Number	Title of the presentation	Slide	Title of the slide
1.	**Stem cells and transdifferentiation: introduction, basic concepts**		
		1.	Title
		2.	Definitions
		3.	Stem cell research – a brief history
		4.	Abnormal multilineage differentiation: teratoma/teratocarcinoma
		5.	Issues of plasticity
		6.	Concept of regenerative medicine
		7.	Aims and concepts behind cellular reprogramming
		8.	Obstacles of cellular reprogramming
		9.	Evolution of tissue regeneration
		10.	Evolution of tissue regeneration
		11.	Types of stem cells
		12.	Methods for reprogramming
		13.	Experimental approaches for reprogramming
		14.	Safety issues related to stem cell research/regenerative medicine
		15.	Summary
2.	**Stem cell types, their maintenance and homeostasis**		
		1.	Title
		2.	Sources and types of stem cells: different origins and developmental spectra
		3.	Sources of embryonic stem cells (ESCs)
		4.	Stem cell sources in the mouse embryo
		5.	Characteristics of ES cells
		6.	Cell membrane markers for ESCs
		7.	Structure of glycoantigens characteristic for ES cells
		8.	Characteristics of CD-defined antigens for ES cells
		9.	Main regulatory mechanisms of stem cells – external and internal effects
		10.	Stem cell niches in various organs
		11.	Stem cell environment – examples for stem cell niche
		12.	Multiple interactions involved in stem cell homeostasis
		13.	Antagonistic regulatory circuits between differentiation and pluripotency
		14.	mRNA regulation of stem cell gene expression
		15.	TF regulation for self-renewal/differentiation
		16.	Reprogramming: Induction of pluripotency in iPS cells
		17.	Reprogramming: Lineage shift in differentiated cells
		18.	Sequential maturation and regeneration pluripotency
		19.	Differentiation-associated commitment and reversibility
		20.	Summary
3.	**Regeneration in animal models**		
		1.	Title
		2.	Regeneration
		3.	Types of regeneration in multicellular organisms
		4.	Evolution of stem cells
		5.	Regeneration in Porifera (sponges)
		6.	Regeneration in *Hydra*
		7.	Stem cell lineages in *Hydra*
		8.	Molecular factors of *Hydra* stem cells
		9.	Regeneration in planarians I.

		10.	Regeneration in planarians II.– neoblasts
		11.	Molecular pattern of neoblasts
		12.	Regenerative capacity of axons in *C. elegans*
		13.	Regeneration in annelids
		14	Regeneration in insects
		15.	Regeneration and colony fusion protochordates
		16.	Regeneration in vertebrates
		17.	Regeneration in fish I
		18.	Regeneration in fish II – heterogeneity of cell source
		19.	Regeneration in fish III – molecular patterns
		20.	Epimorphosis or epimorphic regeneration
		21.	Similarities in regeneration
		22.	Imprinting in regeneration
		23.	Regeneration of the limb
		24.	Regeneration of the amphibian lens
		25.	Neuronal stem cell differentiation capacity
		26.	Factors controlling regeneration in vertebrates
		27.	Summary
4.	**Epigenetic factors in transdifferentiation**		
		1.	Title
		2.	Epigenetics
		3.	Chromatin remodelling and histone modifications
		4.	Epigenetic gene regulation of stem cell genome
		5.	DNA methylation
		6.	Detection procedures of DNA methylation
		7.	DNA methylation in stem cells
		8.	DNA methylation proflie ES cells
		9.	Histone methylation
		10.	Histone methylation in stem cells
		11.	Histone acetylation
		12.	Histone acetylation in stem cells I
		13.	Histone acetylation in stem cells II
		14.	Ubiquitination and sumoylation
		15.	Citrullination and phosphorylation
		16.	Polycomb group factors
		17.	Polycomb group protein in stem cells
		18.	Non-coding RNA: story I
		19.	Non-coding RNA: story I II
		20.	Non-coding RNA, RNA interference
		21.	miRNA role in stem cells I
		22.	miRNA and stem cell differentiation
		23.	miRNA role in stem cells I II.
		24.	Cross-talk between genetic and epigentic regulators in ESC I
		25.	Cross-talk between genetic and epigentic regulators in ESC II
		26.	Therapeutical considerations
		27.	Summary
5.	**Genomic and other cell tracing approaches, reprogramming**		
		1.	Title
		2.	Animal cloning

		3.	Stem cell potential
		4.	Origin of stem cells and reprogramming
		5.	Conventional sources of stem cells
		6.	Origins of ES cell lines
		7.	Somatic cell nuclear transfer
		8.	Mikromanipulation equipment
		9.	Chromosome removal (’Enucleation’)
		10.	Nuclear injection
		11.	Egg activation
		12.	Blastocysts and ESC colony formation
		13.	Stem cell characterization I
		14.	Stem cell characterization II
		15.	Stem cell markers I
		16.	Stem cell markers II
		17.	Cell tracing in stem cell biology: non genomic
		18.	Cell tracing in stem cell biology: genomic I
		19.	Cell tracing in stem cell biology: genomic II
		20.	*In vivo* imaging for cell tracing
		21.	Cell tracing in stem cell biology
		22.	Reprogramming
		23.	Molecular mechanisms of self-reneal
		24.	Genes involved in reprogramming
		25.	Telomerase activity I.
		26.	Telomerase activity II: telomer in iPS cells
		27.	Summary
6.	**Hematopoietic stem cells and transdifferentiation**		
		1.	Title
		2.	Issues of hemopoietic differentiation
		3.	Ontogeny of embryonic hemopoietic tissues
		4.	Evolution of hemopoietic tissues in rodents
		5.	Characteristics of murine embryonic HSCs (AGM/YS/FL)
		6.	Transcriptional induction of eHSCs
		8.	Extrinsic regulation of eHSCs
		9.	Hemopoietic differentiation models
		10.	Transcriptional regulation of early hemopoietic commitment
		11.	Transcriptional regulation of myeloid differentiation
		12.	Transcriptional regulation of lymphoid differentiation
		13.	Steady-state and activated haemopoiesis
		14.	Human hemopoietic potential
		15.	Other potential uses of hemopoietic stem cells
		16.	Summary
7.	**Regeneration and transdifferentiation of skeletal muscle**		
		1.	Title
		2.	Conditions requiring skeletal muscle regeneration
		3.	Experimental models for studying muscle regeneration
		4.	Embyonic development of skeletal muscle
		5.	Transcriptional control of myogenic differentiation
		6.	Cellular sources for muscle regeneration
		7.	Tissue sources for muscle regeneration
		8.	Muscle stem cells – satellite cells
		9.	Structure and regeneration of skeletal muscle
		10.	Problems with myoblast regeneration in Duchenne’s muscular

			distrophy
		11.	Non-SCs contributing to muscle regeneration
		12.	Summary
8.	**Liver regeneration from stem cells**		
		1.	Title
		2.	Structure of the hepatic lobe
		3.	Clinical necessity of liver regeneration
		4.	Main phases of liver regeneration
		5.	Developmental relationship between hepaticpancreatic differentiation
		6.	Transcriptional control of hepatoblast development
		7.	Oval cells – adult liver stem/progenitor cells
		8.	Cellular targets for hepatic regeneration
		9.	Stages and forms of liver regeneration
		10.	Sequence of parenchymal regeneration of the liver
		11.	Oval cell activation and expansion
		12.	Non-hepatic cells for liver regeneration
		13.	Differentiation of iPS cells into hepatocytes
		14.	Summary
9.	**Differentiation and regeneration in the pancreas**		
		1.	Title
		2.	Structure and function of the pancreas I
		3.	Structure and function of the pancreas II
		3.	Pancreas phylogeny
		4.	Specification of the pancreas I
		5.	Specification of the pancreas II
		6.	Embryonic pancreas development
		7.	Pancreas development I
		8.	Pancreas development II
		9.	Maintenance of β cell identity
		11.	Maintenance of αcell identity
		12.	Maintenance of exocrine identity
		13.	Diabetes epidemiology
		14.	Main types of diabetes
		15.	Pathogenesis of T1DM and β cells
		16.	β cells and autoimmune processes of diabetes
		17.	Process of type 1 diabetes
		18.	Type 2 diabetes
		19.	LADA (latent autoimmun diabetes)
		20.	Regenerative capacity of panceas and β cells
		21.	Differentiation of insulin producing β cells from ES cells
		22.	Possible sources of β cells for cell replacement therapy
		23.	β cells generated from existing β cells through purification and *in vitro* expansion
		24.	β cells generation via a pancreatic stem cell that is purified, expanded and differentiated *in vitro* to generate β cells
		25.	β cells differentiated *in vitro* from embryonic stem cells
		26.	β cells reprogrammed from somatic cells by expression of pancreatic β cell transcription factors
		27.	Summary
10.	**Transzdifferentiation in the regeneration of central nervous system**		

		1.	Title
		2.	Neurogenesis in Drosophila and mammals
		3.	Criteria for evaluation of neural plasticity
		4.	Adult neural stem cells
		5.	Location of neural stem cells in mammals
		6.	Neural precursor cell differentiation
		7.	Direct neuronal differentiation
		8.	Using stromal cells along with hES cells *in vitro*
		9.	Embryoid body formation
		10.	Factors involved in hNP differentiation from hESCs
		11.	Regional specification of neural cells
		12.	Transcription factors and neural stem cells
		13.	Differentiation of hES into motorneurons
		14.	Spinal cord injury
		15.	Events of spinal cord injury and directed manipulation of stem cells after SCI
		16.	Stem cells to treat SCI
		17.	Non stem cell based approach
		18.	Retina regeneration
		19.	Retina regeneration by Müller glia I
		20.	Retina regeneration by Müller glia II
		21.	Retina stem / progenitor cells (RPC)
		22.	Retina progenitors and their plasticity
		23.	Non-eye derived progenitor cells
		24.	Stem cells in the cornea
		25.	Cornea regeneration
		26.	Sensory hair cell regeneration
		27.	Summary
11.	**Cardiovascular regeneration**		
		1.	Title
		2.	Structural heart diseases requiring regenerative therapy and cellular specialization
		3.	Constrains of in vivo experiments
		4.	Cells with myocardial regeneration potential
		5.	Tissue sources for myocardial regeneration
		6.	Bone marrow-derived mononuclear cells – a controversial field
		7.	Endothelial progenitors cells
		8.	Mesenchymal stem cells (MSCs)
		9.	Cellular characteristics of MSCs
		10.	iPS reprogramming for myocardial regeneration
		11.	Mechanisms of action
		12.	Three-dimensional cardiac regeneration – tissue engineering
		13.	Regeneration for peripheral vascular disease (PVD)
		14.	Regenerative approaches in PVD
		15.	Summary
12.	**Kidney regeneration**		
		1.	Title
		2.	The kidney
		3.	Renal disease
		4.	Renal replacement therapy I a
		5.	Renal replacement therapy I b

		6	Renal replacement therapy II
		7.	Renal replacement therapy III
		8.	Tissue engineering of the kidney
		9.	Embryonic kidney culture for transplantation
		10.	Artificial scaffolds in kidney transplantation I
		11.	Artificial scaffolds in kidney transplantation II
		12.	Kidney regeneration *de novo* using blastocysts
		13.	Kidney regeneration *de novo* using xenoembryos I
		14.	Kidney regeneration *de novo* using xenoembryos II
		15.	Kidney regeneration *de novo* using xenoembryos III
		16.	Stem / progenitor cells in kidney regeneration
		17.	Endogenous stem cells
		18.	Renal progenitor cells
		19.	Exogenous stem cells
		20.	Humoral factors released by progenitor cells involved in kidney regeneration
		21.	Microvesicles and cell-cell communication
		22.	Microvesicles and stem cells
		23.	Microvesicles role in kidney repair
		24.	Repair mechanisms of stem cells in kidney regeneration
		25.	Gene therapy for kidney disease I
		26.	Gene therapy for kidney disease II
		27.	Summary
13.	**Cancer stem cells**		
		1.	Title
		2.	Cancer and cancer stem cell theory
		3.	History of CSC theory
		4.	Solid tissue tumor CSCs
		5.	Solid tissue CSC markers
		6.	CSC development: stochastic or hierarchic evolution and clonal selection
		7.	Altered niche for CSCs
		8.	AML niche characteristics
		9.	Combined treatment of cancers – CSCs and their niche
		10.	Summary
14.	**Ethical background of stem cell research and therapy**		
		1.	Title
		2.	Societal impact of stem cell research
		3.	Main fields of ethical issues in stem cell research
		4.	Pro-life view on the use of embryos in human stem cell research
		5.	View of dominant religious faiths concerning the moral standing of embryos
		6.	Biologically relevant aspects pertaining to the standing of human embryos
		7.	Ethical aspects of stem cell application
		8.	Ethical aspects of patient selection for enrollment to stem cell therapy
		9.	Summary