國立臺灣大學 技術移轉/授權 安盟生技
- 活體三維斷層高速掃描術

簡報人: 黃升龍

光電所暨電機系

4/21/2015

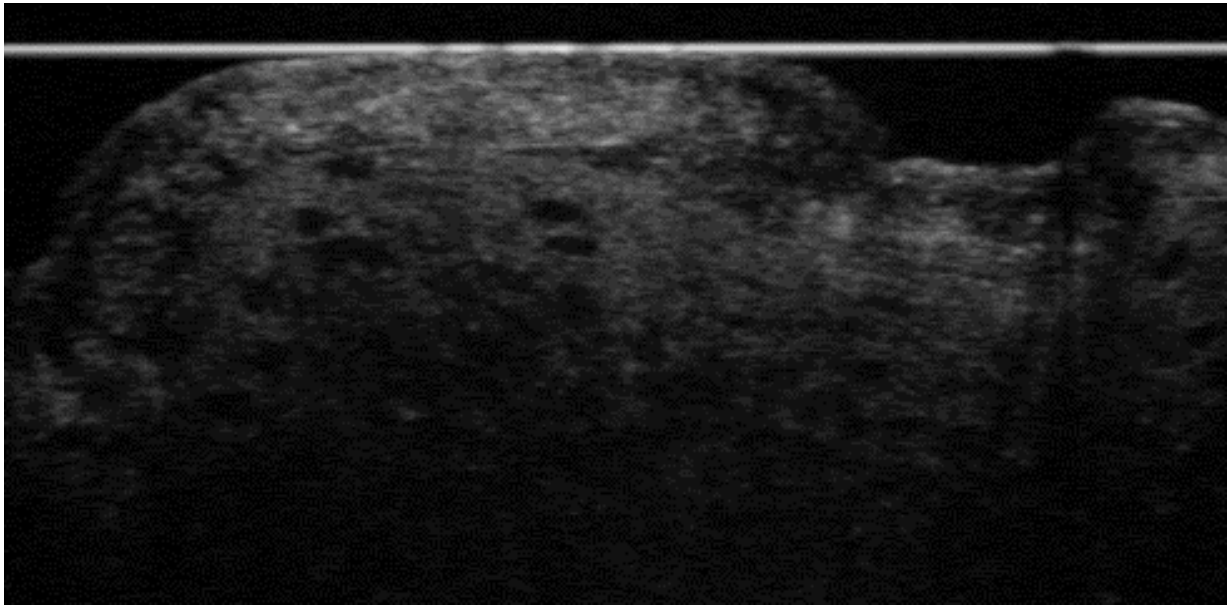
簡報大綱

- 光學切片術簡介
- 臨床/前臨床實驗結果
- 技術移轉/授權
- 創新創業實現

臺大專利授權技術

可臨床用之高速且高解析的無標記三維斷層掃描術

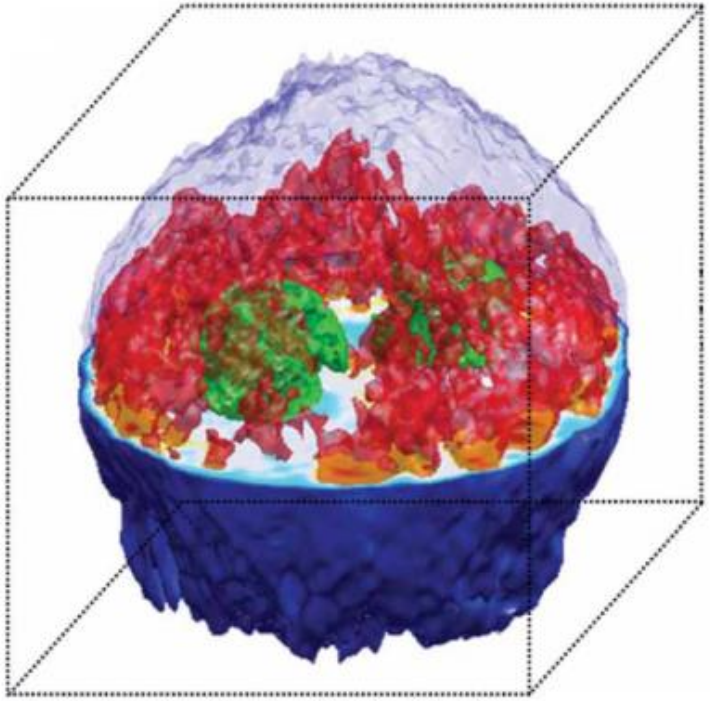
縱向剖面圖(video)



橫向剖面圖 (video)

與其他技術之比較

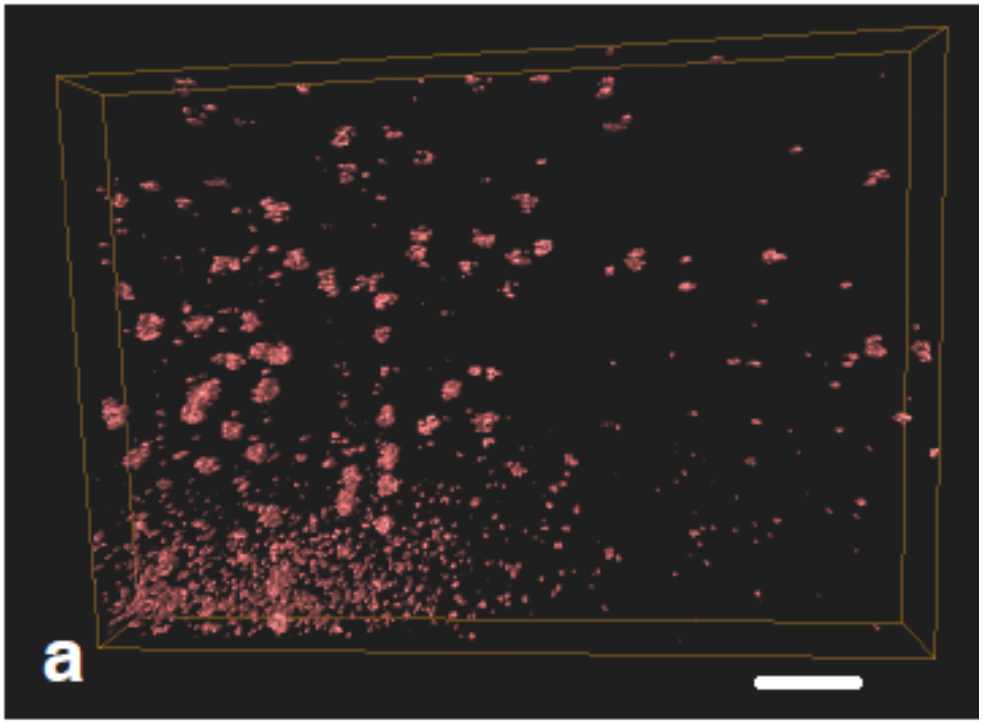
斷層相位顯微術



20-μm cube

W. Choi, et al, “Tomographic phase microscopy,” Nature Methods, 4, pp. 717-719, 2007.

光學同調斷層掃描術



200-μm bar

W. Tan, A. L. Oldenburg, J. J. Norman, T. A. Desai, S. A. Boppart, “Optical coherence tomography of cell dynamics in three-dimensional tissue models,” Optics Express, 14, pp. 7159-7171, 2006.

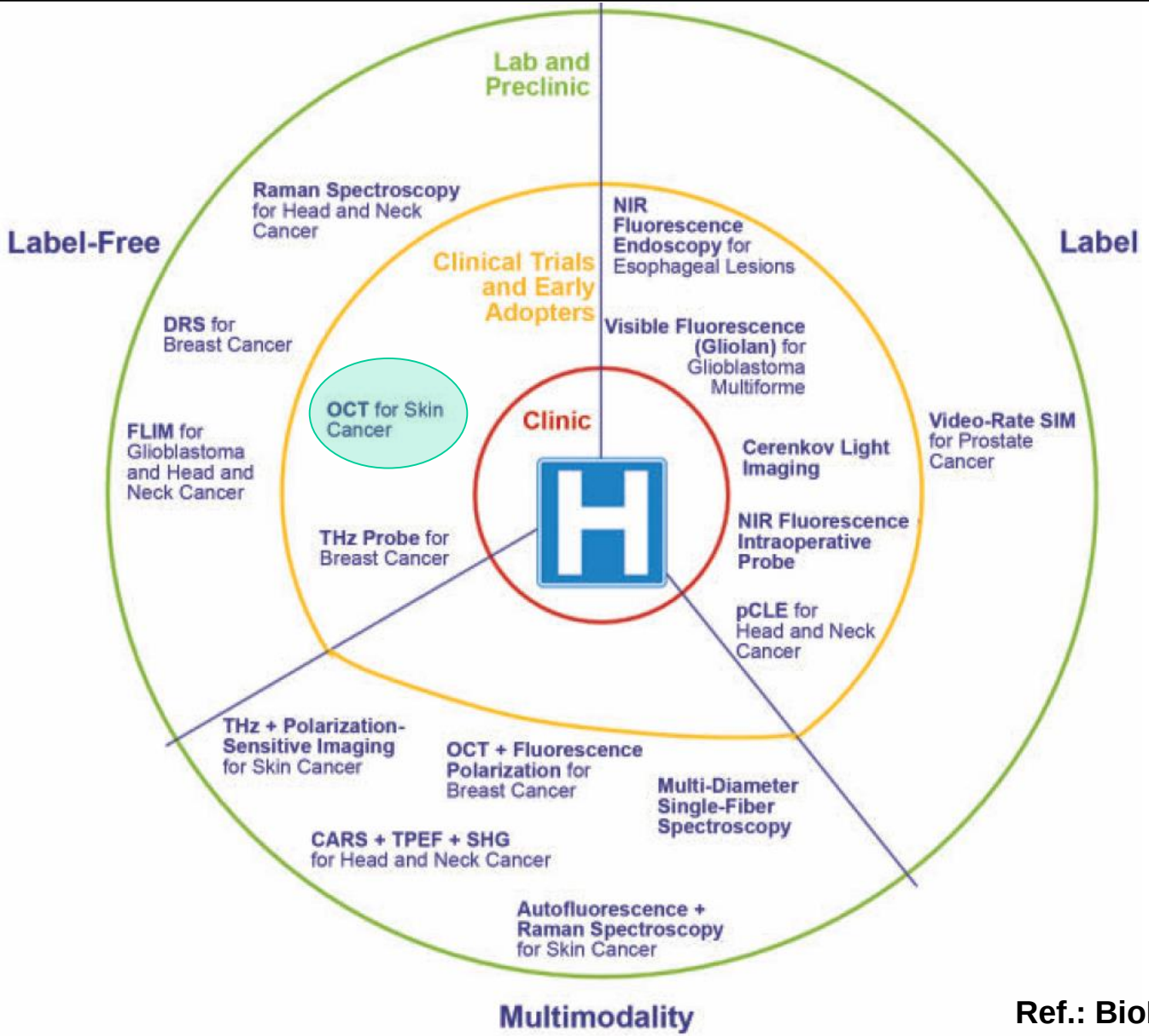
國際專業網站之報導

OCT News
Optical Coherence Tomography News

Feature of the Week

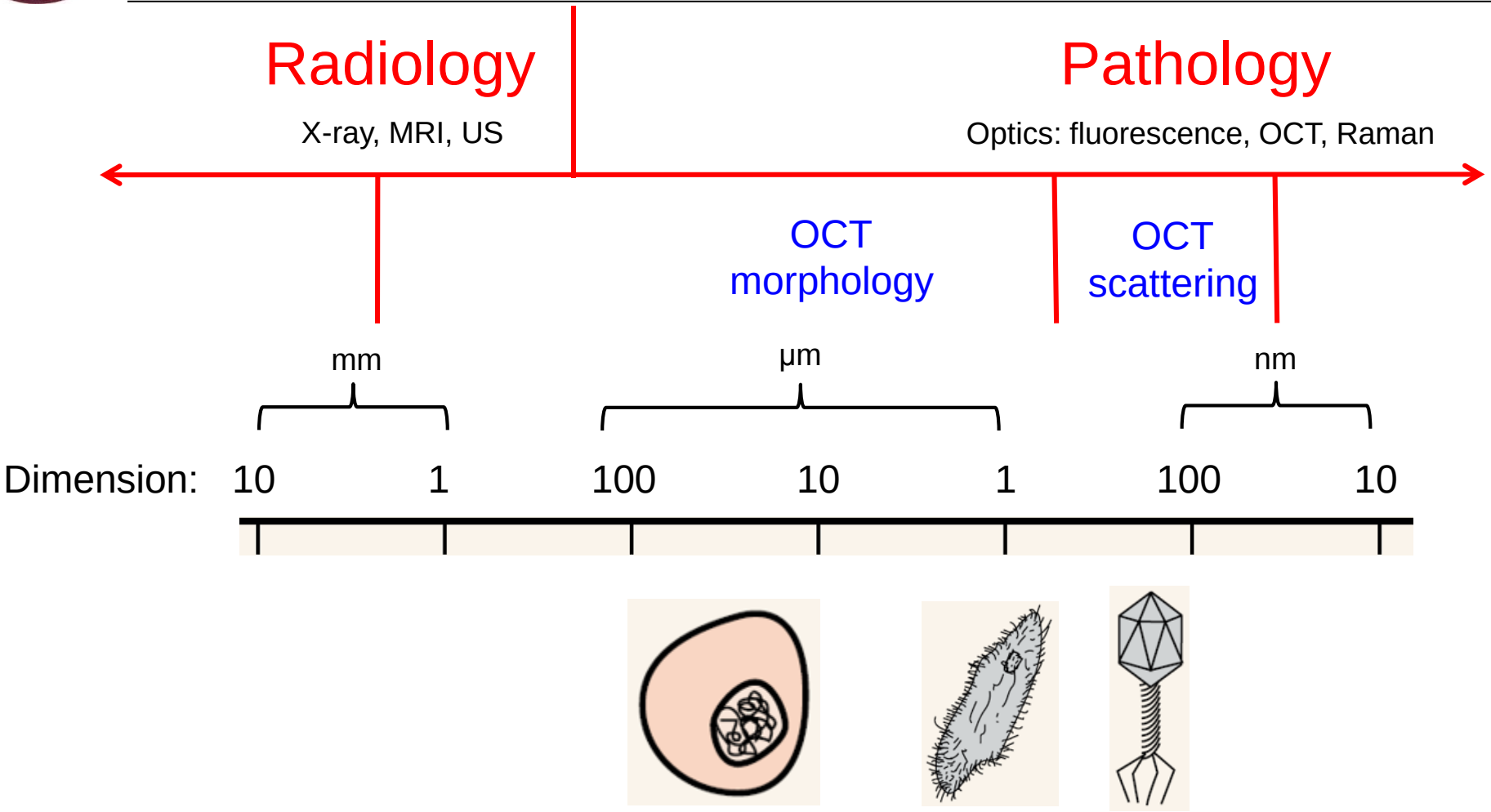
Year	Achievement
2010	Fish cornea stroma tomography
2012	*In vitro* single Cell 3D tomography analysis
2014	*In vivo* full-depth epidermis tomography

手術中之腫瘤邊界評估



Ref.: BioPhotonics, Dec. 2014

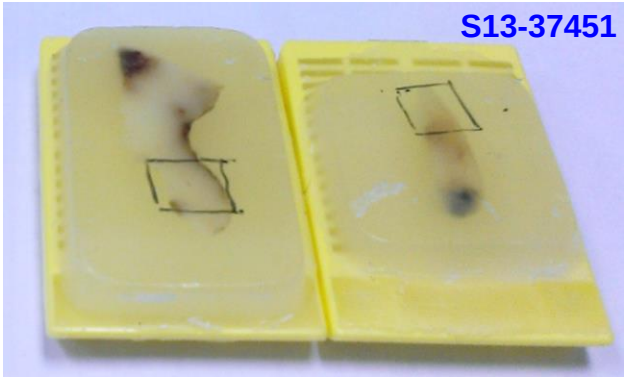
醫療用光學技術



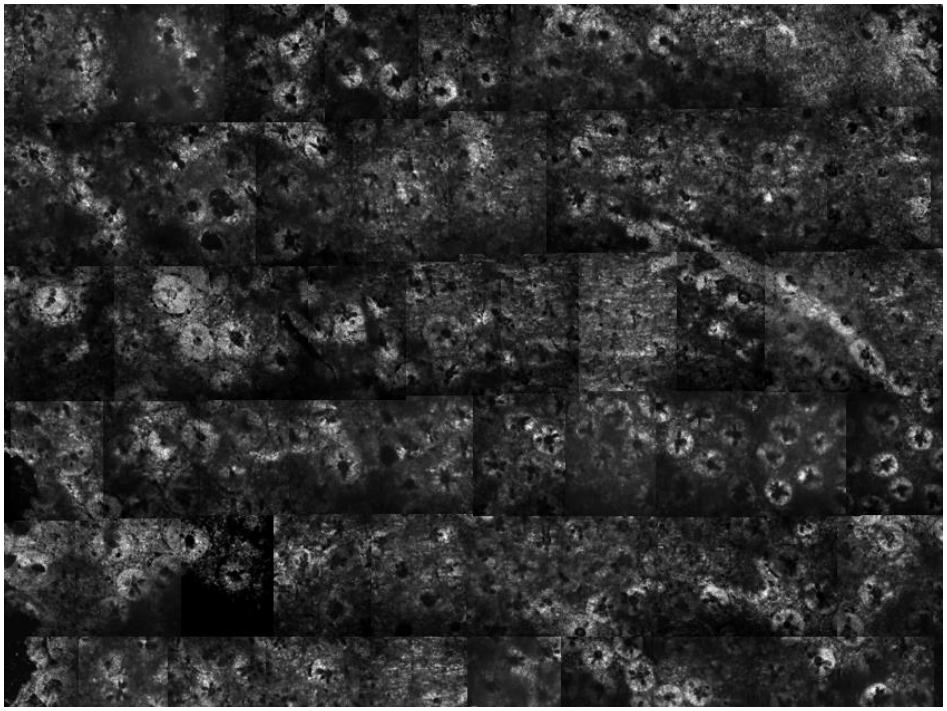
病理切片是癌症診斷之黃金標準

大腸癌與正常組織切片之OCT影像

大腸癌
樣本



正常組織
樣本

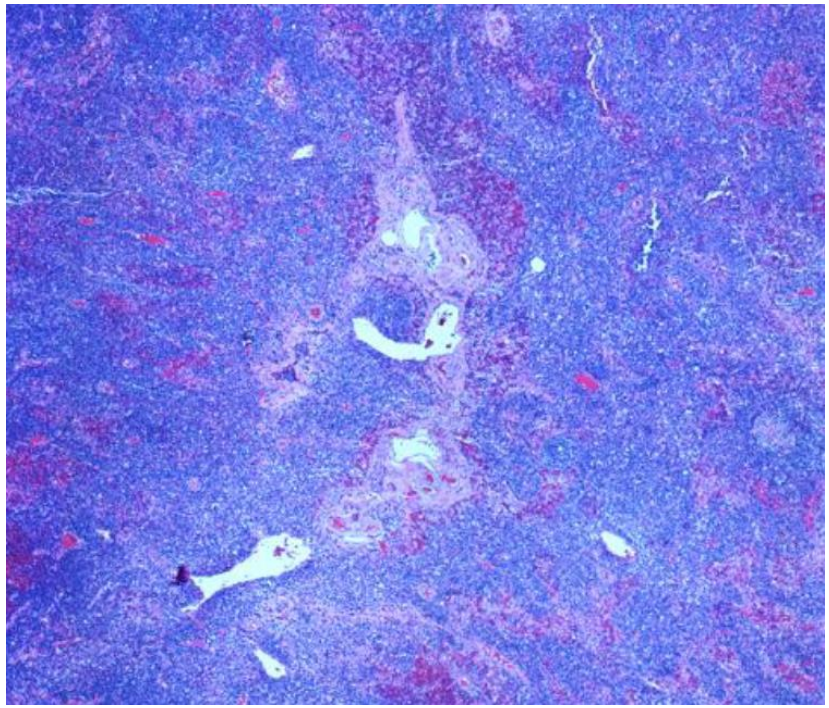


Collaboration with NTUH 孫家棟/李昱儀 醫師

光學同調斷層掃描與H&E染色切片之比對

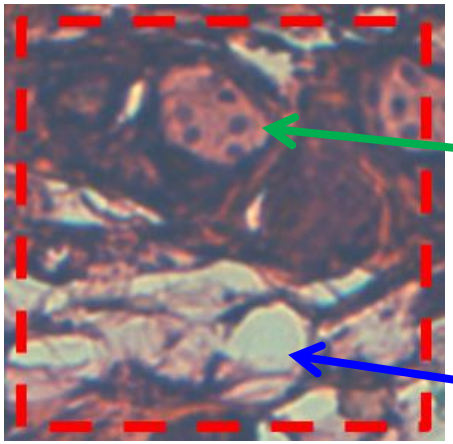
巨觀比對

面積
~3 x 3 mm^2



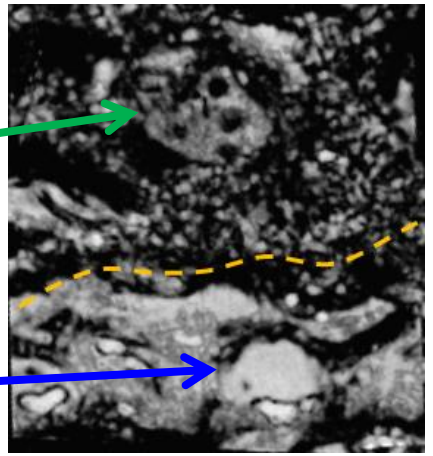
微觀比對

面積
~0.3 x 0.3 mm^2



毛囊細胞

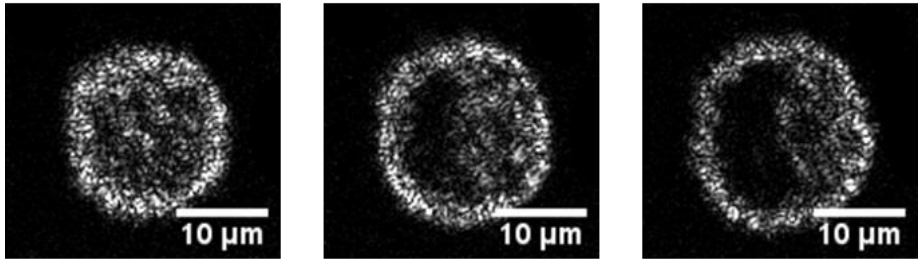
脂肪細胞



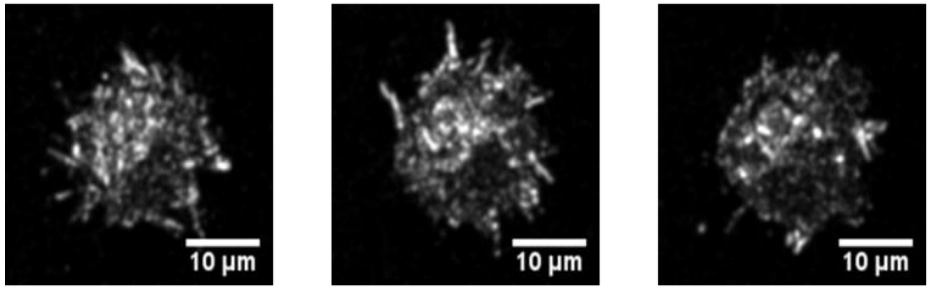
黑色素正常細胞與癌化細胞之單細胞分析

OCT Images

Melanocyte



Melanoma



Features analysis

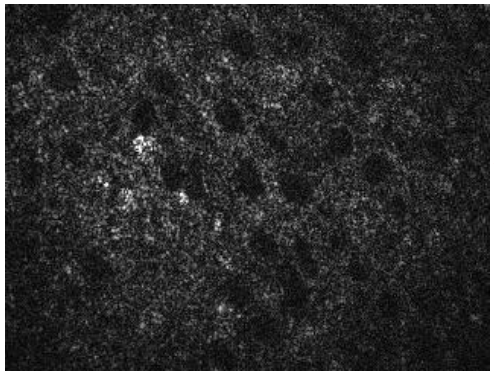
OCT features	P value
***En face* features**	
1. Average of *en face*	0.11
2. Standard deviation of *en face*	<0.001
3. Kurtosis of en face	<0.001
Intensity (voxel) features	
1. Sum of signal intensity	<0.001
2. Skewness of signal intensity	<0.001
3. Kurtosis of signal intensity	0.009
Morphology feature	
1. N/C ratio	<0.05

Collaboration with NTUH 邱政偉醫師

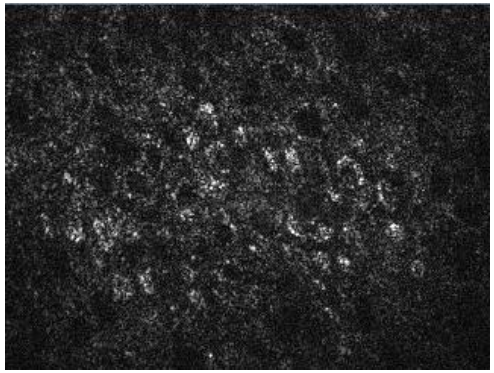
黑色素冠狀層偵測

橫向剖面圖 (X-Y)

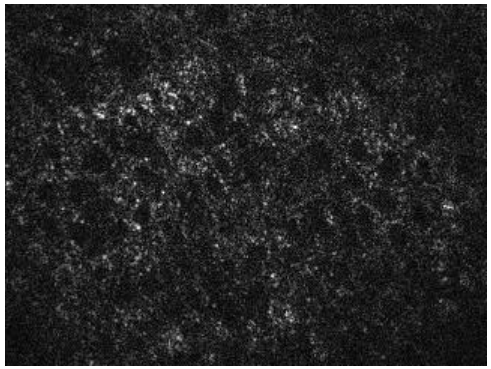
z=176



z=192

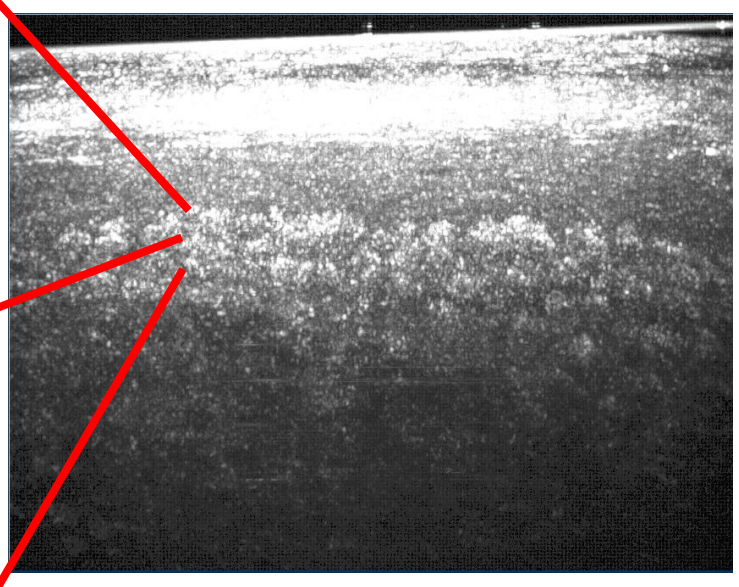


z=209



縱向剖面圖 (max projection)

X-Z 平面



145 x100 μm^2

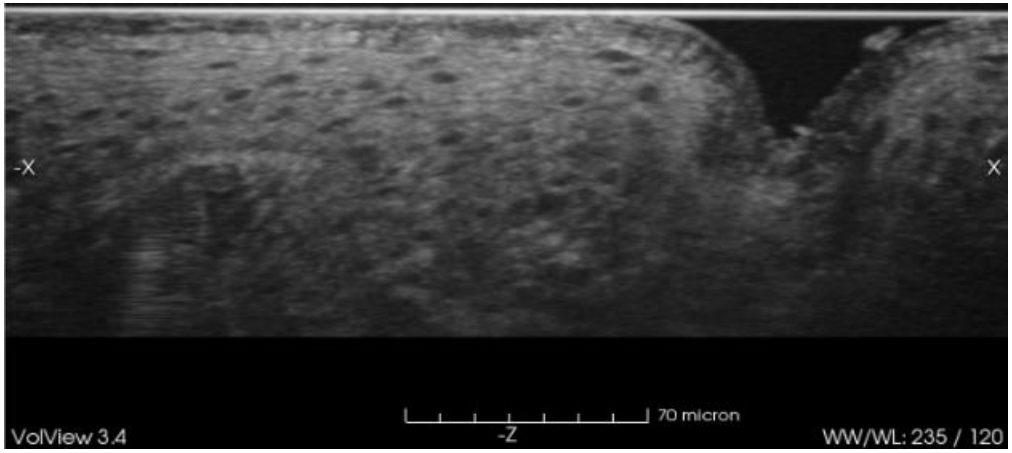
Y-Z 平面

110 x100 μm^2

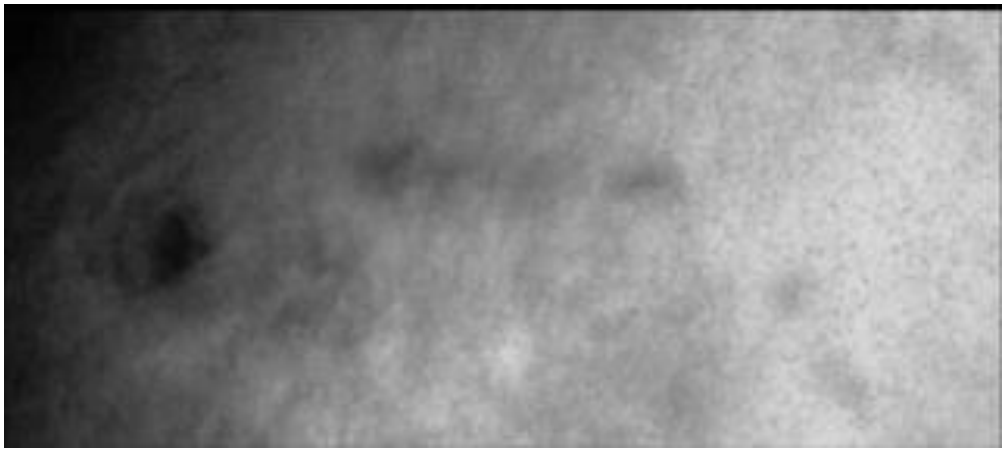
***In vivo*, forearm, 35-year-old male**

活體三維皮膚病變之影像辨識

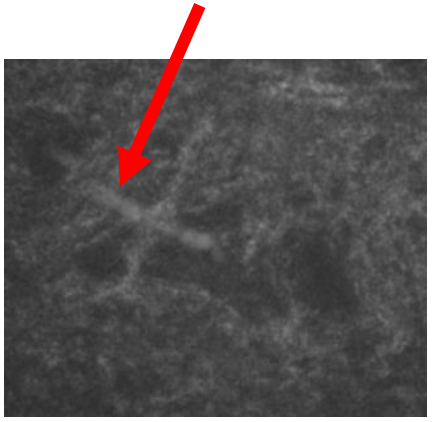
表皮之細胞及層狀結構



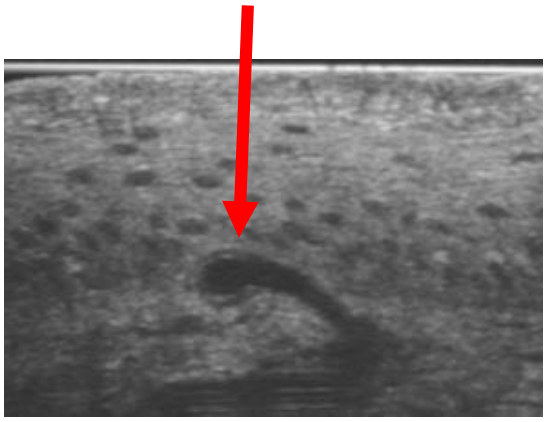
紅血球動態觀測



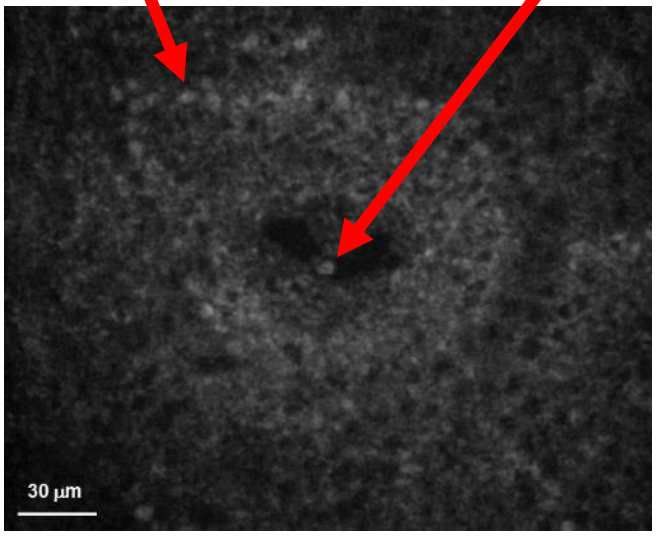
纖維化組織



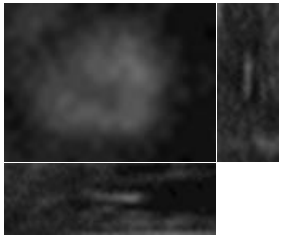
廢棄之微血管



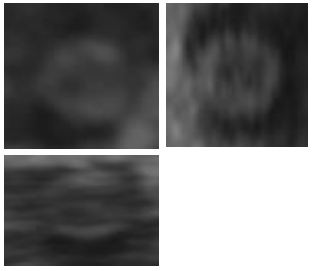
黑色素 / 紅血球



紅血球三面視圖

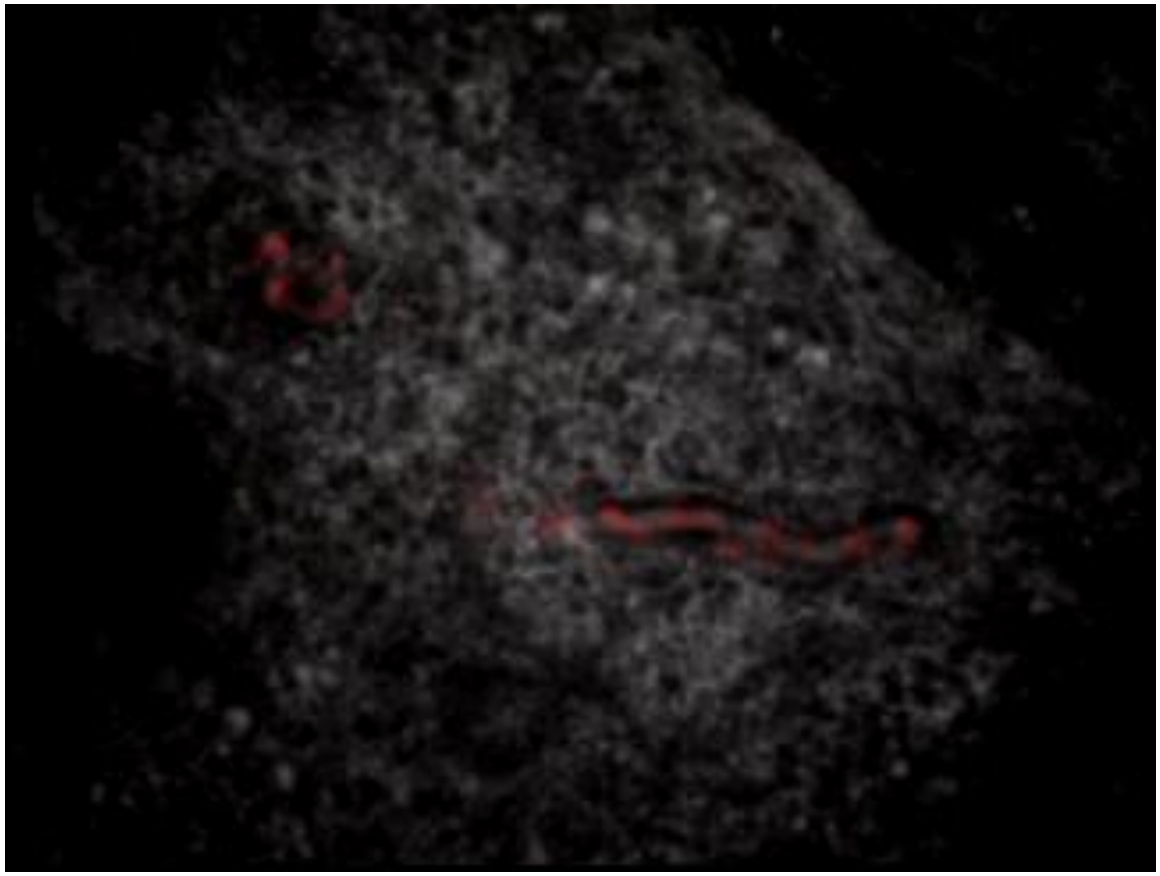


白血球三面視圖

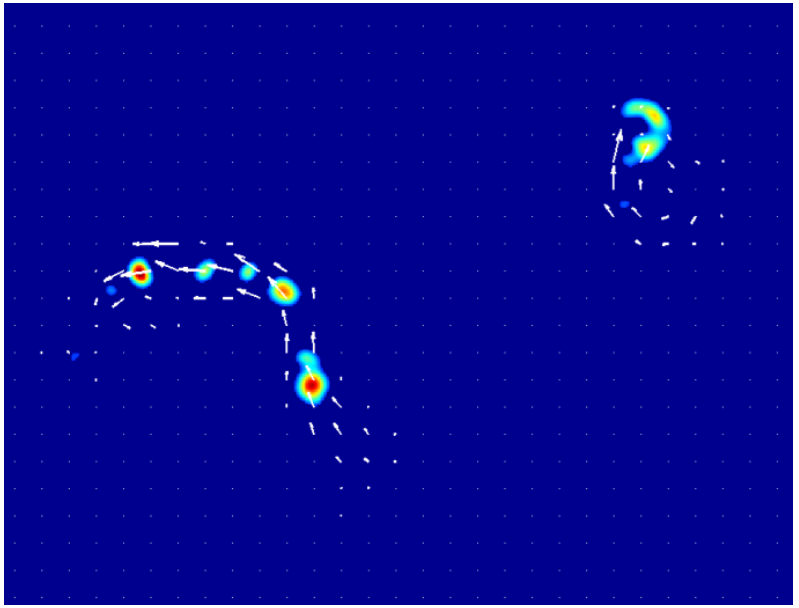


活體之微血管血球流速分析

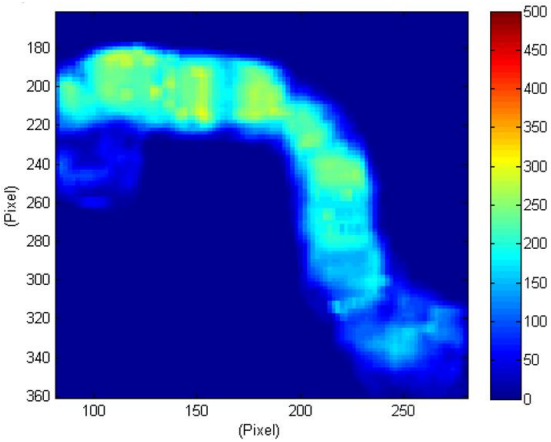
皮膚動態斷層影像



交叉相關分析

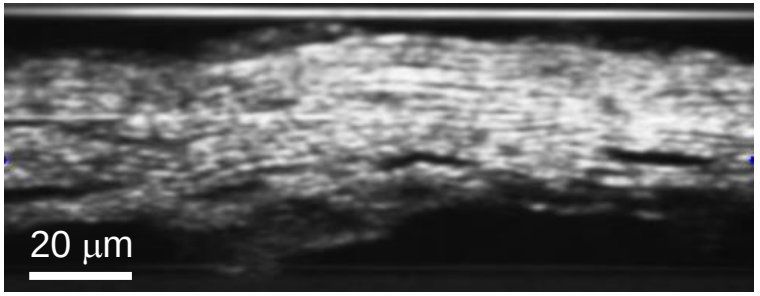


定量血流速分析

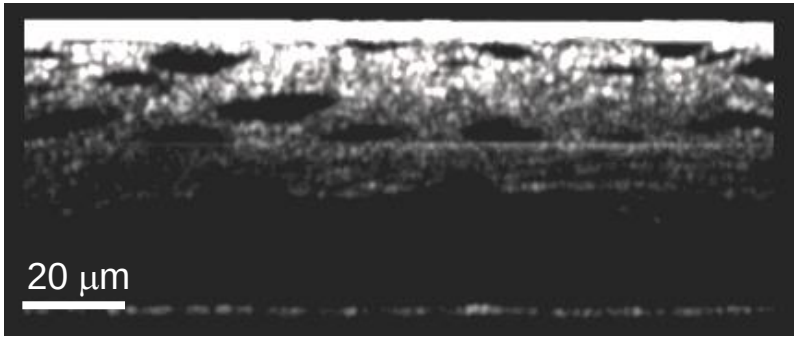


皮膚老化程度之評估

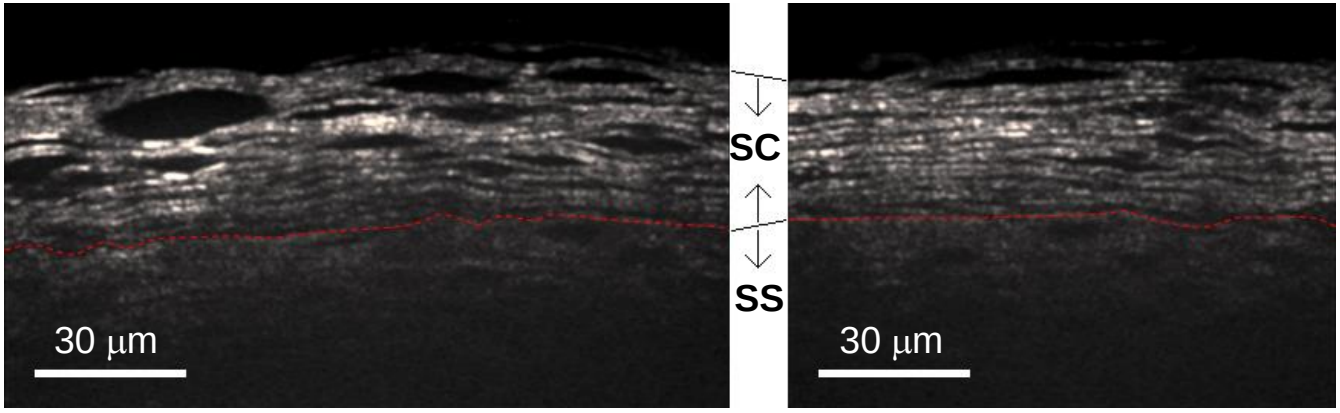
女性 1963 / inner arm



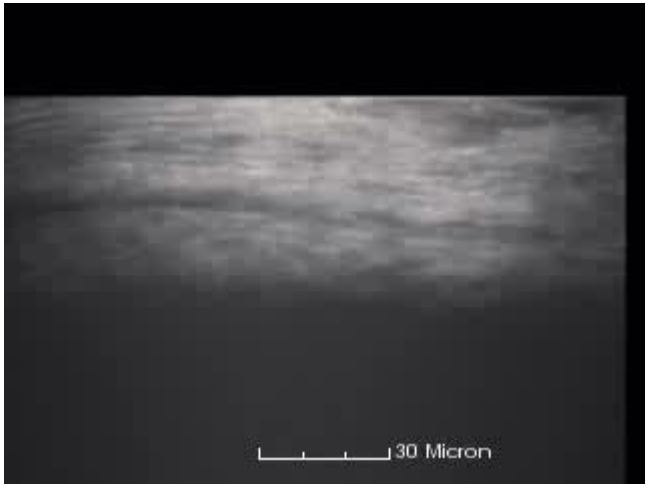
女性 1923 / inner arm



男性 1945 / face



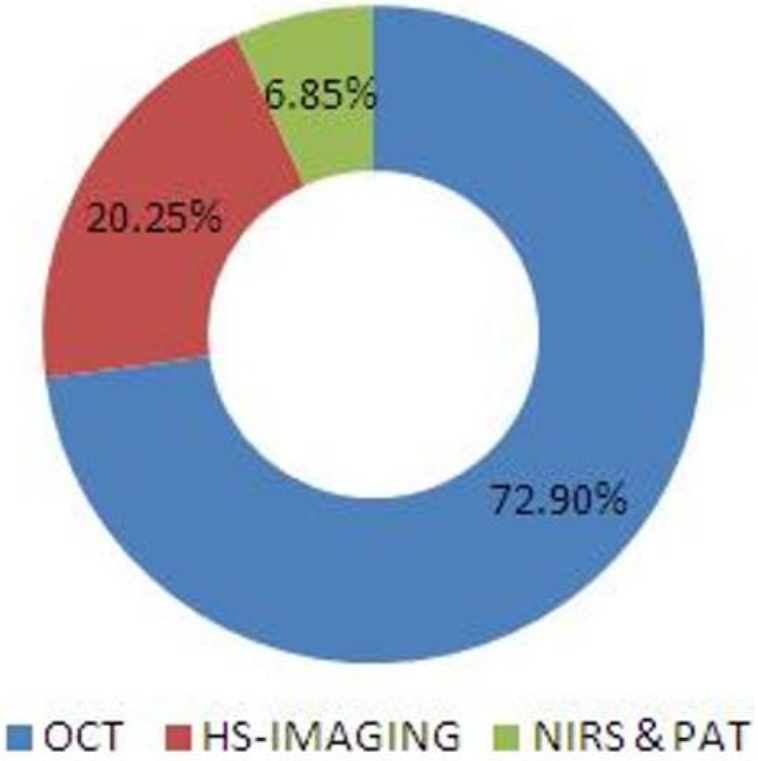
3D view



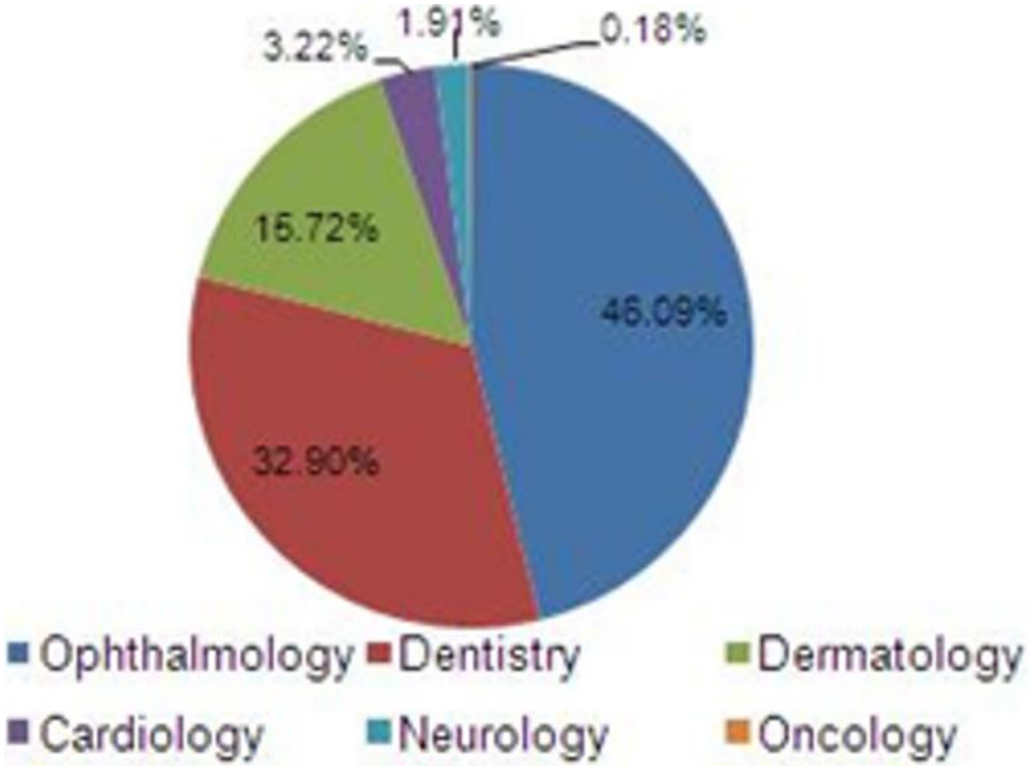
Collaboration with NTUH 邱政偉醫師

全球生醫影像儀器市場

19億美金@2018



臨床診斷市場



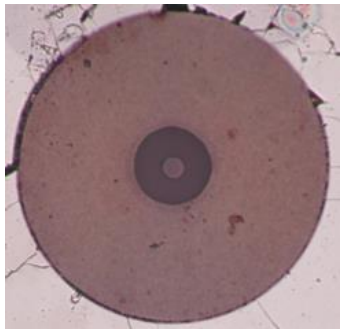
資料來源: Markets and Markets Analysis, 2013

技術授權

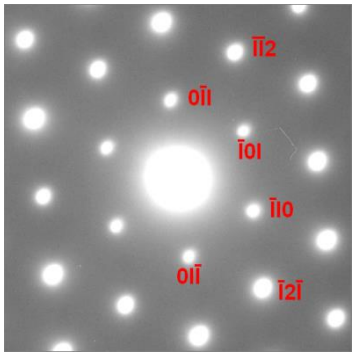
技術授權對象	安盟生技 (Apollo Medical Optics)
技術來源	1. 國科會前瞻台灣計畫「功能性三維斷層掃描術在皮膚科之研究及系統開發（計畫編號: NSC 101-3113-P-002-024）」 2. 經濟部學界科專計畫「具早期疾病診斷功能之超高解析度及多模組三維顯微儀開發計畫（計畫編號:101-EC-17-A-19-S1-209）」
技術名稱	高解析之光學同調斷層掃描術
技術內容	晶體光纖光源 暨 三維斷層掃描術
授權產品範圍	醫療器材及泛生物技術相關之產品與服務
授權方式	專屬授權，惟臺大於學術研究範圍內仍得實施本授權技術
授權金	2975萬
臺大合約編號	07A-141218-1E-A

晶體光纖寬頻光源

雙纖衣晶體光纖
截面圖



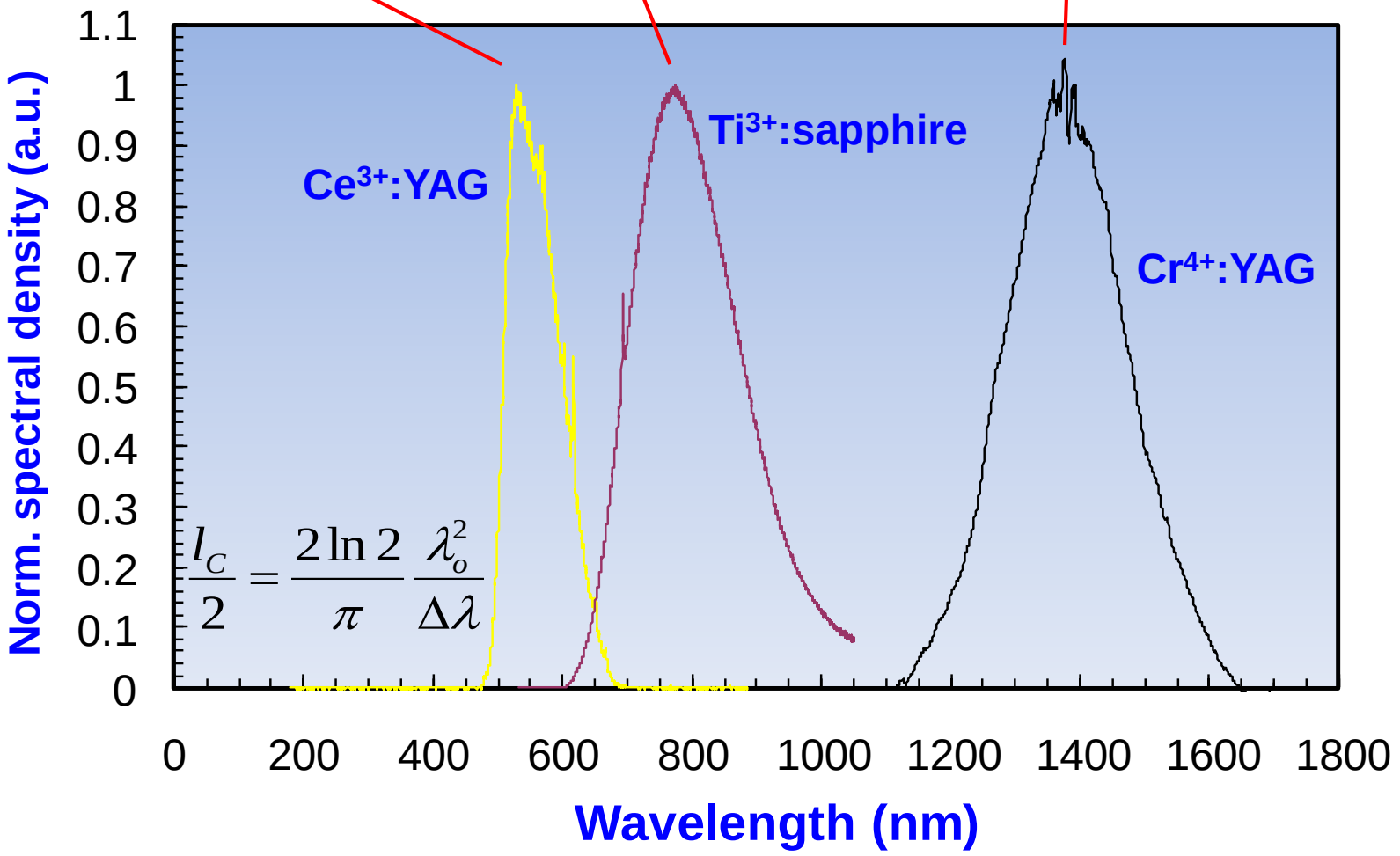
纖心電子繞射圖



- 液晶面板
- OCT+共焦螢光顯微術

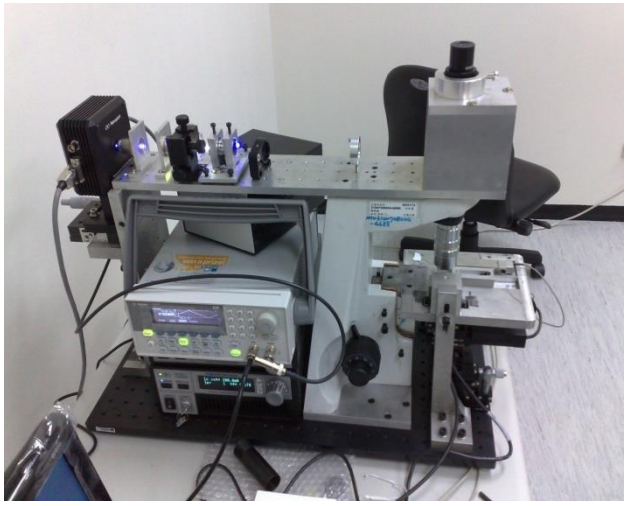
- 眼科
- 皮膚科
- 免疫風濕科

- 半導體元件 (IC, solar cell)
- 水分偵測

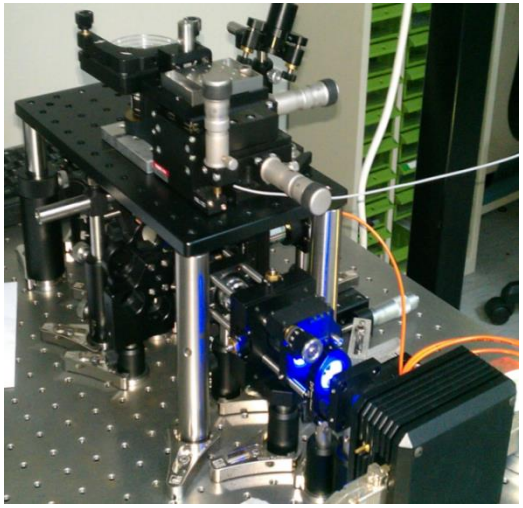


臺大之工程原型演進

第一代: 可攜式

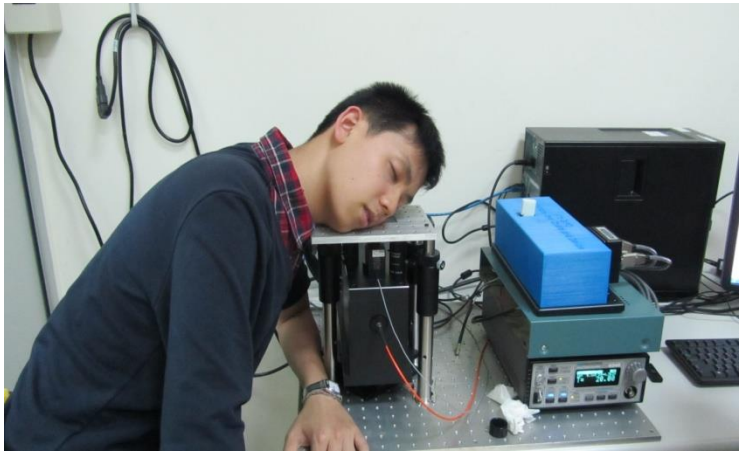


第三代: 倒立式

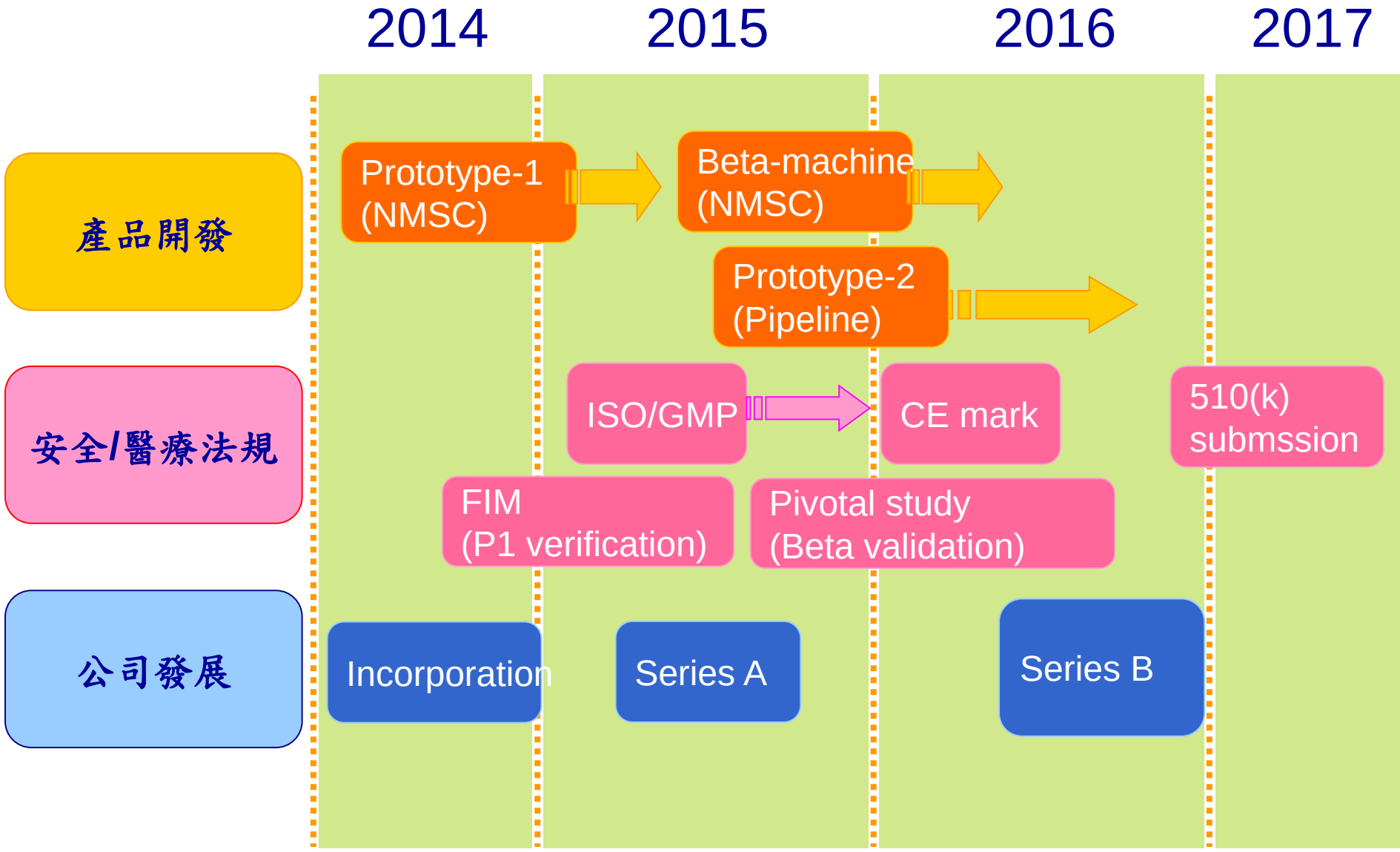


第二代: 小型化

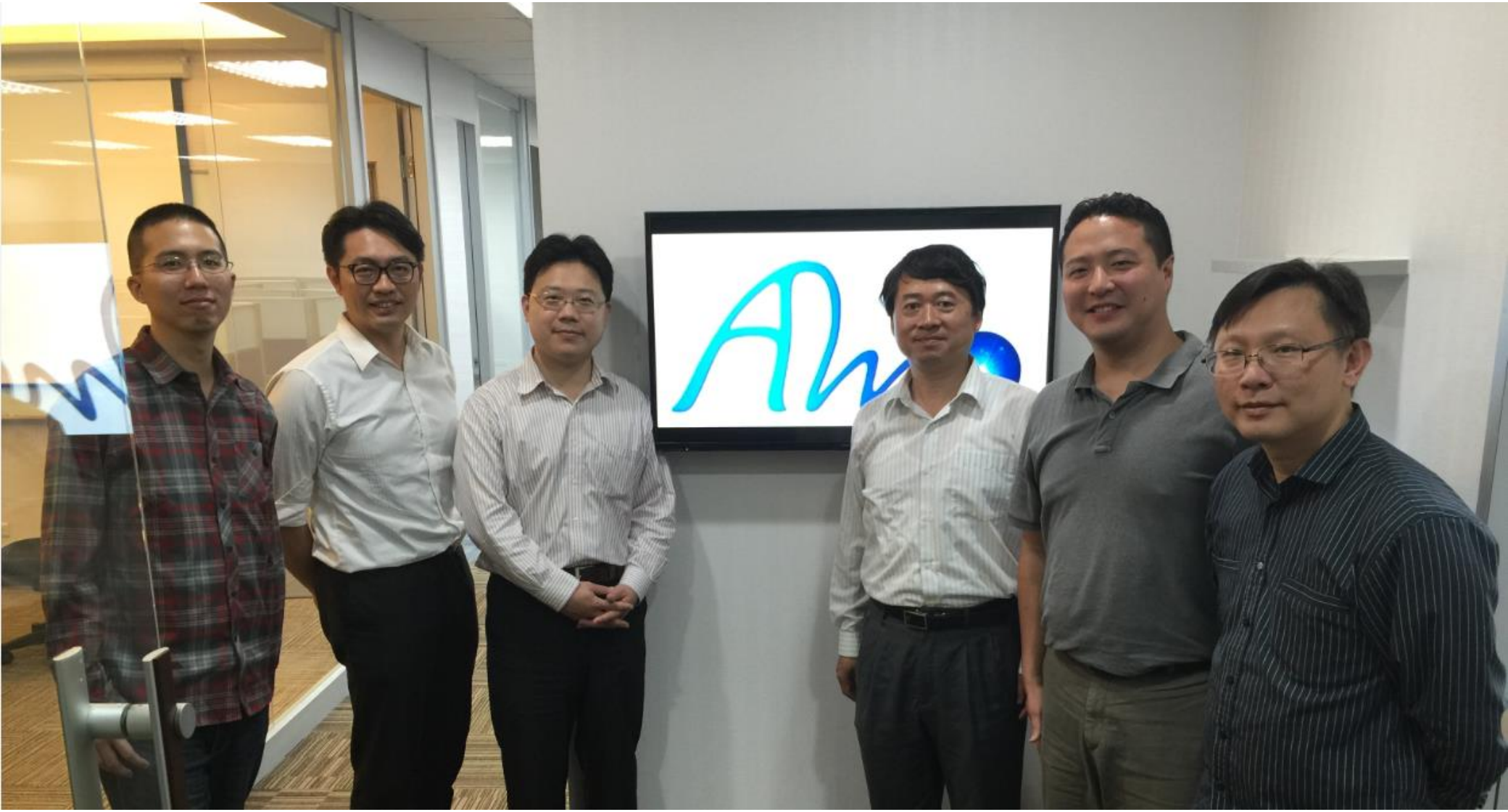
第四代: 臨床用

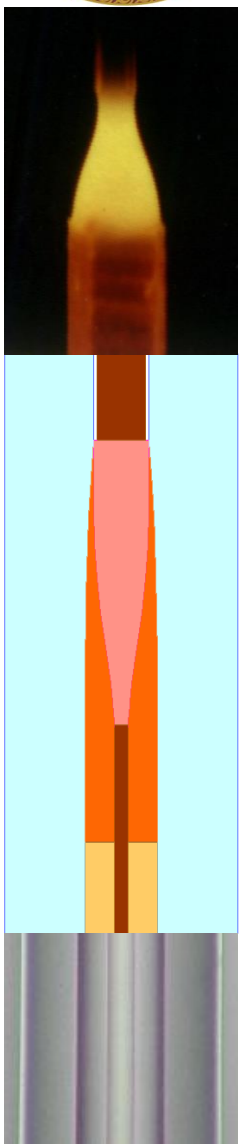


創新創業時程


2014
2015
2016
2017
產品開發
安全/醫療法規
公司發展
Prototype-1 (NMSC)
Beta-machine (NMSC)
Prototype-2 (Pipeline)
ISO/GMP
CE mark
510(k) submssion
FIM (P1 verification)
Pivotal study (Beta validation)
Incorporation
Series A
Series B

技轉廠商-安盟生技





感謝聆聽 敬請指教