

Contributors:

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News



Ethanol biofuels from orange peels

Biofuel production from lignocellulosic materials is limited, because fermentable sugars are not easily released from the complex multi-polymeric raw materials. Therefore, Henry Daniell and colleagues expressed a cocktail of lignocelluloses degrading enzymes from bacteria and fungi in tobacco plants. Based on observed expression levels a huge amount of pectate lyases or endoglucanases can be produced in tobacco, which leads to a 1000-fold lower production cost compared to buying the same recombinant enzymes produced via microbial fermentation. Chloroplast-derived enzymes had higher temperature stability and wider pH optima and chloroplast-derived crude-extract enzyme cocktails yielded more (up to 3625%) glucose from filter paper, pine wood or citrus peel than with commercial cocktails. Thus, discarded fruit peels and other throwaways like newspapers are turned into a cheap, clean fuel to power the world's vehicles. /us

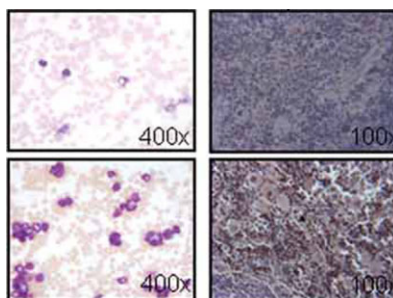
Verma et al., *Plant Biotechnol. J.* 2010, 8, 332–350.

<http://dx.doi.org/10.1111/j.1467-7652.2009.00486.x>
<http://news.ucf.edu>

Targeting leukaemia's gene addiction

Acute lymphoid leukaemia (ALL) and chronic myelogenous leukaemia (CML) induced by the fusion gene product Bcr/Abl have a constitutively active tyrosine kinase activity. Specific Bcr/Abl kinase inhibitors (e.g. Imatinib) inhibit its constitutive activation, but several

resistance conferring mutations were described. Researchers from Vienna, Austria, and collaborators tested whether the transcription factors Stat3 and Stat5, acting downstream of Bcr/Abl are critical for leukaemia maintenance and could be alternative pharmaceutical targets. They discovered that both factors are required for the development of Bcr/Abl – positive leukaemia, but once established only Stat5 is crucial for the survival and



growth of leukemic cells. Therefore, they demonstrate that Bcr/Abl – positive leukaemia cells are addicted to Stat5 to maintain the leukaemic state. Thus, inhibition of Stat5 may provide a novel therapeutic approach for treatment of ALL and CML. /us

Hoelbl et al., *EMBO Mol. Med.* 2010, 2, 98–110.

<http://dx.doi.org/10.1002/emmm.201000062>
<http://www.embmolmed.org>

Pea-derived solar cells

Nathan Nelson and his team from Tel Aviv University, Israel, have isolated the photosystem I (PSI) super complex from



In the news

Nanobiotech to detect cancer

A new testing method is being developed to detect cancer soon after the tumor has formed. It will identify characteristic substances in the blood which accompany a certain type of tumor. The technology is based on a microfluidic chip with tiny channels in which a blood sample from the patient circulates. The chip traces marker proteins which are indicative of cancer. The measured concentration of the tumor marker in the blood will help doctors to diagnose the disease at an early stage. Similar testing systems already exist but their measurements are not very precise and they can only detect molecules that are present in large quantities. Biofunctionalized nanoparticles developed by research scientists at the Fraunhofer Institute for Silicate Research ISC in Würzburg are the key element in the new sensor. „We have improved the detection limit compared with the present state of the art by a factor of one hundred,“ explains Dr. Jörn Probst, Head of the Business Unit Life Science at the ISC. „We have placed antibody-occupied nanoparticles on the sensor electrode which fish out the relevant proteins. For this purpose, we repeatedly pump the blood across the electrode surface. As with a river, the flow is fastest in mid-channel and the water runs more slowly near the bank. We have therefore made a sort of fishing rod using nanoparticles which registers the antibodies in the middle of the blood flow where most proteins swim by per unit of time.“ If an antibody catches the matching protein, a tumor marker, the electrical charge distribution shifts and this is picked up by the electrode.

The researcher groups are now developing a first demonstrator combining four independent single-molecule-sensitive biosensors. The experts are also working on the simultaneous detection of several tumor markers, which will increase the clarity of tests. The system will be ready to enter the market in a few years' time. /bj



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<http://www.fraunhofer.de>

Most Read

Industrial systems biology

Otero and Nielsen, *Biotechnol. Bioeng.* 2009, 105, 439–446.
<http://dx.doi.org/10.1002/bit.22592>

Engineering the embryoid body micro-environment to direct embryonic stem cell differentiation

Bratt-Leal, Carpenedo and McDevitt, *Biotechnol. Prog.* 2009, 25, 43–51.
<http://dx.doi.org/10.1002/btpr.139>

PEGylation of therapeutic proteins

Jevševar, Kunstelj and Porekar, *Biotechnol. J.* 2010, 5, 113–128.
<http://dx.doi.org/10.1002/biot.200900218>

Advanced biofuel production in microbes

Peralta-Yahya and Keasling, *Biotechnol. J.* 2010, 5, 147–162.
<http://dx.doi.org/10.1002/biot.200900220>

De novo sequencing of peptides by MS/MS

Seidler et al., *Proteomics* 2010, 10, 634–649.
<http://doi.wiley.com/10.1002/pmic.200900459>

Design principles of photo-bioreactors for cultivation of microalgae

Posten, *Eng. Life Sci.* 2009, 9, 165–177.
<http://dx.doi.org/10.1002/elsc.200900003>

Technologies for plasma membrane proteomics

Dunn and Cordwell, *Proteomics* 2010, 10, 611–627.
<http://dx.doi.org/10.1002/pmic.200900521>

Biofuels from Microalgae

Li et al., *Biotechnol. Prog.* 2008, 24, 815–820.
<http://dx.doi.org/10.1021/bp070371k>

Mass spectrometry in clinical proteomics – from the present to the future

Palmblad, Tiss and Cramer, *Proteomics – Clin. Appl.* 2009, 3, 6–17.
<http://dx.doi.org/10.1002/prca.200800090>

Electrochemical Coagulation for Chromium Removal: Process Optimization, Kinetics, Isotherms and Sludge Characterization

Vasudevan, Lakshmi and Vanathi, *Clean* 2010, 38, 9–16.
<http://doi.wiley.com/10.1002/clen.200900169>

Biosorption: critical review of scientific rationale, environmental importance and significance for pollution treatment

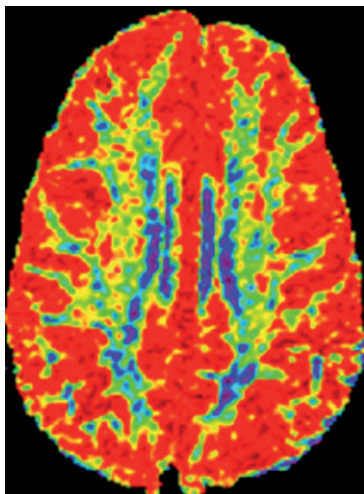
Gadd, *Chem. Technol. Biotechnol.* 2009, 84, 13–28.
<http://dx.doi.org/10.1002/jctb.1999>

the pea plant, crystallized it and determined its crystal structure. The PSI reaction center is a pigment-protein complex responsible for the photosynthetic conversion of light energy into another form of energy like chemical energy. Nelson suggests that these reaction centers, thousands of which are precisely packed in the crystals, may be used to convert light energy to electricity and serve as electronic components in a variety of different devices. So far, upon illumination of the PSI crystals placed on gold-covered plates, the researchers were able to generate a voltage of 10 V./mk

<http://www.tau.ac.il>

HIV is a kick in the head

Einstein was a smart guy. Decades ago he invented a diffusion tensor imaging (DTI) method that is now very useful in tracking the effects of HIV on the human brain and qualifying markers of deterioration. Wow! Even with the virus controlled, brain injury continues increasing in advanced AIDS cases. Ann Ragin et al. sought a non-invasive, quantitative means of evaluating brain deterioration that could be used to validate the reliability of markers derived from a high-throughput screening system. The combination of DTI and magnetic resonance yielded the data. After screening >18 protein candidates, they



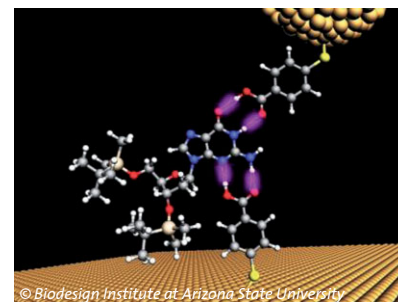
selected MCP-1, monocyte chemoattractant peptide-1, as a robust protein marker of brain injury. /tl

Ragin et al., *Proteomics Clin. Appl.* 2010, 4, 295–303.

<http://dx.doi.org/10.1002/prca.200900083>

Nano-scale DNA reader

Stuart Lindsay and his team from Arizona State University (Phoenix, AZ, USA) have developed a DNA reader that can discriminate between the four different bases of DNA (A, G, C, T). Their method relies on scanning tunneling and atomic force microscopes which have a delicate electrode tip that is held very close to the DNA sample. Lindsay's



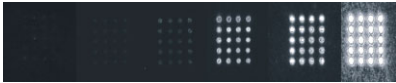
team made two electrodes that had their ends chemically modified to attract and catch the DNA between a gap like a pair of chemical tweezers. The gap between these functionalized electrodes had to be carefully adjusted to the right size of 2.5 nm so that, when a single chemical base of DNA passes through the gap, it momentarily sticks to the electrodes and a small increase in the current is detected. Each of the four bases of the DNA gives a unique electrical signature as it passes through the gap. /mk

Chang et al., *Nano Lett.* 2010, 10, 1070–1075.

<http://dx.doi.org/10.1021/nl1001185>

Membrane in black

Protein microarrays are an emerging technology for diagnostics and proteomic research. Their performance is highly dependent on the appropriate



surface for protein binding. Three-dimensional substrates like nitrocellulose have a higher binding capacity than planar surfaces and allow immobilization of proteins in a functional manner. Yet, currently used nitrocellulose based microarrays suffer from a high background fluorescence which can interfere with the detection of low abundance proteins. Therefore, scientists from Hanover and Satorius Stedim Biotech in Göttingen (Germany) have developed a black nitrocellulose membrane-based protein microarray. They have measured the limit of detection (LOD) and signal to noise ratio (SNR) and compared it to several commercially available systems. This new membrane exhibits a lower autofluorescence in combination with increased sensitivity. /us

Walter et al., *Eng. Life Sci.* 2010, 10, 103–108.

<http://dx.doi.org/10.1002/elsc.200900078>

Cheese improves the immune response of elderly

Oral intake of specific probiotics has been reported to enhance the immunity of elderly. Earlier studies have used milk or yoghurt as a probiotic carrier. Authors from Turku, Finland, chose a commercial probiotic cheese to evaluate its potential as a probiotic food. Consumption of the probiotic cheese significantly increased the cytotoxicity



© Berit Myrekrok/Digital Vision/Getty Images

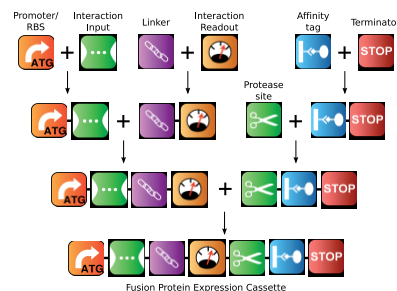
of NK cells. A significant increase in phagocytosis was observed for both the control and the probiotic cheese. Cheese was found to be an effective carrier for the study of probiotics, and daily consumption of the probiotic enhanced parameters of innate immunity in elderly volunteers. The present study demonstrates that cheese with *L. rhamnosus* HNO01 and *L. acidophilus* NCFM may be beneficial in improving the immune response of healthy elderly subjects. /fb

Ibrahim et al., *FEMS Immunol. Med. Microbiol.*, 2010, in press.

<http://dx.doi.org/10.1111/j.1574-695X.2010.00658.x>

Synthetic proteins built from standard parts

Synthetic biologists aim to introduce clear-cut engineering principles into the complex and often messy world of biology. Sophisticated biological systems are supposed to be constructed from well-behaved and reusable off-the-shelf components. Researchers from Barcelona, Spain, explore methods



and strategies for the design of synthetic multi-domain proteins and simple protein “devices”. The authors started out from a small catalog of protein building blocks and optimized an iterative “BioBrick” cloning protocol to assemble 25 synthetic protein constructs each from 8 standardized DNA fragments and screened them for expression in *E. coli*. Two different protein-protein interaction input and two interaction readout devices were then tested

Industry News

Biomarker assays for personalized medicine

NextGen Sciences, a provider of biomarker discovery, assay development, validation and testing services, and Takeda Pharmaceutical Company Limited have agreed that NextGen Sciences will develop validated protein biomarker assays to be used in Takeda’s preclinical and clinical studies to support their drive towards personalized medicine. The biomarker assays will be designed to target specific protein isoforms found in the liver and muscle in multiple species. /kh

<http://www.nextgensciences.com>

<http://www.takeda.com>

Bioplastic industry defies economic crisis

Despite the economic crisis, European Bioplastics’ members are investing in new plants, in further innovation and cooperations. For example, Nature Works just doubled its production capacity of PLA and Braskem made big investments for this year’s start-up of biobased PE. BASF introduced new biodegradable plastics for coating paper and shrink-film while Novamont launched the 2nd generation of Mater-Bi, and Purac, Sulzer and Synbra kicked off a cooperation in the field of foamed PLA products. /kh

<http://www.european-plastics.org>

SDS-PAGE monitoring of mAb

At the Peptalk 2010 conference, for the first time, true, practical at-line monitoring of monoclonal antibody production was announced by lab901. Before now, at-line monitoring of antibody production by SDS-PAGE has been impractical with other existing platforms as the cost per test-point is too high or the analysis takes too long to be of value. With a rapid staining protocol and automated sample handling, electrophoresis and data presentation, the company’s technique can deliver information on yield, purity and molecular weight within a few minutes. /kh

<http://www.lab901.com>

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<http://www.emagazinebioforum.com>

Awards

BTJ Editors elected members of the US National Academy of Engineering (NAE)

The US National Academy of Engineering (NAE) has elected 68 new members and nine foreign associates. This brings the total U.S. membership to 2 267 and the number of foreign associates to 196. Election to the National Academy of Engineering is among the highest professional distinctions accorded to an engineer.



BTJ Editor-in-Chief Sang Yup Lee, KAIST, Daejeon, Republic of South Korea, for leadership in bacterial biotechnology and metabolic engineering, including development of fermentation processes for biodegradable polymers and organic acids.



BTJ Editorial Board member Jay D. Keasling, University of California, Berkeley, for developing synthetic biology tools to engineer the anti-malarial drug artemisinin.

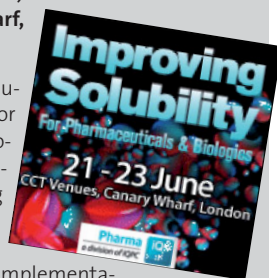


BTJ Editorial Board member Jens Nielsen, Chalmers University of Technology, Göteborg, Sweden, for contributions to the development of fungal biotechnology for pharmaceutical intermediates and nutraceuticals.

Meeting highlight

Improving Solubility for Pharmaceuticals and Biologics 21 – 23 June 2010, CCT Venues, Canary Wharf, London

The Pharma IQ's 6th Annual Improving Solubility for Pharmaceuticals & Biologics conference will explore the newest drug enhancement technologies and the best practice strategies of their implementation to ensure effectiveness and efficiency from discovery to preclinical development for both pharmaceuticals and biologics in two separate afternoon streams on each of the conference days



<http://www.improving-solubility.co.uk>

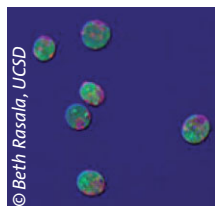
in various combinations. This systematic domain-swapping between synthetic proteins sheds light on factors limiting protein expression but also reveals some challenges of the parts-based engineering approach. /rg

Grünberg et al., *Nucleic Acids Res.* 2010, in press.

<http://dx.doi.org/10.1093/nar/gkq152>

Therapeutic proteins produced in algae

Scientists at The Scripps Research Institute in La Jolla, the San Diego biofuel company Sapphire Energy, and ProtElix, a protein engineering company in Hayward (all CA, USA), have produced seven diverse human therapeutic proteins in *Chlamydomonas reinhardtii*, a green



© Beth Rasala, UCSD

alga used widely in biology laboratories as a genetic model organism. Of the seven genes chosen, four expressed

proteins at levels sufficient for commercial production. The scientists reported that all of the algal-produced proteins in their study showed biological activity comparable to the same proteins produced by traditional commercial techniques. And because algae cells can be grown cheaply and quickly, doubling in number every 12 h, they noted that algae could be superior to current biological systems, *i.e.* bacteria or mammalian cell culture, for the production of many human therapeutic proteins. /mk

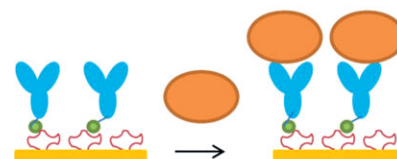
Rasala et al., *Plant Biotechnol. J.* 2010, in press.

<http://dx.doi.org/10.1111/j.1467-7652.2010.00503.x>

Biosensor detects 100 mycoplasma cells

Piezoelectric-excited millimeter sized cantilever (PEMC) sensors are sensitive mass-change devices that measure tar-

get analyte using antibody. Previous work has shown that PEMC responds at femtogram levels for detecting DNA strands, proteins and biomarkers in complex fluids. Authors from Philadelphia (PA, USA) show that less than 1000 mycoplasma cells (*Acholeplasma laidlawii*) are detectable in cell culture



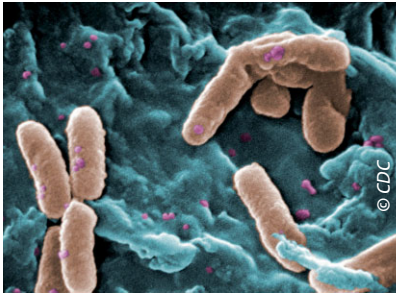
(5% serum) samples in a background of mammalian cells (5×10^6 A431 cells) and *E. coli* JM101 cells (107 cells). Using a second antibody for sandwich binding the authors demonstrate that detection of a few hundred mycoplasma cells per milliliter is feasible in a short assay time of 1 hour. PEMC sensors are ~10,000 fold more sensitive than an ELISA assay and require no sample preparation as the flow conditions used in the assay coupled with the sensor vibration reduce nonspecific binding significantly. /sv

Xu, Sharma and Mutharasan, *Biotechnol. Bioeng.* 2010, 105, 1069–1077.

<http://dx.doi.org/10.1002/bit.22637>

Protecting maggots against bacteria

Maggot debridement therapy is a standard procedure at wound care centers, in which sterile larvae from the green bottle fly *Lucilia sericata* are applied to the wound. Scientists from the Copenhagen Wound Healing Center, Statens Serum Institut and the University of Copenhagen in Denmark have shown that maggots applied to simulated wounds heavily infected with the bacterium *Pseudomonas aeruginosa* were unable to treat the wound and were left dead after 20 h. *P. aeruginosa* is often associated with chronic wounds in which the bacteria clump together to form biofilms. Due to their effective commu-



nication system called quorum sensing (QS), bacteria in biofilms are known to avoid destruction by the host immune system as well as by antibiotics. When Dr. Anders Schou Andersen and his team blocked the QS signaling pathways in the bacteria, the maggots were much better at surviving and potential-ly cleansing the wounds. /mk

Andersen et al., *Microbiology* 2010, 156, 400–407.

<http://dx.doi.org/10.1099/mic.o.032730-0>

Advanced biofuels from microbes

The climate change and energy security are the major challenges of current times. Biofuels produced from renewable resources are a cost-effective alternative. Ethanol produced by microorganisms is currently the major biofuel in the transportation sector. However, ethanol's corrosivity and hygroscopicity make it incompatible with existing fuel storage and distribution infrastructure and limits its economic use. Advanced biofuels, such as long chain alcohols and isoprenoid- and fatty acid-based biofuels, have physical properties that more closely resemble petroleum-derived fuels. Therefore, they are attractive candidates for the replacement of petroleum-derived fuels. Authors from



the University of California, Berkeley, review recent developments in the engineering of metabolic pathways for the production of advanced biofuels by

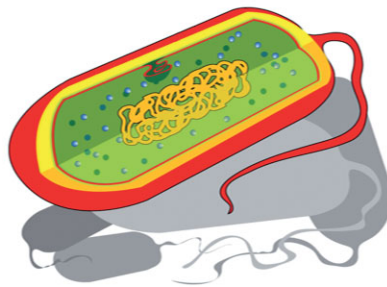
microorganisms, most importantly *Escherichia coli* and *Saccharomyces cerevisiae*. /us

Peralta-Yahya and Keasling, *Biotechnol. J.* 2010, 5, 147–162.

<http://dx.doi.org/10.1002/biot.200900220>

Fluorescent bacterial uptake

NBDT is a green fluorescent toluene analogue with similar chemical characteristics as the unlabeled lipophilic compound. It is used to measure toluene uptake in bacteria which are able to grow on this substance. In the first place, NBDT enters the cell membranes by passive diffusion. Carbonyl cyanide 3-chlorophenylhydrazone (CCCP) needs to be added to inactivate NBDT efflux pumps, in this way enabling analysis of



the NBDT related green fluorescence of the cells' membranes. Additionally, porin mediated influx of toluene was proven and shown to be responsible for up to 45% toluene uptake. Shot gun proteome measurements gave evidence for the presence of toluene transporting porins in the bacterium *Pseudomonas putida* mt-2 when grown on toluene but not when grown on glucose. /sv

Sträuber et al., *Cytometry A* 2010, 77A, 113–120.

<http://dx.doi.org/10.1002/cyto.a.20811>

Two disparate stem cell states

In their prospective review published in *Science*, Dr. Linheng Li (Stowers Institute for Medical Research, Kansas City, MO, USA) and Dr. Hans Clevers

Writing tips

Figure preparation made simple

Most journals' author guidelines will tell you that high resolution images are needed. But if you are not a graphics expert, how can you create good figures in a simple way?

In general, figure **resolution** should be at least **400 dpi** (dots per inch) at printing dimensions. Expect your figures to be printed either to fit the width of **one column (8 cm)** or to fit the **width of the page (17 cm)**. Avoid extreme height-to-width ratios ("noodles" and "skyscrapers").

Resizing: Increasing the resolution of an image will result in a proportionally smaller image size. Example: you have an image 20 x 30 cm with a resolution of 96 dpi; increasing the resolution to 400 dpi will result in an image 5 x 7 cm.

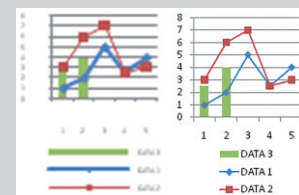
Text editors automatically compresses tiff files (and other uncompressed graphics) so the image quality will decrease. Therefore **do not embed TIFF files** in DOC files – however, JPEG files remain unchanged.

How to make chart figures from Excel and similar software

- Open your excel sheet and scale the chart to at least **400%** of the expected printing size (in practice, you can simply scale the chart to fill the whole screen) and scale the font accordingly
- Select the chart, **copy**
- Open PowerPoint, and use Edit → "Paste special..." → **paste as PNG file** → submit the resulting ppt/pptx file. Alternatively, paste your chart in an image editor of your choice, and save as **PNG or TIFF**; do not save charts or any line art as JPEG.

Do not copy-paste by using ctrl-v or by selecting "paste": this results in an excel object, not an image.

The example below demonstrates the importance of scaling the chart before copying-pasting as an image. /lk and bj



Some useful tutorials on the web:

Photo editing:

http://www.geofflawrence.com/photoshop_tutorial_size.php

Photo and digital imaging tips:

<http://www.photoghetto.com/image-tips/index.asp>

Reduce the file size of a picture:

<http://office.microsoft.com/en-us/help/HA101922001033.aspx>

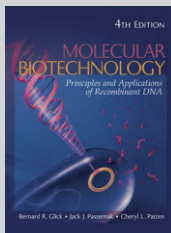
Book Highlights

Molecular Biotechnology

Principles and Applications of Recombinant DNA (4th Edition)

Bernard J. Glick, Jack J. Pasternak,
Cheryl L. Patten, Hardcover, 1018 pages, February 2010, ISBN:
978-1-55581-498-4

This 4th edition of a bestselling text features greatly expanded coverage of the latest innovations in DNA sequencing techniques, therapeutics, vaccines, transgenic plants, and transgenic animals. Moreover, readers will find nearly 240 new figures to help them grasp all the latest concepts and applications. /as



<http://eu.wiley.com/WileyCDA/WileyTitle/productCd-1555814980.html>

Bacterial Signaling



Reinhard Krämer, Kirsten Jung
(Eds.), Hardcover, 513 pages,
December 2009,
ISBN: 978-3-527-32365-4

Providing a comprehensive insight into cellular signaling processes in bacteria, this is the first book to cover inter-cellular, transmembrane, as well as intra-cellular signaling and its relevance for biofilm formation, differentiation, host pathogen interactions, symbiotic relationships, chemotaxis and various stress responses. /as

<http://eu.wiley.com/WileyCDA/WileyTitle/productCd-3527323651.html>

Yeast

Molecular and Cell Biology

Horst Feldmann, Paperback,
348 pages, November 2009,
ISBN: 978-3-527-32609-9,

This book is an up-to-date resource providing a comprehensive account of yeast biology and its use as a tool and model organism for understanding cellular and molecular processes of eukaryotes. Topics covered range from the fundamentals of yeast biology such as cell structure, biochemistry, genetics and signaling, to current approaches and applications such as metabolomics, disease models and uses in biotechnology. /as



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(Hubrecht Institute, Utrecht, The Netherlands) propose a model of mammalian adult stem cell regulation that may explain how the coexistence of two disparate stem cell states regulates stem cell maintenance and simultaneously supports rapid tissue regeneration. Current models assume the existence of a single quiescent (resting) population of stem cells residing in a single niche of a given tissue. Li and others have previously reported that primitive blood-forming stem cells can be further separated into quiescent (reserved) and active (primed) subpopulations. Emerging evidence indicates that quiescent and active stem cell subpopulations also coexist in several tissues, including hair follicles, intestine, and bone marrow, in separate yet adjacent microenvironments. In the review, Li proposes that quiescent and active stem cell populations have separate but cooperative functional roles. /mk

Li and Clevers, *Science* 2010, 327, 542–545.

<http://dx.doi.org/10.1126/science.1180794>

Brachypodium genome sequenced

A global initiative has sequenced the genome of the wild grass *Brachypodium distachyon*. The primary international repository for the *Brachypodium* genome sequence data called BrachyBase is situated at Oregon State University (Corvallis, OR, USA). *B. distachyon* is an annual grass native to the Mediterranean and Middle East, with little agricultural or economic impor-



tance. However, it allows researchers to obtain genetic information for grasses much more easily than some of its related but larger counter-

parts with much more complex genomes, i.e. plants of high importance in world nutrition. *Brachypodium* has one of the smallest known genomes among grasses and it is physically small. The plants are easy to grow, easy to genetically manipulate, easy to study and have a short lifecycle. Thus, *Brachypodium* can serve as a model to support research on improved varieties of wheat, oats and barley, as well as switchgrass, a crop of major interest for biofuel production. /mk

The International Brachypodium Initiative, *Nature* 2010, 463, 763–768

<http://dx.doi.org/10.1038/nature08747>

Encyclopedia of Life Sciences

Nuclear transfer for cell lines

The production of cloned animals following nuclear transfer, using somatic cells grown in culture, represents a remarkable feat of developmental biology. It demonstrates the potential of a



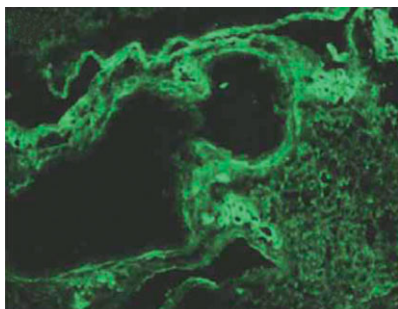
differentiated nucleus to be reprogrammed back to an embryonic state when exposed to a suitable cytoplasmic environment, such as that of an oocyte. However, reprogramming is often incomplete resulting in embryo, fetal and post-natal mortality. The majority of the clones that do survive to adulthood do appear normal. This provides encouragement for the practical applications of nuclear cloning in the fields of agriculture, animal conservation and biomedicine. /us

Wells, *Encyclopedia of Life Sciences*, John Wiley & Sons 2010, Chichester.

<http://dx.doi.org/10.1002/9780470015902.a0002669.pub2>

WIRES Nanomedicine and Nanobiotechnology: Nanoparticle detection of respiratory infection

Respiratory viruses such as respiratory syncytial virus (RSV), the leading cause of respiratory infection in infants and young children, the severe acute respiratory syndrome (SARS) virus or H1N1 (swine) influenza are a constant concern for all demographics. Traditional



methods of virus detection require several days to confirm infection. Recently, nanoparticle-based detection strategies have been employed in an effort to develop detection assays that are both sensitive and expedient. Authors from Vanderbilt University (Nashville, TN; USA) discuss several nanoparticle-based scaffolds like gold nanoparticles functionalized with virus specific antibodies or oligonucleotides. Another option are quantum dots which possess unique fluorescence properties that have been explored for their application to virus detection. /us

Halfpenny and Wright, *WIRES Nanomed. Nanobiotechnol.* 2010, 2, 277–290.

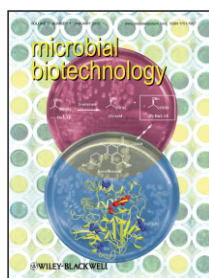
<http://wires.wiley.com/WileyCDA/WiresArticle/wisId-WNAN83.html>

Journal Highlights

Biocatalysis

The latest special issue from *Microbial Biotechnology* captures the most recent advances in the field of 'Biocatalysis' and is edited by Karl-Erich Jaeger, Andreas Schmid, Manuel Ferrer and Kenneth N. Timmis. It features 9 origi-

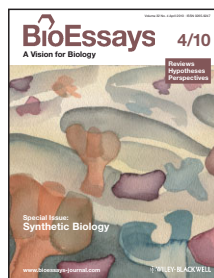
nal research articles, one highlight, entitled 'Metabolic engineering, new antibodies and biofilm viscoelasticity', an update on probiotics genomics, a LOVely Enzymes Minireview and a Web Alert, an annotated selection of World Wide websites relevant to Metabolic engineering. /lc



<http://www3.interscience.wiley.com/journal/123220863/issue>

Synthetic Biology

This special issue of *BioEssays* takes readers from the origins of life to "prothetic networks" in mammalian cells.



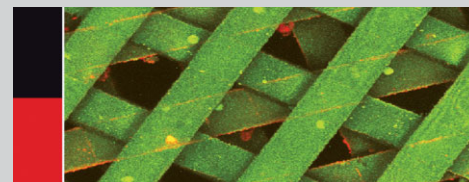
Understanding how the first organisms arose on Earth and defining the "minimal genome" are anything but exclusively in-

tellectual pursuits, as insights into the chemical nature of life and the genetic material necessary to maintain basic properties of life will surely help us to create our own, tailored, biological systems. The application of such tailored systems for therapeutic purposes in mammalian cells appears to be just around the corner. And as xenobiological approaches (e.g. a 4-letter genetic code and artificial amino acids) demonstrate iconically, such work is aimed at complementing, repairing, enhancing or creating variations on "natural" living systems... /am

<http://www3.interscience.wiley.com/journal/34201/home>

Test your knowledge

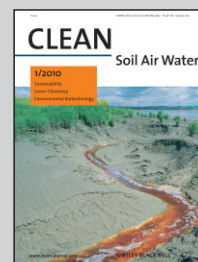
Do you recognize this?



Search Wiley Interscience to find out from which Wiley-Blackwell cover this image was taken. The answer will be published in the next BiotecVisions!

Tip: This is from the cover image of a journal containing the word "biotechnology".

<http://www3.interscience.wiley.com/journal/112727130/home>



The last image was taken from the Wiley-Blackwell Journal *CLEAN – Soil, Air, Water* 2010, Issue 1.

<http://www3.interscience.wiley.com/journal/11793578/group/home/home.html>

WIRES Authors Spotlight



Nanotechnology and orthopedics

Cato Laurencin has been working in nanotechnology since his dissertation. He earned his MD/PhD at Harvard Medical School and MIT and specialized in orthopedic surgery. He then started the Center for Advanced Biomaterials and Tissue Engineering at Drexel to work on biodegradable polymer materials for fracture repair and continued work on soft tissue repair at University of Virginia.

Nanotechnology and orthopedics: a personal perspective

Laurencin et al., *WIRES Nanomed. Nanobiotechnol.* 2009, 1, 6–10.

<http://wires.wiley.com/WileyCDA/WiresArticle/wisId-WNAN25.html>
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