About OMICS Group

OMICS Group International is an amalgamation of Open Access publications 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 open access scholarly journals in all aspects of Science, Engineering, Management and Technology journals. OMICS Group has been instrumental in taking the knowledge on Science & technology to the doorsteps 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, Phrama scientific conferences all over the globe annually 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, Omaha, Orlando, Raleigh, Santa Clara, 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

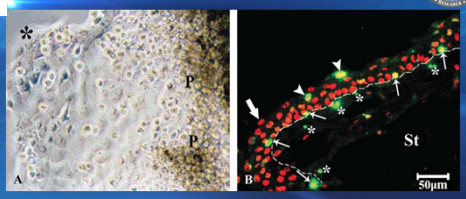
Migration of Epithelial a cells as a sheet

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?

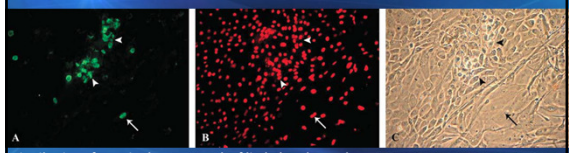
Epithelial stem cell migration



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

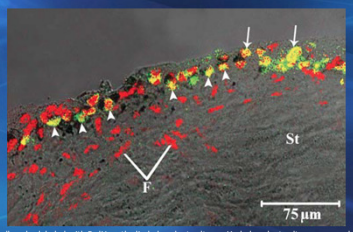


Distribution of LRCs in the outgrowth of limbal explant cultures.

Limbal explant cultures were pulse labeled with BrdU for 5 days, followed by 21-day chase

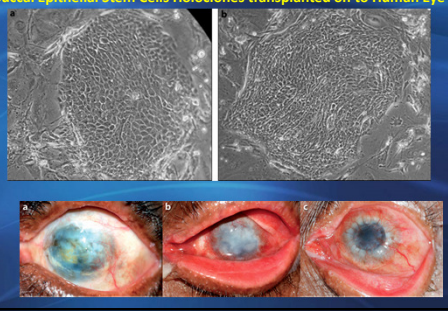
Epithelial cells in the outgrowth showing BrdU-positive (green) cells in 2 clusters (arrowheads) of small cells and a few labeled large cells (arrow).

STEM CELLS ON Explant after 21 Days

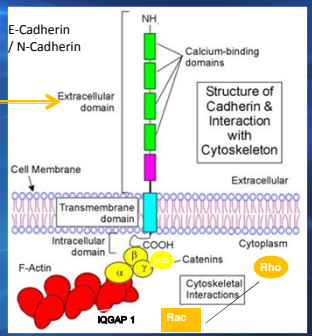


Distribution of epithelial cells pulse labeled with BrdU on the limbal explant cultures. Limbal explant cultures were pulse labeled with BrdU for 5 days, cryosectioned, and then processed for immunostaining for BrdU. Confocal overlay images of BrdU (green) and PI (red) along with transmitted light image are shown. Note the presence of 2–3 layers of epithelial cells on the stroma of limbal explant cultures, with several BrdU-positive cells, which appeared yellow because of merging of green and red. Arrowheads indicate BrdU-positive pigmented cells in the basal layer of cultured limbal explant; arrows indicate BrdU-positive limbal suprabasal cells. F, fibroblast; St, PI-stained stromal cells.

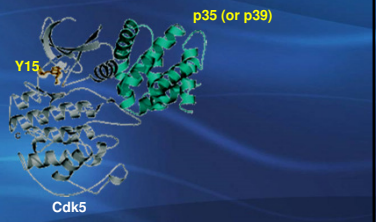
Buccal Epithelial Stem Cells Holoclones transplanted on to Human Eye



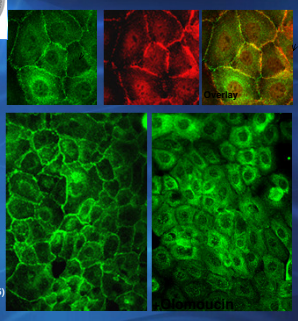
Cell-Cell Adhesion Complexes

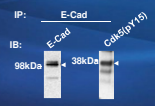


Cdk5-a serine/threonine kinase



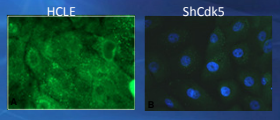
Interaction of E-cadherin and CDK5

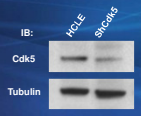




E-cadherin and Cdk5 (pY15) co-localize at cell-cell adhesions

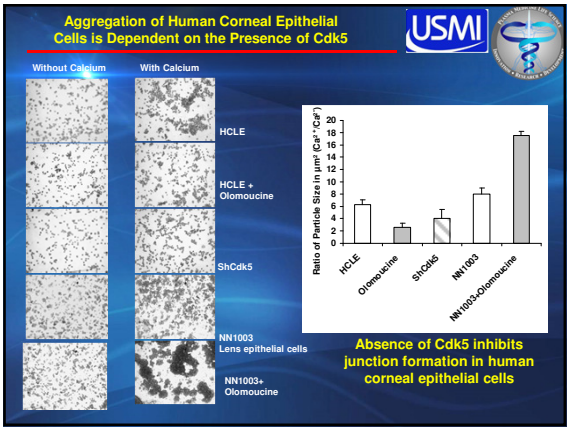
Generation of Cdk5 Deficient Human Corneal Epithelial Cell Line

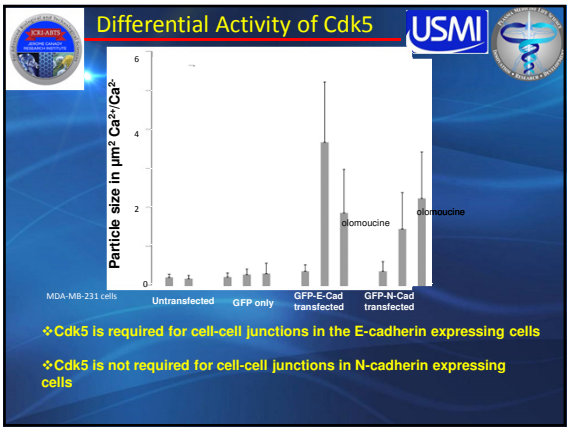


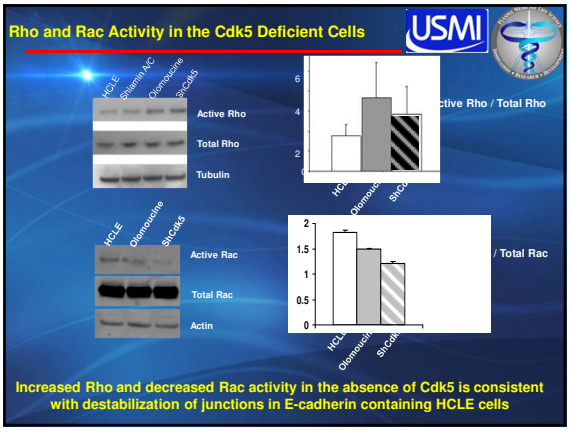


ShCdk5 Stable Cell line showing loss of Cdk5 expression

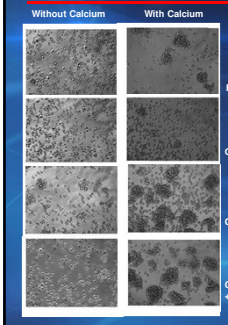
- Cdk5-lentiviral titers on the HCLE cells were selected using Blasticidin and tested for the suppression of Cdk5
- Cdk5 was suppressed by 90% in the stable ShCdk5 cells

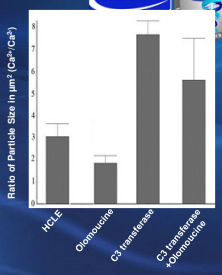

Aggregation of Human Corneal Epithelial Cells is Dependent on the Presence of Cdk5
USMI
Without Calcium
With Calcium
HCLE
HCLE + Olomoucine
ShCdk5
NN1003 Lens epithelial cells
NN1003+ Olomoucine
Ratio of Particle Size in µm² (Ca²⁺/Ca²⁺)
HCLE
Olomoucine
ShCdk5
NN1003
NN1003-Olomoucine
Absence of Cdk5 inhibits junction formation in human corneal epithelial cells


Differential Activity of Cdk5
USMI
Particle size in µm² Ca²⁺/Ca²⁺
olomoucine
olomoucine
MDA-MB-231 cells
Untransfected
GFP only
GFP-E-Cad transfected
GFP-N-Cad transfected
❖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
USMI
HCLE
Olomoucine
ShCdk5
Active Rho
Total Rho
Tubulin
Active Rac
Total Rac
Actin
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



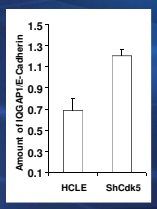


Rho Inhibitor- C3 transferase
CDK5 Inhibitor-Olomoucine

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

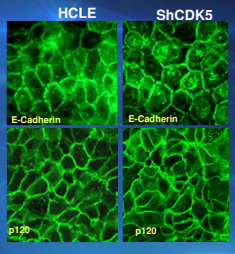
Interaction of E-cadherin with IQGAP-1 and Cdk5

IQGAP-1
- a substrate for Rac-1
- binds to the E-cadherin junctional complex through β- catenin and inhibits cell-cell adhesion



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

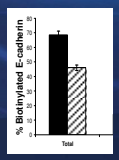


Ratio of cell border to total intensity

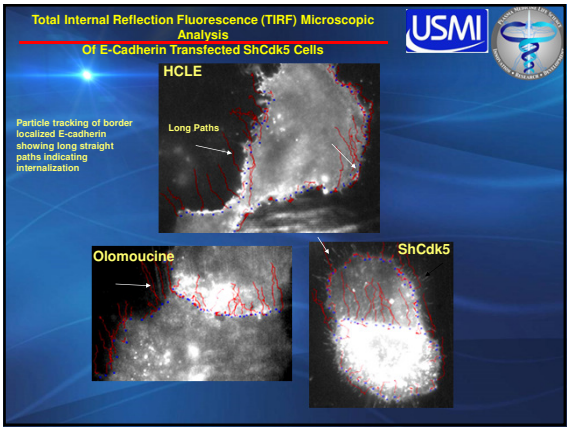
	E-Cadherin	p120
ShCdk5	0.347 ± 0.145	0.576 ± 0.027
HCLE	0.535 ± 0.142	0.516 ± 0.0291

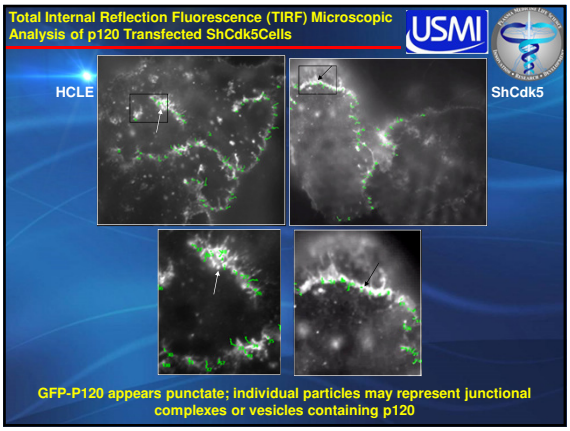
Localization of E-Cadherin is significantly reduced at the cell- cell borders of ShCdk5 cells

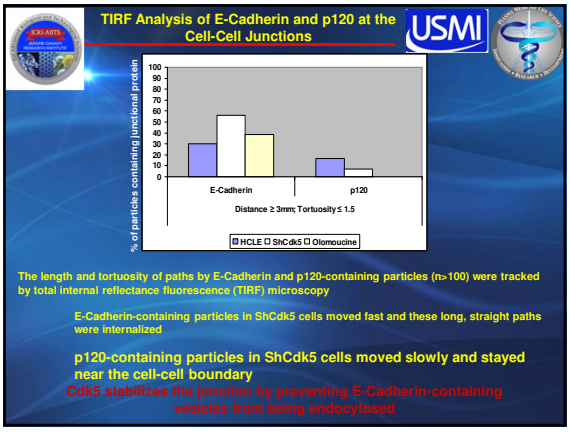
Surface Biotinylation of E-cadherin



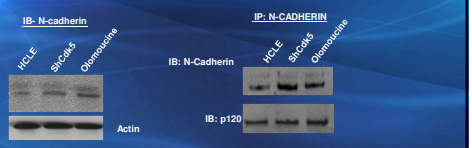
Cdk5 deficient cells-
- are capable of forming junctions containing E-cadherin and p120
- have increased endocytosis
- have p120 at junctions


Total Internal Reflection Fluorescence (TIRF) Microscopic Analysis
Of E-Cadherin Transfected ShCdk5 Cells
USMI
HCLE
Particle tracking of border localized E-cadherin showing long straight paths indicating internalization
Long Paths
Olomoucine
ShCdk5


Total Internal Reflection Fluorescence (TIRF) Microscopic Analysis of p120 Transfected ShCdk5Cells
USMI
HCLE
ShCdk5
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
USMI
% of particles containing junctional protein
100
90
80
70
60
50
40
30
20
10
0
E-Cadherin
p120
Distance ≥ 3mm; Tortuosity ≤ 1.5
HCLE ShCdk5 Olomoucine
The length and tortuosity of paths by E-Cadherin and p120-containing particles (n>100) were tracked by total internal reflectance 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
Cdk5 stabilizes the junction by preventing E-Cadherin-containing vesicles from being endocytosed

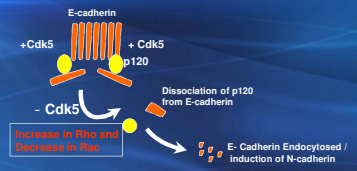
N-Cadherin Expression in Cdk5 Deficient Stable Cells



Inhibition of Cdk5 leads to internalization of E-cadherin and induction of N-cadherin

p-120 at the cell-cell adhesions in the absence Cdk5 is associated with N-cadherin

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

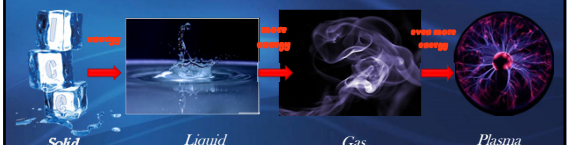
US Medical Innovations, LLC (USMI), a subsidiary of US Patent Innovations (USPI), is a privately owned, FDA registered biomedical device company focused on the research, development and manufacturing of advanced, innovative and affordable plasma electrosurgical devices. USMI products are designed for 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.

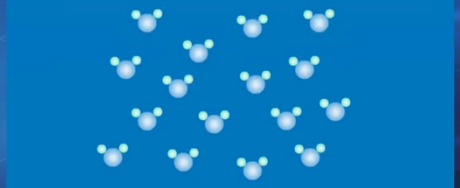
Plasma: 4th State of Matter

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



Solid Liquid Gas Plasma

The 4 States of Matter



Plasma Research

Substantial Continued Investment in Plasma R&D

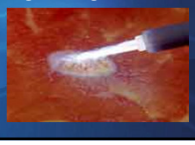
The progression of plasma innovation that resulted in the Canady Systems has created vast market potential, confirmed by the substantial and continued investment in plasma research and development

German Center for Research & Innovation in New York City

6930 Carroll Avenue
Suite 1000, Takoma Park
Maryland 20912

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



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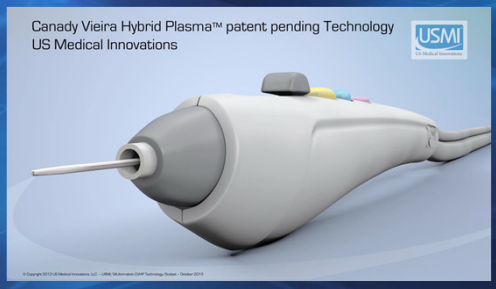
CVHP Scalpel



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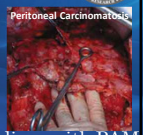
FUTURE of Plasma Research in Cancer



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!

Let Us Meet Again

We welcome you all to our future conferences of OMICS Group International

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