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# The laminin protein family – The key to reliable stem cell expansion and primary cell culture

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## Abstract

Primary cell culture and cell therapy ultimately has four major problems: I) standardized and controlled expansion of pluripotent cells, II) efficient differentiation of primary cells to adult cells, III) maintenance of adult differentiated phenotype *in vitro* and IV) *in vitro* propagation of adult cells or tissue samples. With the help of our chemically defined, xeno-free, human recombinant laminins, we provide solutions to all these problems. The laminins family consists of 16 different basement membrane proteins that influence cell differentiation, adhesion, migration and phenotypic stability. Of the different extracellular proteins surrounding the cells, only the laminin protein family is highly cell and tissue specific. Laminin-511 (α5 β1 γ1) and Laminin-521 (α5 β1 γ1) are expressed in the inner cell mass of the blastocyst and *in vitro* these proteins can re-create the natural environment for embryonic stem cells. With this biorelevant cell cultivation it has been shown that Laminin-511 (Rodin et al, Nat. Biotechnol. 2010) and Laminin-521 (submitted manuscript) alone can support long-term self-renewal of hESC and iPSC without spontaneous differentiation (over 140 passages during 2 years). Laminin-521 is an easy and reliable tool for stem cell culture and enables standardized, single-cell passage without the need of ROCK inhibitor for cell survival. Moreover, our biologically specific laminin matrices are also able to maintain many differentiated cell types in their native state for months in a cell culture plate. We have also been able to expand functional pancreatic islets and propagate progenitor heart cells and differentiate them to mature beating cells.

## Biography

Louise Sivertsson is research and marketing manager at the biotech company BioLamina. She has completed her Ph.D. followed by postdoctoral studies at the department of Physiology and Pharmacology at Karolinska Institute in Stockholm.