About OMICS Group

OMICS Group International is an amalgamation of international scientific and worldwide International science conferences and events established in the year 2007 with the sole aim of making the information on Sciences and technology 'Open Access'. OMICS Group publishes 400 online journals in all aspects of Science, Information Management and technology journals. OMICS Group has been instrumental in taking the knowledge on science & technology to the door steps of ordinary men and women. Research Scholars, Students, Libraries, Educational Institutions, Research centers and the industry are main stakeholders that benefitted greatly from this knowledge dissemination. OMICS Group also organizes 300 international conferences annually across the globe, where knowledge transfer takes place through debates, round table discussions, poster presentations, workshops, symposia and exhibitions.

About OMICS Group Conferences

OMICS Group International is a pioneer and leading science event organizer, which publishes around 400 open access journals and conducts over 300 Medical, Clinical, Engineering, Life Sciences, Pharma, Scientific conferences all over the globe with the support of more than 1000 scientific associations and 30,000 editorial board members and 3.5 million followers to its credit.

OMICS Group has organized 500 conferences, workshops and national symposiums across the major cities including San Francisco, Las Vegas, San Antonio, Orlando, Bengaluru, New York, Chicago, Philadelphia, Baltimore, United Kingdom, Valencia, Dubai, Beijing, Hyderabad, Bengaluru and Mumbai.

A Coordinating Epithelial Cell Proliferation and Migration in Corneal Wound Healing

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Introduction

Migration of Epithelial a cells as a sheet
Stem Cells of the basal limbus migrate along the epithelial sheet
Cdk5 - Cyclin Dependent Kinase 5, a neuronal protein involved in cell-cell adhesion
Does Epithelial Stem cells require CDK5 for cell adhesion and migration?

Epithelial stem cell migration

A phase contrast image of 3-day limbal explant culture, showing small outgrowth of rounded and flattened cells on the dish and clusters of pigmented cells (P) migrating from the limbal explant along the cut edge.

Location of BrdU-LRCs in cryosections of cultured limbal explant, which were pulse labeled with BrdU for 5 days, followed by 21-day chase.

STEM CELLS IN THE TRANSPLANTABLE EPITHELIAL CULTURES

Distribution of LRCs in the outgrowth of limbal explant cultures.
Limbal explant cultures were pulse labeled with BrdU for 5 days, followed by 21-day chase
Epithelial cells in the outgrowth showing BrdU-positive (green) cells in 2 clusters (arrowheads) of small cells and a few labeled large cells (arrow).
Distribution of epithelial cells pulse labeled with BrdU on the limbal explant cultures. Limbal explant cultures were pulse labeled with BrdU for 5 days, processed, and then stained by immunostaining for BrdU. Confocal overlay images of BrdU and PI were merged to show yellow stained BrdU-positive cells along with transmitted light image subtraction. Note the presence of 2–3 layers of epithelial cells on the cornea of limbal explant cultures, with several BrdU-positive cells in the basal layer of cultured limbal explant; arrows indicate BrdU-positive pigmented cells in the basal layer, arrows indicate double-stained BrdU-positive cells in the lower layers. F: fibroblast; St: PI-stained stromal cells.

STEM CELLS ON Explant after 21 Days

Buccal Epithelial Stem Cells Holoclones transplanted on to Human Eye

Cell-Cell Adhesion Complexes
Aggregation of Human Corneal Epithelial Cells is Dependent on the Presence of Cdk5

Absence of Cdk5 inhibits junction formation in human corneal epithelial cells

Differential Activity of Cdk5

Cdk5 is required for cell-cell junctions in the E-cadherin expressing cells
Cdk5 is not required for cell-cell junctions in N-cadherin expressing cells

Rho and Rac Activity in the Cdk5 Deficient Cells

Increased Rho and decreased Rac activity in the absence of Cdk5 is consistent with destabilization of junctions in E-cadherin containing HCLE cells
Regulation of Cdk5 at Cell-Cell adhesion Requires Rho Signaling

Increase in Rho activity caused by inhibiting Cdk5 is responsible for the decrease in cell-cell adhesion.

Interaction of E-cadherin with IQGAP-1 and Cdk5

Absence of Cdk5 exhibits weak cell-cell junctions due to increased association of IQGAP-1 with E-cadherin (β-catenin) complex.

E-Cadherin and p120 in the ShCdk5 Cells

Cdk5 deficient cells:
- are capable of forming junctions containing E-cadherin and p120
- have increased endocytosis
- have p120 at junctions.
Total Internal Reflection Fluorescence (TIRF) Microscopic Analysis Of E-Cadherin Transfected ShCdk5 Cells

Particle tracking of border localized E-cadherin showing long straight paths indicating internalization

Olomoucine

Total Internal Reflection Fluorescence (TIRF) Microscopic Analysis of p120 Transfected ShCdk5 Cells

GFP-P120 appears punctate; individual particles may represent junctional complexes or vesicles containing p120

TIRF Analysis of E-Cadherin and p120 at the Cell-Cell Junctions

The length and tortuosity of paths by E-Cadherin and p120-containing particles (n=100) were tracked by near total internal reflection fluorescence (TIRF) microscopy

- E-Cadherin-containing particles in ShCdk5 cells moved fast and these long, straight paths were internalized
- p120-containing particles in ShCdk5 cells moved slowly and stayed near the cell-cell boundary

E-Cadherin-containing particles in HCLE cells moved fast and these long, straight paths were internalized

p120-containing particles in ShCdk5 cells moved slowly and stayed near the cell-cell boundary

Chk5 expression stabilizes the junction by preventing E-Cadherin-containing vesicles from being endocytosed
Inhibition of Cdk5 leads to internalization of E-cadherin and induction of N-cadherin

\[ \text{IP: N-CADHERIN} \]

\[ \text{IB: p120} \]

\[ \text{IB: N-Cadherin} \]

\[ \text{IB- N-cadherin} \]

\[ \text{Actin} \]

Summary - Corneal Epithelial Cell-Cell Junctions are stabilized by Cdk5

In the absence of Cdk5 activity:

- p120 dissociates from E-cadherin
- E-cadherin trafficking is altered to a site 20µm or more away from the surface suggesting increased degradation of E-cadherin

Cdk5 is required for:

- E-cadherin based cell-cell junction stabilization
- regulation of Rho and Rac activity

Company Overview

About Us
US Medical Innovations, LLC (USMI), a subsidiary of US Patent Innovations (USPI), is a privately owned, FDA registered biomedical device company focused on the research, development and manufacturing of advanced, innovative and affordable plasma electrosurgical devices. USMI products are designed for ambulatory and inpatient endoscopy centers as well as for complex surgical operations.

Mission
USMI is dedicated to innovation in the fields of electrosurgery and plasma technology for the advancement of patient outcomes, the eradication of cancer and the improvement of human lives. Our core values of innovation, diversity, and community are key to our pursuit of this mission and to our ongoing success.
Plasma: 4th State of Matter

- Not a human invention
- Most common form of matter in the universe
- An ionized gas with freely moving charged particles of electrons and radicals

The 4 States of Matter

Plasma Research

Substantial Continued Investment in Plasma R&D

The progression of plasma innovation that resulted in the Canady Systems has created vast market potential, confirmed by the substantial and continued investment in plasma research and development.
Argon Plasma Coagulation

- Non-contact application of high frequency monopolar electrical energy used to achieve hemostasis and tissue destruction
- Electrical current initiated when APC tip is 1cm from target tissue
- Utilizes argon, which is readily available, non-reactive, safe and inexpensive
- High-frequency electrical current is conducted through jet of gas, resulting in coagulation of biological tissue

CVHP Scalpel

Cervical Veins Hybrid Plasma® patent pending Technology
UB Medical Innovations

FUTURE of Plasma Research in Cancer

Plasma Activated Medium (PAM)

- To treat patients primary tumor cells and cell lines with PAM and test for proliferation, apoptosis, ROS in vitro
- To test Chemotherapeutic drug treated cells/tumors isolated cells along with PAM and assess the tumor activity
- Test for various cellular and molecular markers, migration, TUNEL assays, ROS and signalling cascade and identify new pathways involved in PAM therapy
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Thank you!