. Two concepts could be of interest: 1) what does 'the social' mean – when you think of it at different levels from bacteria to human society? 2) What does 'environment' mean? This concept has different meanings in social and natural science, respectively. Working with these two 'basic' quesitons could create a common platform for the different disciplines to contribute to a shared thematic focus (i.e., certain type(s) of drug resistance in certain geographical area(s) 2. <u>A model/frame for writing an article</u>, while also working towards a concrete research application. This could involve

	a stay at Sandbjerg or Klitgården. It was also suggested to use some of this year's funds (DKK 100.000 per year) for inviting external lectures or for visiting other research environments, potentially to include additional resource persons in future research application(s). Key question: What is our common research problem that we are all able to address from different angles? Three main dimensions are suggested in this regard: 1) basic research; 2) clinical practice; 3) societal complexity. These dimensions call for interdisciplinary collaboration.
Meeting plan	
	Next meeting is 10 April from 2-4pm. Theme: 'Antibiotic stewardship'.

/ MDL, 8 April 2015