**HIGHLIGHTS OF THE RECENT LITERATURE**

**EDITORS’ CHOICE**

**edited by Stella Hurtley**

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**MEDICINE**

**Debunking a Fishy Tale**

For more than a decade, shark cartilage has been touted as a rich source of anticancer agents. Although shark cartilage extracts have not yet shown efficacy against cancer in controlled clinical trials, the general public—especially cancer patients despairing for a cure—appear to have embraced the idea. Ecologists fear that continued growth of the shark cartilage industry could have a negative impact on shark populations, which are vulnerable to overfishing.

One of the main justifications made for studying the anticancer activity of shark cartilage is the assertion that sharks rarely develop cancer. Ostrander et al. describe evidence that this assumption may be incorrect. Gathering information from the National Cancer Institute’s “Registry of Tumors in Lower Animals” and from the scientific literature, they identified 42 cases of tumors in sharks and their close relatives, about one-third of which were malignant. The authors point out the need for systematic surveys to determine the true incidence of cancer in sharks, and they discuss several alternative explanations for why sharks might have a low incidence of cancer, none of which require the presence of protective agents in cartilage.

— PAK

*Cancer Res.* 64, 8485 (2004).

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**CELL BIOLOGY**

**Capping the Barb**

The propulsive force in cell motility is provided by the regulated growth of actin filaments. Actin filaments have a polarized structure with so-called pointed and barbed ends. It is the barbed end that is the site at which new actin subunits are added when actin filaments are forming in the cell, and this growth is regulated by proteins, exemplified by the protein gelsolin, that “cap” the barbed end. Disanza et al. now identify a new class of barbed end–capping proteins—in particular a protein termed Eps8, previously identified as a receptor tyrosine kinase substrate. Eps8 accumulates at sites where actin is showing dynamic growth. Reduction of the levels of Eps8 impairs actin-based motility. Eps8 contains an effector domain that caps actin and a domain that autoinhibits this activity. The autoinhibition is relieved by interaction with another regulatory protein: Abi1. Croce et al. examined nematode worms that had been engineered to lack Eps8. Eps8 was found to be essential for embryonic development. Two isoforms of Eps8 were found, one of which, Eps8A, was specifically required for the apical morphogenesis of intestinal cells. The barbed end–capping ability provided by the C-terminal domain of the protein was important in promoting morphogenesis. — SMH


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**CHEMISTRY**

**More Than a Solvent**

Replacement of a carbonyl oxygen with a methylene (CH₂) group is often necessary in organic synthesis, but the typical methods for doing so involve sensitive reagents, such as highly basic ylides (Wittig reaction) or titanocene derivatives (Tebbe’s and Grubbs’ reagents). In a pair of papers, Yan et al. describe a convenient alternative system, based on a hetero-geneous mixture of TiCl₄, Mg powder, and tetrahydrofuran, which uses the common solvent dichloromethane as the source of CH₂. The readily available reagents are simply mixed with aldehyde or ketone substrate, and the reaction proceeds within an hour.

The nonbasic conditions tolerate a wide range of substrates, without disturbing acidic hydrogens or olefins prone to isomerization. Moreover, the reaction can proceed under severe steric constraints that block the titanocene systems. The second paper shows that increasing the Mg-to-TiCl₄ ratio broadens the scope to include esters. — JSY


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**BIOCHEMISTRY**

**Downhill from Here?**

In the classical theory of protein folding, distinct native and denatured states are separated by an energy...
barrier, and transitions between the two are cooperative. An alternative model has been proposed in which the denatured state gradually merges into the native state as conditions change, with no significant energy barrier. Such downhill protein folding has been suggested for a fluorescently labeled version of the all-helical bacterial protein BBL (Garcia-Mira et al., Reports, 13 Dec. 2002, p. 2191).

Now Ferguson et al. suggest that the results may have been influenced by the labelling of BBL. Thermal denaturation of unlabeled wild-type BBL and two homologs was highly cooperative, with similar transition midpoints being obtained by a variety of techniques. In contrast, the introduction of extrinsic fluorophores into BBL complicated its unfolding behavior. Thus, downhill folding may occur for some proteins that do not have distinct folded states but is unlikely to be used by well-folded proteins such as BBL. — VV

**CHEMISTRY**

**Reducing Is Easier When Lying Down?**

The applied potential needed to oxidize or reduce molecules in solution reflects in part the energy needed to stabilize more highly charged species (ions versus neutrals). If the molecules are adsorbed on a metal, the formation of mirror-image charges should reduce the energetic expense of solvating a charged ion, because a dipole is formed instead.

Vesper et al. provide experimental evidence for this effect using two porphyrine derivatives adsorbed on gold surfaces. Derivative 1 has a single set of sulfur-terminated “legs” so that it self-assembles in “standing-up” geometry, and derivative 2 was designed with two opposing sets so that would lie flat. The molecules were patterned on gold with dip-pen lithography, and the structures were verified by atomic force microscopy. In methylene chloride solution, the molecules showed similar redox behavior. When adsorbed on gold, the first ring-reduction potential of 1 shifted to less negative voltages by 0.43 V, whereas that of 2, whose central ring lies closer to the surface, shifted by 0.80 V. — PDS

**HIGHLIGHTED IN SCIENCE’S SIGNAL TRANSDUCTION KNOWLEDGE ENVIRONMENT**

**Receptors on the Move**

When T cells, B cells, and natural killer (NK) cells of the immune system interact with target cells, plasma membrane signaling molecules accumulate at the cell-cell interaction site: the immunological synapse. It seems that proteins, as well as signals, are transferred between the interacting cells at such contacts. NK cells receive inhibitory signals from cells that express self major histocompatibility complex (MHC) molecules on their surface, and the NK cells can actually acquire MHC class I proteins during these interactions with target cells. Now Vanherberghen et al. show that the exchange goes both ways and that NK receptors are transferred only to target cells that express MHC class I ligands. The NK cell receptor Ly49A was transferred only to target cells that expressed the cognate MHC class I ligand. It is not yet clear what function the transferred receptor might serve, but it is possible that the NK receptor might mark a target cell that has already been scanned by a NK cell. This, in turn, might allow more efficient surveillance by NK cells if they could recognize the marker and avoid rescanning the same cell. — LBR
