High-Throughput Sequencing: Lab Methods and Computational Challenges

14-18 October 2013, Barcelona

PRELIMINARY SCHEDULE

Monday October 14

Morning	Theoretical	Introduction sequencing technologies	HH
		Introduction to ChIP-Seq library preparation: DNA quality control, workflow, insert size	MM
	Practical / lab	Preparation of a a ChIP-Seq library I: end repair, A-tailing, adapter ligation, gel size selection	MM
Afternoon	Lunch	(13:00-14:00) PRBB Canteen	
	Practical / lab	Preparation of a ChIP-Seq library II: size selection, set up PCR amplification	MM
	Practical / comp	Read data filtering	AM
	Practical / lab	Preparation of a ChIP-Seq library III: clean-up	MM

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Tuesday October 15

Morning	Practical / lab	Preparation of a ChIP-Seq library IV: Bioanalyzer quality control	MM
	Theoretical	Introduction to genomic library preparation: DNA quality control, workflow, insert size, GC bias	MM
	Theoretical	Genome sequencing and assembly: Concepts, data requirements	AM JD
	Practical / comp	Assembling genomes and interpreting genome assemblies	AM, JD
	Lunch	(12:30-13:30) PRBB Canteen	
Afternoon	Theoretical	Introduction to mRNA seq protocol, quality control, biases, directionality	HH, IG
	Practical / lab	mRNA seq I: Isolation of poly A+ RNA, fragmentation, reverse transcription 1st strand	IG
	Break	(15:00-15:30)	
	Theoretical	Introduction to mRNA seq protocol, quality control, biases, directionality, single cell transcriptomics	AF
	Practical/lab	mRNA-Seq II: 2nd strand cDNA synthesis (	IG
		Break	
	Practical/lab	mRNA-Seq III: Clean-up cDNA (	IG

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Wednesday October 16

Morning	Practical / lab	mRNA-Seq IV: A-tailing, adapter ligation, size selection, set up PCR amplification	IG
	Lunch	(13:00-14:00) PRBB Canteen	
Afternoon	Practical/lab	mRNA-Seq V: Clean-up amplified library (IG)	IG
	Practical/comp	Assessment of transcript coverage, identification of differentially expressed genes (DD, MH)	DD MH
	Break		

17:00-18:00 **Public Lecture TBA**

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Thursday October 17

Morning	Practical/lab	mRNA Seq VI: run and discuss mRNA-Seq bioanalyser (IG)	IG
	Theoretical	Chip seq peak calling: introduction	DD
	Practical/comp	Peak calling and data interpretation	DD
	Theoretical	Introduction to exome sequencing: experimental approaches (AF) and data analysis	MH SB
Afternoon	Lunch	(13:00-14:00) PRBB Canteen	
	Practical/comp	Exome selection quality control (MH), SNP and indel calling in exome data	SB

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Friday October 18

Morning	Theoretical	Sequencing Instrumentation at CRG Genomics Unit (HH)	HH
	Practical/comp	Calling of variants in genomic data (JD)	JD
	Wrap-up of the course, feedback to the course instructors		