michael smith laboratories CBR THE CENTRE FOR BLOOD RESEARCH

The Michael Smith Laboratories & Centre for Blood Research

INVITE YOU TO A SEMINAR ON

Wednesday December 14 @ 12PM

MSL 102 (2185 East Mall, Vancouver)

"Mussel-inspired Self-Sealing Adhesive Biomaterials"

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Catecholamines are found ubiquitously in nature. Wetting-resistant, adhesive foot-pads in mussels, neurotransmitters in the brain, melanin bio-pigments in the skin and eyes, squid beaks, and insect cuticles are related examples. In materials science, catecholamines have recently attracted significant attention due to the unprecedented material-independent surface-functionalization properties found in poly(dopamine) (pDA) and poly(norepinephrine). The material-independent coating properties are developed only when both catechol and amine moieties coexist in a polymeric backbone. In contrast, when the both moieties are 'not' covalently linked, they exhibit self-sealing properties at liquid/air interfaces. The self-sealing requires only O_2 in air, and other external stimuli such as light, heat, pH, and moisture as well as internal co- factors such as catalysts are not necessary. Self-sealing conceptually mimics biological healing processes in which precursors at internal liquid are polymerized and/or crosslinked at liquid/air interfaces rather occurring at a bulk liquid. Furthermore, the newly generated material at interfaces robustly attached to existing (i.e. undamaged) one, resulting in sealing properties. As self-sealing utilizes oxygen, regeneration of the catecholamine materials occurs nearly unlimited times as long as the precursor internal solution exists, and more than 100 times of self-sealing was experimentally demonstrated. Finally, this seminar will present a 'hemostatic needle' which results in blood vessel self-sealing exhibiting no bleeding after needle withdrawal from tissues