義大研訊

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SEARCH & DISCOVERY

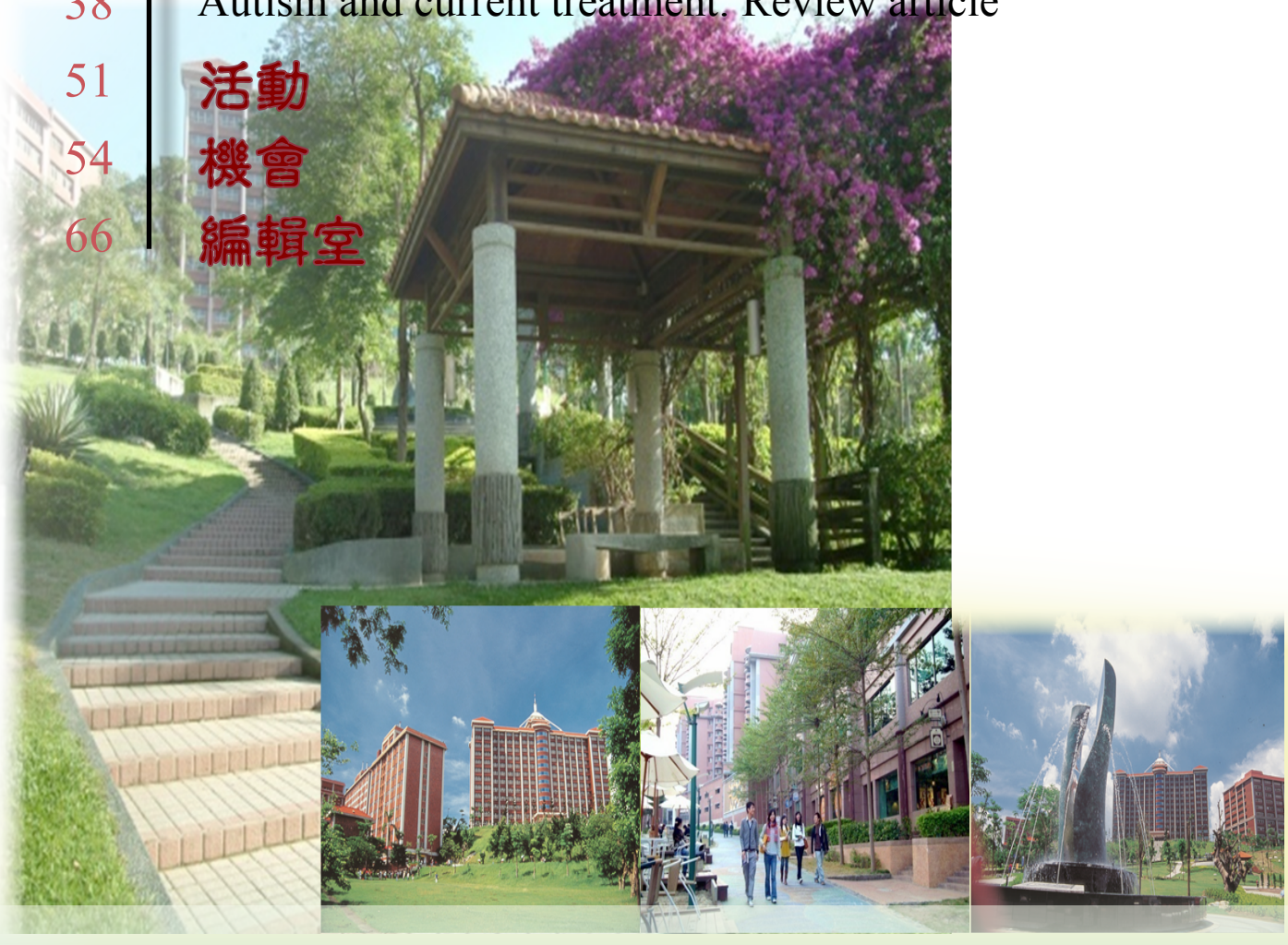
RESEARCH AT ISU & EDH

NEWS ARTICLES ACTIVITIES OPPORTUNITIES

義守大學 I-SHOU UNIVERSITY

E-DA HOSPITAL

目錄



2014年世界綠能大學評比 義大排名全國第四

世界綠能大學(UI GreenMetric World University Ranking)公布2014年排名，共有62個國家、360所大學參加評選，台灣共有20所大專院校上榜，高雄義守大學排名第四，為南部私立綜合大學第一，全球第55名，比去年93名排名大幅進步。

義大校長蕭介夫表示，2009年義大就獲選為教育部13所綠色大學示範學校之一，對於推動校園節能減碳向來不遺餘力，並配合政府綠色消費政策，將永續發展的精神融入校務發展、教學課程發展等面向，未來將持續與國際接軌，全力營造綠色校園，創造優質的學習環境。

義大露天觀眾席座使用透水鋪面，打造綠色校園

2014 年世界綠能大學評比，義大排名全國第四

義大無論是在行政、教育或是研發等層面，均融入綠色的概念，其中包括實施宿舍垃圾不落地、植樹計畫、校園美化、廢乾電池回收、實驗室廢棄物處理、再生水回收利用、環境區域認養推廣、機車排氣定檢專案等措施，為提昇校園生活環保不遺餘力，並積極推廣學生環保教育，強調資源回收等政策。

世界綠能大學排名(UI GreenMetric World University Ranking) 是以友善環境為基礎建設的指標評比，由印尼大學於2010年發起，評比項目包含環境及基礎建設、能源及氣候變遷、廢棄物、水源、運輸系統、教育等六項目，其他名列前茅的學校包括英國諾汀漢大學、美國康乃狄克大學、加州大學戴維斯分校等國際大學。

BACK

義大與晶元光電 7日簽訂產學合作

高雄義守大學與晶元光電公司7日簽訂產學合作協議書，晶元光電捐贈兩套總值約850萬的機器設備，供義大電機資訊學院師生使用，雙方將持續進行學術暨產學合作，開發LED(發光二極體)產品，並積極推動建教合作案，進行南部科學園區人才培訓計畫、公司參訪、業界工程師經驗分享等，達到學用合一，產學合作的目標。

義大行政副校長顏志榮表示，很感謝晶元光電贈送兩套貴重設備給義大，讓學生能藉此加強就業競爭力，提升開發LED產品的研究，義大為使學生跟產業無縫接軌，在100學年度成

義大行政副校長顏志榮（左）與晶元光電協理曾俊龍

立綠能光電實習中心，也和業界合作成立產學碩士專班，和產業交往甚密，這次在雙方共同努力下，相信未來台灣的LED產品會更上一層樓。

晶元光電協理曾俊龍表示，非常榮幸可以跟義大合作，希望未來內部工程師們能藉由跟學校的教授合作，激發出更多的創意火花，台灣電子科技產業目前只能倚靠優秀的人才，來面對大陸市場的強烈競爭力，因此期待能與學術界更多的合作，讓優秀人才能不斷加入，研究開發更多產品，創造產業更多價值。

晶元光電於民國85年9月成立，以自有的有機金屬氣相磊晶 (MOVPE)技術，全力發展超高亮度發光二極體系列產品，晶元生產的發光二極體磊晶片及晶粒，具備體積小、耗電量少、壽命長的特點，其應用範圍非常廣泛，適用於消費性電子產品的指示燈、汽車用燈具、交通號誌顯示燈以及照明燈等。

義大與晶元光電簽訂產學合作

BACK

中研院前院長李遠哲 7日蒞義大演講

中央研究院前院長、諾貝爾化學獎得主李遠哲，7日到高雄義守大學大樹區校本部進行「世界的轉變與人類的未來」演講，現場座無虛席，他直指今年是扭轉氣候變遷的關鍵一年，溫室氣體是地球最大的敵人，呼籲同學「自己的國家自己救，自己的地球更應該救」，希望大家能減少碳排放量，共同救地球。

李遠哲指出今年是關鍵性的一年，溫室氣體會讓大家面臨更嚴重的災難。

義大校長蕭介夫表示，很榮幸邀請到李遠哲來義大演講，這些年來他除了專業領域之外，也開始關注很多的地球議題，並且走遍全世界去宣導，讓人相當欽佩，相信這場演講對同學的幫助一定會很大。

李遠哲蒞臨義大演講，現場座無虛席。

李遠哲表示，地球現在是面臨「嚴重超載」的問題，人口的增加帶來了能源的消耗，雖然台灣目前面臨少子化社會，但人口密度太高是台灣最大的問題，而人類的敵人就是溫室氣體，今年會是個關鍵的一年，因為年底G21高峰會，若能讓國際間達到共識，就能急速減少碳排放量，如果不能，剩下的時間就不多了。

李遠哲也希望年輕人不僅要救自己的國家，更應該救救自己的地球，減少碳排放量，不要讓極端氣候越來越嚴重，「俗話說不見棺材不掉淚，但我們已經看到棺材的角落了」，並說台灣應該慢慢走向無工業的社會，讓下一代能夠更好。

義大校長蕭介夫（左）、中研院前院長李遠哲（右）

BACK

義大與鴻海科技 13 日締結職涯發展策略聯盟夥伴

高雄義守大學與鴻海科技集團為積極推動就業產學實務合作平台，13日於大樹區校本部舉辦簽約儀式，未來雙方將共同規劃、進行就業產學合作、推動人才培訓，以及提供義大學生專題研究和實習的機會，現場並展示多架自動化機器人，讓來賓一飽眼福，希望電機資訊學院的畢業生，有機會到鴻海一展所長。

義大校長蕭介夫表示，義大擁有8大學院，根據Cheers雜誌調查，義大獲選校長互評辦學績優TOP20大學，並再次獲得教育部教學卓越計畫，為南部高教體系獲得補助最高的綜合型大

全體合照

全體合照簽約典禮現場展示自動化機器人，讓與會貴賓一飽眼福。

學，顯示辦學績效榮獲各界的肯定；也努力為學生開創、找尋就業管道和機會，讓學生能夠學以致用，這次很榮幸能與世界知名企業鴻海集團簽約，希望義大的學生未來都能在鴻海有所發展和表現。

義大校長蕭介夫(左)、鴻海集團副總經理曾盛松(右)代表簽約

鴻海集團副總經理曾盛松表示，鴻海集團非常重視人才的專業領域，除了專業以外，企業也需要給人才發展的舞台和願景，誠懇的歡迎年輕有膽識，擁有札實專業領域的年輕人，鴻海非常歡迎大家，年底鴻海高雄軟體科技園區硬體將會落成，屆時需要大量人才的加入，尤其軟體人才最欠缺，像是資工、資管、電子等專業人才，希望年輕人能來到鴻海一展所長。

未來雙方將進一步推動實務考察與觀摩參訪機會，並依實務需求，開辦相關進修課程，共同舉辦就業研討會等相關活動，也不排除提供高階資深專業人員擔任相關課程與業務顧問，持續增進雙方實務與學術交流經驗，以及人才培訓等發展。

BACK

義大20-23日舉辦
高雄學園慶與產研特色展

教育部高教司黃雯玲司長，以「我國高等教育的發展與創新轉型」進行專題演說

高雄義守大學20-23日於大樹區校本部國際學院，舉辦一年一度高雄學園慶祝活動，現場同時安排產學研究特色展。

高雄學園慶祝活動，是由高雄地區的義守大學、高雄大學、高雄師範大學、高雄海洋科技大學、高雄第一科技大學、高雄應用科技大學與樹德科技大學等7校，為促進高雄地區校際、產學合作與資源共享每年舉辦的聯合活動。

今年活動特別邀請教育部高教司黃雯玲司長，以「我國高等教育的發展與創新轉型」進行專題演說，義大校長蕭介夫則主持「因應少子化之高等教育未來發展和招生策略」焦點論壇。

在產學研究特色展部份，7校共推出21件產學研發成果作品。

義大電機系蔣榮生師生團隊，開發結合智慧型手機改善電療儀器，未來可透過手機APP延伸不同型態波長，大幅降低器材成本，該作品今年在義大創新專題競賽獲得金牌獎，目前已申請專利，今年計畫參加國際發明展。

今年獲得高雄國際發明展「醫療照護獎」，由生物醫學工程學系王智昱師生團隊研發的「擬真雷射針灸儀」，也同時成為參展焦點。

義大電機系蔣榮生師生團隊，開發結合智慧型手機改善電療儀器

為展現義大國際化校園特色，園慶結合義大國際學院與國際處，另舉辦「愛無限」國際音樂文化祭開幕式，安排一連串文化、音樂、飲食、愛滋關懷及留遊學教育等交流。

園慶結合「愛無限」國際音樂文化祭開幕式活動

醫院導入及通過ISO9001品質管理系統驗證後其醫療品質提升之實證研究

馬震中

義守大學醫務管理學系助理教授

摘要

自從國際標準化組織制定ISO 9000系列標準以來，品質管理系統(QMS)的應用已協助企業組織提升品質管理，甚至被醫療健康服務業引用做為推動品質管理系統的標準。本研究目的是想要了解個案醫院導入及通過ISO 9001 品質管理系統驗證後其醫療品質提升之實證研究。本研究採用問卷調查法針對南部某醫學中心二線醫療專科部門，以問卷調查的方式收集資料。結果顯示出個案醫院追求卓越品質的決心。透過第三方驗證，不僅可以提升醫療品質還可以增加病人對醫院的信心與滿意度。

關鍵字：國際標準化組織、品質管理系統、醫院評鑑

本文

近年來，大大小小的醫療疏失及醫療糾紛案件層出不窮，醫院改革與病人安全的呼聲與日遽增。有鑑於此，我國導入新制醫院評鑑制度，將病人權益、病人安全以及醫療照護風險管理的要求列入評鑑的重點，以因應社會大眾對於醫療照護產業服務品質的期待。尤其是104年版醫院評鑑更導入「病人為焦點的評鑑查證方法」[1] 以落實「以病人為中心」、「以病人為導向」的照顧，強化團隊合作。因此在醫療資源不足及醫療照護服務競爭強烈的今日，如何透過適切且有效的品質管理系統

來提升醫療服務品質，同時降低醫療執業風險，這已經成為國內醫療照護產業不得不面對的重要議題。

自從國際標準化組織（The International Organization for Standardization，ISO）制定ISO 9000系列標準以來，品質管理系統（Quality Management System, QMS）[2]的應用已協助企業組織在提升品質管理上取得了良好的成效，並在全球廣泛的推廣，甚至被醫療健康服務業引用做為推動品質管理系統的標準[3]。因此，國際間許多詮釋QMS的內涵或是指引QMS在特定領域的應用標準也陸續被發表，其中也包含ISO 9001在醫療健康服務業的應用。因此本研究目的是想要了解個案醫院導入及通過ISO 9001品質管理系統驗證後其醫療品質提升之實證研究。

方法

本研究採用問卷調查法針對南部某醫學中心二線醫療專科部門，以問卷調查的方式針對該專科部門於執行作業中 (1)在接觸ISO9001：2008/IWA1：2005 (International Workshop Agreement 1, IWA1)國際標準規範至2013年1月認證前，(2) 2013年1月認證後迄今2014年1月。在二個不同階段中，ISO9001：2008/IWA1：2005國際標準規範中各章節，對您在執行醫療作業是否有應用或提升醫療作業品質？請舉例具體說明。以了解該專科部門導入及通過ISO 9001 品質管理系統驗證後是否有達成提升醫療服務品質的目標。問卷於2014年1月14日發放5個單位共58 份並於2014年1月21日驗證當日全數回收。

結果

(1) 在第四章文件要求---文件及紀錄管制方面: (A)接觸至認證前: 在未接觸時，所有作業文件的制、修定以及紀錄管制沒有一定的標準作業程序可供遵循。人員甚至不知道哪些作業程序已經變更修定亦或已廢除，仍舊依照不符程序之作業方式進行醫療服務作業。 (B)認證後迄今: 科內各項作業程序文件的制、修定有其標準程序，透過文件制、修定之後的傳閱，讓所有人員知道哪些作業程序已經變更修定及廢除，透過簡化的作業流程讓醫療作業更具效率，用以提升醫療作業品質。

(2) 第五章管理責任---品質目標、責任、溝通、管理審查方面: (A)接觸至認證前: 對於科品質目標毫無概念，各組之間的溝通缺乏多元管道，造成溝通不良。醫療作業多頭馬車，造成資源浪費亦無法提升醫療服務品質。以往人員謹遵本分完成個人工作使命，溝通方式多為上對下，幾乎是一個口令一個動作，加上科內組別多(基層主管、組主管、科主管)，在多頭馬車下人員較無所適從。(B)認證後迄今: 訂定明確之品質政策目標與指標，從每人之職務與職掌到整體之目標實現，找尋問題檢討與改善，從個人到幹部到主管明確分工，井然有序，提昇效能。透過內部稽核讓各組人員了解彼此間的作業流程，經由科務會議及管審會議來討論制定本科各項醫療作業的品質目標，藉由品質目標的達成來提高同仁的責任感，精進改善進而提升整體醫療作業品質。

(3) 第六章資源管理---人力、設備、工作環境方面: (A)接觸至認證前: 人力評估、訓練、設備管理與環境安全衛生原即有相關規範，每職類在工作、設備與環境中因習慣而忽略各程序之關聯性，沒有相互確認之觀念，再理所當然之下易生異常。(B)認證後迄今: 人員之認知從作業各項程序來培訓，在作業學習各作業證照、法令規章、設備安全、服務品質等，皆與人力之資源管理息息相關，正常順暢的程序提升對環境之滿意，多元溝通團隊合作，以和諧之工作環境獲得全體之認同。

(4) 第七章服務實現---(A)接觸至認證前: 每項服務品質皆會受到每一流程所影響，檢討中各項工具的利用來分析原因較不確實，各項流程監測未能掌握錯誤預防，提供更優質之服務。對於本科提供之醫療服務由於沒有標準化作業流程的管理，使得部分醫療服務品質無法滿足病人要求，也增加醫病之間緊張關係。(B)認證後迄今: 從計畫到流程直至服務，以服務之實現來分析檢討,所有流程之輸入輸出皆建立各項審核機制及風險評估，採取各項預防措施,避免錯誤之發生，並激勵人員創新服務加強品質。各項醫療作業相關流程的討論制定，不僅簡化了流程讓醫療人員能更順暢的執行醫臨床醫療作業意提供人員得以遵循的作業規範。不僅提高工作效率，也滿足了病人要求，提升了醫療服務品質。

(5) 第八章量測、分析和改善---滿意度調查、異常事件矯正及預防措施方面: (A)接觸至認證前: 書面文件資料之建立沒有整合及改善效益，記錄上沒有人事地物完

發生的異常事件及其矯正預防措施大都徒具形式，無法達到醫療服務品質精進改善的效果。(B)認證後迄今: 從監測與分析中了解各項程序的矯正預防，更建立各量測之方式並文件化，同時定期實施內部稽核,定期提報稽核結果，審查改善情形。各組作業異常也因有相關標準化的矯正預防措施表格的呈現，在科務會議上共同討論分享，讓所有人員明瞭病人及其他顧客的意見反應以及各組異常事件發生原因及其矯正預防措施，做為各組作業上的借鏡，用以提升醫療服務品質。

結論

個案醫院二線醫療專科部門在接觸ISO9001：2008/IWA1：2005國際標準規範至2013年1月認證前以及 2013年1月首次正評通過認證後至2014年1月在二個不同階段中，自評在執行醫療作業有應用或提升醫療作業品質並具體說明以驗證。個案醫院二線醫療專科部門於2014年1月再度通過ISO9001：2008/IWA1：2005國際品質管理系統認證，此項結果顯示出個案醫院追求卓越品質的決心。透過第三方驗證，不僅可以提升醫療品質還可以增加病人對醫院的信心與滿意度。個案醫院高階主管的承諾與員工的積極參與是建構該院品質管理系統的重要成功因素。

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BACK

以小搏大的投資工具-權證

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摘要

權證的投資門檻低且槓桿效果大，投資人僅需支付少量的權利金即可參與交易，並有機會獲得未來標的物價格變動的高報酬，對於資金部位較小的投資人而言非常具有吸引力。其可分為認購權證和認售權證，前(後)者類似選擇權概念的買(賣)權，也就是持有人有權利在未來一定期間內以履約價格買進(賣出)一定數量的標的物。權證雖具有投資門檻低且槓桿效果大的特性，但其高槓桿風險及時效性問題，也是投資人必須特別留意的。

關鍵字：權證、買權、賣權、槓桿效果

本文

權證(Warrants)是一種投資門檻低且槓桿效果大的投資工具，投資人僅需支付少量的權利金即可參與交易，並有機會獲得未來股價變動的高報酬，對於資金部位較小的投資人而言非常具有吸引力。權證是應用選擇權概念的衍生性金融商品，可分為認購權證(Call Warrants)和認售權證(Put Warrants)，前者類似選擇權概念的買權(call)，也就是持有人有權利在未來一定期間內(或特定到期日)以約定價格(履約價格)”買進”一定數量的標的物; 後者則為賣權(put)，其允許持有人有權利在未來一定期間內(或特定到期日)以約定價格”賣出”一定數量的標的物。認購權證和認售權證之標的物可以是任何金融商品，例如股票或股價

數(本文皆以股票為例)，發行者一般為證券商。以下先介紹選擇權基本概念，再將權證套用其中。

在選擇權市場，有幾個時點與動作必須留意，首先是建立部位(開倉)，買方是買進權利的人，也就是多頭部位者(long); 賣方是賣出權利的人，也就是空頭部位者(short)，而雙方所買賣的權利可能是call 或put，因此，在開倉時，共有四種情況，分別是：買進買權(long call)、賣出買權(short call)、買進賣權(long put)、賣出賣權(short put)。若投資人向證券商買進認購權證(Call Warrants)，等於在一開始做了long call的動作，其有權利在未來用約定價格買股票，而證券商的角色即為short call，其有義務在未來用約定價格將股票賣給投資人; 另方面，若投資人向證券商買進認售權證(Put Warrants)，等於在一開始做了long put的動作，其有權利在未來用約定價格賣股票，而證券商的角色即為short put，其有義務在未來用約定價格向投資人買進股票。茲整理如下：

權證種類 / 部位種類	認購權證 **(Call)**	認售權證 **(Put)**
買方 (投資人) **(long)**	擁有在未來用約定價格買進標的股票的權利 (long call) (投資人看多)	擁有在未來用約定價格賣出標的股票的權利 (long put) (投資人看空)
賣方 (證券商) **(short)**	承擔在未來必須用約定價格賣出標的股票的義務 (short call)	承擔在未來必須用約定價格買進標的股票的義務 (short put)

舉例而言，若小林以每單位5元向凱基證券買了一張美式的認購權證[1]，擁有在未來六個月之內的任何一天，以每股100元的價格買進一張鴻海股票的權利，則上述中，「每單位5元」為權利的價格，也就是權利金，一張權證有1000個單位，則小林在一開始開倉時付出了5000元的權利金成本；「凱基證券」為權證的發行者；「六個

月」為權證的存續期間，也就是權證的有效期間，超過這時間點，權證會失效；「每股100元的價格」為權證的履行價格 (執行價格或約定價格)[2]；「鴻海股票」為標的股票；「每張權證可買一張股票」，則行使比例為1:1，前面的1指的是權證數量，後面的1指的是股票數量。

承上例，在未來六個月之內，若鴻海股票每股漲到120元，則小林有權利以每股100元向凱基證券買進一張股票，此動作稱為履約[3]，在這情況下，其每股可獲利20元，扣除權利金5元，每單位權證獲利15元，一張權證獲利15000元；反之，若鴻海股價下跌到每股80元，小林可選擇不履約，損失的只有權利金5000元，因為若履約他要用高價100元買進市價僅有80元的股票，理性的投資人不會這樣做。由此可知，若投資人買進認購權證等於做了long call的動作，持有一種權利稱為買權，其為一種選擇權，賦予投資人可選擇對自己有利的狀態，然而持有這權利必須付出權利金成本。

綜合上述，權證具有幾種特性: (一)投資門檻較低，開倉時僅需支付少量權利金即可進場，在上例中，若要以每股100元買一張標的股票，需要準備100,000元的資金，但買進認購權證僅需準備5000元的權利金，日後同樣可以參與股價上漲的獲利。 (二)槓桿效果大，在上例中，買一張股票的資金可以買進20張的權證(100,000/5,000)， 此稱為成本槓桿倍數，表示以1元即可操作價值20元的標的物，換句話說，以少量資金即有機會獲得高報酬，是一種以小搏大的特性。(三)高槓桿的風險，權證的價格漲跌幅度的波動甚大，在看對行情時可享有高報酬，但在看錯行情時，亦可能血本無歸而產生高風險。(四)權利具有時效性，以認購權證而言，若過了權證的存續期間，標的股票的市價仍未大於履約價格，也就是權證一直未能處於價內[4]，則權證隨即失效，投資人當初所支付的權利金將無法回收，這是必須特別留意的，因權證的有效期通常僅短短幾個月。

延伸閱讀：

[1] 權證依投資人可以履約的時間點不同，可分為美式權證和歐式權證，美式權證在到期日前的任一天，投資人皆可向證券商要求履約，而歐式權證只有在到期日當天，投資人才可向證券商申請履約。台灣目前多以美式權證為主，此種權證給投資人的自由度較高，價格自然也會比歐式權證高。

[2] 一般權證的履約價格皆為固定，但較進階的權證商品如重設型權證，履約價格會隨市場的狀況而有所調整。

[3] 履約是權證很重要的環節之一，可分為「證券給付」和「現金結算」，前者是約時實際有買賣標的物的動作(如文中例子)，後者是履約時直接以現金方式結算標的物市價與履約價格的差價給投資人。

[4] 以認購(售)權證而言，標的股票的市價大(小)於履約價格，稱為價內（ITM, In The Money），亦即履約價值大於0，但實際利潤是否大於0須視權利金成本而定；標的股票的市價小(大)於履約價格，稱為價外（OTM, Out of The Money）；標的股票的市價等於履約價格，稱為價平（ATM, At The Money）。

BACK

福建賽衛矛莖部化學成分及抗發炎活性研究

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摘要

從福建賽衛矛(*Microtropis fokienensis*)莖部分離純化三個ursane與一個oleanane三萜類新化合物。所有化合物以質譜與核磁共振圖譜進行結構解析。在抗發炎活性方面，30-hydroxyolean-12-en-3,11-dione (**4**)對於彈性蛋白酶釋放(elastase release)試驗中顯示選擇性抑制效果(IC_{50} = 1.53 ± 0.09 μg/mL)。

關鍵詞: 福建賽衛矛、三萜類、抗發炎、彈性蛋白酶

前言

衛矛科(Celastraceae)全球約有100屬1300多種，主要分布於熱帶及溫帶地區。植物型態為直立喬木或灌木，或藤本；莖光滑或具刺。根據「台灣植物誌」(Flora of Taiwan)所記載[1]，台灣包含6屬衛矛科植物，為南蛇藤屬(*Celastrus*)、衛矛屬(*Euonymus*)、美登木屬(*Maytenus*)、假衛矛屬(*Microtropis*)、核子木屬(*Perrottetia*)和雷公藤屬(*Tripterygium*)。衛矛科植物被人類應用於傳統醫療及農業方面已有很長歷史，尤其是在亞洲和拉丁美洲。根據過去文獻[2]研究衛矛科植

物，發現本科植物為大量顯著活性之二次代謝重要來源。衛矛科植物之活性化學成分主要有三大類-sesquiterpenoids,、diterpenoids和triterpenoids。抗癌活性方面，從*Celastrus hindsii*分離純化化合物maytenfolone-A對於Hepa-2B (hepatoma)及KB (nasopharynx carcinoma)等細胞株其ED_{50}分別為2.3及3.8 μg/mL；化合物celasdin B進行抑制HIV複製實驗，其ED_{50}為0.8 μg/mL。由資料顯示衛矛科植物所含triterpenoids化學成分具有多樣化優異生物活性，在新藥物開發上深具潛力。

在台灣，假衛矛屬植物僅包含二種植物，分別為福建賽衛矛(*M. fokienensis*)與日本賽衛矛(*M. japonica*)。過去我們研究工作團隊已發表過多種具細胞毒殺活性triterpenoids類化合物[3-5]，並進一步搜尋過去研究未曾發現假衛矛屬植物有相關抗發炎活性發表。故此次將進一步探討福建賽衛矛莖部甲醇萃取物之抗發炎活性成分的相關研究。

實驗原理與方法

福建賽衛矛莖部蔭乾後共2.85公斤，在室溫下以甲醇(10 L)連續萃取，其萃取液經減壓濃縮乾後共130公克，之後利用水和乙酸乙酯分配萃取，分別收集水層和乙酸乙酯層。進一步將乙酸乙酯層減壓濃縮乾後以水摻甲醇和正己烷分配萃取。水摻甲醇層(38公克)利用管柱層析法，以矽膠(silica gel)等固定相，配合有機溶媒(正己烷-乙酸乙酯)梯度沖提方式得到18個fractions。Fr. 10 (2.5 g)以Sephadex LH-20 ($CHCl_3$–MeOH=1:1)純化分離得到6個subfractions。Fr. 10-2-8以逆向高效能液相層析法(reverse phase HPLC, 250 × 10 mm, Hypersil®, MeOH–H_2O, 97:3)純化分離得到**4** (14.1 mg, t_R13.4 min, flow rate 2 mL/min)。Fr. 10-3 (132.88 mg)以逆向高效能液相層析法(reverse phase HPLC, 250 × 10 mm, Hypersil®, MeOH–H_2O, 78:22)純化分離得到**1** (1.3 mg, t_R24.1 min, flow rate 2 mL/min)、2 (1.9 mg, t_R34.6 min, flow rate 2 mL/min)與**3** (1.9 mg, t_R15.4 min, flow rate 2 mL/min)。

結果與討論

化合物**1**外觀為白色粉末狀。IR光譜在3425與1655 cm^{-1}處的吸收訊號，顯示具有hydroxyl group及α,β-unsaturated ketone。由HRESI-MS (found *m/z* 479.3501; calcd 479.3500)推算分子式為$C_{30}H_{48}O_3$，計算其不飽和度為7。觀察^{1}H-NMR圖譜(C_5D_5N, 400 MH_Z)可知化合物**1**觀察到一個olefinic質子吸收訊號[δ_H 5.85 (s)]；在化學位移3~5 ppm之間具有三個特殊的質子吸收訊號(δ_H 3.14, 3.50, 4.59)；具有五個tertiary methyl protons吸收訊號(δ_H 1.06, 1.09, 1.26, 1.27, and 1.38)、二個secondary methyl protons吸收訊號[δ_H 0.80 (3H, d, *J* = 6.4 Hz), 0.91 (3H, d, *J* = 6.0 Hz)]。由^{13}C-NMR (C_5D_5N, 100 MH_Z)得知共有30個吸收訊號，其中特徵訊號包含八個甲基吸收訊號(δ_C 16.6, 17.0, 17.6, 18.7, 21.2, 21.9, 23.0, 與28.7)、一組α,β-unsaturated ketone system (δ_C 130.7, 163.7, 與199.3)及二個接氧三級碳 (δ_C 64.7與77.9)。因此，化合物**1**為具有α,β-unsaturated ketone system之urs-12-ene化合物。觀察EI質譜發現斷裂片*m/z* 248與289，更加證實化合物1確定結構。立體化學方面，由H-16的耦合常數(*J* = 11.0 Hz)可知H-16為α位向。再藉由NOESY圖譜之氫與氫的相互連結，觀察到H-3與H-5有NOE效應，確定3位置的hydroxyl group為β位向。綜合上述資料與NMR圖譜資料比對分析，證實化合物**1**為首次分離得到之化合物，命名為3β,16β-dihydroxyurs-12-en-11-one [6-8]。

化合物**2**外觀為白色粉末狀。IR光譜在3446、1694與1649 cm^{-1}處有hydroxyl、carbonyl及olefinic groups吸收訊號。由ESI-MS得知其假性分子離子峰為*m/z* 525 $[M+Na]^+$，並由HRESI-MS (found *m/z* 525.3556 $[M+Na]^+$; calcd 525.3559)推算分子式為$C_{31}H_{50}O_5$，計算其不飽和度為7。觀察^{1}H-NMR圖譜(C_5D_5N, 400 MH_Z)可知化合物**2**具有五個singlet甲基吸收訊號(δ_H 0.98, 1.31, 1.70, 1.84與1.92)及二個doublet甲基吸收訊號[δ_H 0.97 (d, *J* = 7.2 Hz), 1.26 (d, *J* = 6.4 Hz)]；在化學位移3~5 ppm中，觀察到一個methoxy group吸收訊號[δH 3.35 (s)]及四個質子吸收訊號[δH 3.93 (d, *J* = 10.4 Hz), 4.47 (d, *J* = 10.4 Hz), 4.82 (d, *J* = 10.0 Hz), 4.94 (brs)]。由^{13}C-NMR (C_5D_5N, 150 MH_Z)及DEPT圖譜得知共有31個吸收訊號，其中特徵訊號包含一個methoxyl

group (δ_C 51.4)、一個接氧二級碳(δ_C 66.8)、二個接氧三級碳(δ_C 67.8及77.3)、一組四取代雙鍵(δ_C 116.5及145.0)及一個carbonyl group吸收訊號(δ_C 216.0)。由以上資料分析與比對過去相關文獻，推測化合物**2**為urs-12-en-3-one type三萜類骨架化合物。根據由HMBC圖譜得知一個二級hydroxyl、一個methoxy與一個三級hydroxyl groups位於C-6、C-11與C-12。立體化學方面，由H-6的耦合常數(brs)得知H-6為α位向。再藉由NOESY圖譜得知4位置上β位向甲基質子吸收訊號δ_H 1.70與δ_H 1.92 (H-25)有NOE效應、δ_H4.82 (H-11)與δ_H 1.92 (H-25)有NOE效應，確定原本4位置上α位向甲基被hydroxymethylene取代、H-11為β位向。綜合上述資料與過去文獻分析，證明化合物**2**為首次分離得到之新化合物，命名為6β,12,23-trihydroxy-11α-methoxyurs-12-en-3-one [9]。

化合物**3**外觀為白色粉末狀。IR光譜在3418與1694cm^{-1}處的吸收訊號，顯示為具有hydroxyl及carbonyl groups之化合物。由ESI-MS得知其分子離子峰為*m/z* 495 $[M+Na]^+$，並由HRESI-MS (found *m/z* 495.3450 [M+Na]+; calcd 495.3452)推算分子式為$C_{30}H_{48}O_4$，計算其不飽和度為7。由^{1}H-NMR圖譜(C_5D_5N, 500 MHz)觀察含有六個singlet甲基吸收訊號(δ_H 1.13, 1.20, 1.26, 1.27, 1.30, 1.54)、二個doublet甲基吸收訊號[δ_H 0.95 (d, J = 6.5 Hz), 1.18 (d, J = 6.5 Hz)]；在化學位移3~5 ppm區域間顯示四個質子吸收訊號[δ_H 3.04 (m), 3.10 (d, J = 11.5 Hz), 4.58 (d, J = 9.5 Hz), 4.63 (m)]。在^{13}C-NMR和DEPT圖譜中觀察到30個碳吸收訊號，包含八個甲基吸收訊號(δ_C 16.9, 17.8, 18.9, 22.0, 22.1, 23.6, 26.0與27.5)、二個接氧三級碳吸收訊號(δ_C 65.9與70.2)、一組四取代雙鍵吸收訊號[δ_C 113.2 (s)與148.4 (s)]與一個carbonyl group吸收訊號 (δ_C 217.2)。根據以上圖譜分析與比對過去相關文獻，推測化合物**3**為urs-12-en-3-one三萜類化合物。根據HMBC圖譜之氫與碳的相互連結(^2J、^3J correlations)得知三個hydroxyl groups位於C-11、C-12與C-16，以及一雙鍵位於C-12與C-13之間。立體化學方面，由H-11的耦合常數(J = 9.5 Hz)，可知H-11為β位向。藉由NOESY圖譜得知δ_H 4.63 (H-16)與δ_H 1.54 (H-27)有NOE效應，確定H-16分別為α位向。綜合上述資料與過去文獻分析，最後證明化合物3為首次分離得到之新化合物，命名為

11α,12,16β-trihydroxyurs-12-en-3-one [4]。

由IR光譜在3441、1697與1648 cm^{-1}處的吸收訊號，顯示化合物**4**為具有hydroxyl、carbonyl及α,β-unsaturated ketone化合物。由HRESI-MS (found *m/z* 477.3344 $[M+Na]^+$; calcd. 477.3341)推算分子式為$C_{30}H_{46}O_3$，計算其不飽和度為8。觀察^1H and ^{13}C-NMR圖譜得知共有30個吸收訊號，其中特徵訊號包含七個甲基吸收訊號(δ_C 15.9, 18.5, 21.5, 23.4, 26.5, 28.2, 28.7)、一個二級碳吸收訊號 (δ_C 65.3)、一組α,β-unsaturated ketone system (δ_C 128.4, 170.6, 198.9)及一個carbonyl group吸收訊號(δ_C 215.9)。根據上述資料及比對過去文獻，推測化合物**4**為12-oleanen-11-one三萜類化合物。藉由HMBC圖譜得知氫與碳間^2J和^3J相互關連(correlations)；根據過去相關文獻研究，當C-29 (equatorial)取代成hydroxymethyl group，其碳吸收訊號約為75 ppm，則C-30 (axial)之甲基吸收訊號約為20 ppm；反之，當C-30取代成hydroxymethyl group，其碳吸收訊號約為67 ppm，則C-29之甲基吸收訊號約為28 ppm。故推斷E環上的hydroxyl group位於C-30上。進一步藉由NOESY圖譜證實其相對立體。由上述數據與NMR圖譜資料比對分析，證明化合物4首次分離得到之新化合物，命名為30-hydroxyolean-12-en-3,11-dione [10]。

本研究中，一開始依據活性測試結果為導向之分離(bioassay-guided separation)，得到三個ursane與一個oleanane三萜類新化合物，分別為3β,16β-dihydroxyurs-12-en-11-one (1)、6β,12,23-trihydroxy-11α-methoxyurs-12-en-3-one (2)、11α,12,16β-trihydroxyurs-12-en-3-one (3)與30-hydroxyolean-12-en-3,11-dione (**4**)。因為過去研究未曾發現假衛矛屬植物有相關抗發炎活性發表，將分離純化得到化學成分進行fMLP/CB 所誘導抑制人類嗜中性白血球之超氧自由基生成(superoxide anion generation)與彈性蛋白酶釋放(elastase release)的活性試驗。由於受限於檢體重量，故僅將30-hydroxyolean-12-en-3,11-dione (**4**)進行抗發炎活性篩選。從結果得知30-hydroxyolean-12-en-3,11-dione (**4**)對於彈性蛋白酶釋放(elastase release)具有顯著抑制活性(IC_{50} = 1.53 ± 0.09 μg/mL) [11, 12]。

結論

本研究中，一開始依據活性測試結果為導向之分離(*bioassay-guided separation*)，得到三個ursane與一個oleanane三萜類新化合物。化合物**4**進行fMLP/CB 所誘導抑制人類嗜中性白血球之超氧自由基生成(superoxide anion generation)與彈性蛋白酶釋放(elastase release)的活性試驗。結果顯示化合物**4**對於彈性蛋白酶釋放(elastase release)具有選擇性抑制活性(IC_{50} = 1.53 ± 0.09 μg/mL)。更值得一提是此研究為首次假衛矛屬植物抗發炎活性之發表。

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BACK

Densification behavior of SnO_2 doped with metal oxide glass

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Abstract

A metal oxide glass containing GeO_2, MoO_3 and V_2O_5 (GMV) was made up to act as sintering aid to enhance the densification and to vary the dielectric property of SnO_2. The influence of GMV glass concentration on the densification behavior and dielectric properties of SnO_2 was investigated by dilatometer, x-ray diffractometer, scan electron microscopy. The ideal of addition of glass not only was found to assist the SnO_2 particles shrinkage, but also to increase the grain size of SnO_2. The glass additive formed a thin continuous liquid phase and rearranged SnO_2 particles into a dense microstructure at much low temperature. The dielectric constants of SnO_2 were ranged from 8 to 15 depending on the concentration of glass additive, while the dielectric loss was decreased with the glass concentration as a result of denser SnO_2 microstructure.

Keywords: densification, microstructure, electrical property, liquid phase.

1. Introduction

SnO_2 polycrystalline ceramics are n-type semiconductors that have been widely used as gas sensors, as electrodes for electric glass melting furnaces and, in thin films, as electrochromic devices, crystal displays, photodetectors, solar cells and protective coatings. However, the use of SnO_2 ceramics is limited by the low densification of this oxide during sintering because of the dominance of non-densifying mechanisms for mass transport such as surface diffusion or evaporation-condensation. The high density of SnO_2 ceramics can be obtained by hot isostatic pressing (HIP) or with the help of an additive like ZrO2, MnO_2, CuO, Li_2CO_3, ZnO, Nb_2O_5, Fe_2O_3 or Co_2O_3 [1-6]. These oxides serve as sintering aid that assist SnO_2 ceramics to densify at a lower sintering temperature. Although in the solid state sintering, densification can be enhanced by the formation of defects due to the dissolution of additive derived species and oxygen vacancies in the SnO_2 network. However, SnO_2 ceramics are very sensitive to the atmosphere, the interaction of gases with the SnO_2 surface promotes charge transfer and defects creation during sintering of this oxide. As a result, larger grains of SnO_2 microstructure will present as well as larger pores. This is not ideal microstructure for many applications.

Applying a liquid-phase sintering process, refractory ceramics can be sintered at lower temperature by forming thin continuous or semicontinuous liquid phases at grain boundaries [7-10]. During sintering, the ceramic particles are soluble in the liquid. This solubility causes the liquid to wet the solid, leading a capillary force that pulls the particles together. At the same time, the high temperature softens the solids, further promoting densification. High-diffusion rates are also associated with liquids, resulting fast sintering or lower sintering temperatures. In this work, we have designed a unique glass composition containing GeO_2, MoO_3 and V_2O_5 as a sintering aid that allows the SnO_2 to densify at much low temperatures by viscous flow and liquid-phase sintering mechanisms. On the other hand, this glass additive can also adjust

the dielectric constant of SnO_2 by varying the concentration of glass additive. The effect of the glass concentration on the densification behavior, microstructure and dielectric properties of SnO_2 were investigated.

2. Experimental

The glass composition used as sintering aid was made up of GeO_2, MoO_3, V_2O_5 in 1:1:3 molar proportion (all with purity ≥99.99%, Aldrich, St. Louis, USA). The traditional twin-roller quencher is used to prepare glass additives. The starting powders were first mixed to form a 70 g batch and then melted in a 90% Pt-10% Rh crucible at 1000 °C for 30 minutes using an electric furnace. The melts were stirred to ensure the homogeneity of glass composition. The molten glasses were subsequently quenched into a twinned roller, yielding thin ribbons of approximately 0.2 mm thickness. The resulting glasses were fully amorphous, as was confirmed by X-ray diffractometry. The ribbon glasses were then grinded into powders (<325 mesh) and mixed with SnO_2 powders in proportion of 3 to 15 wt % using ethanol solvent and zirconia milling media for 24 h. After drying, the mixtures were die-pressed at 100MPa to yield several disk type pellets (12 mm in diameter and 3 mm in thickness). The pellets were then sintered at 550, 650, 750 and 850 °C for 4 h with a heating rate of 5 °C/min. The bulk density of samples was measured by the Archimedes method. An X-ray diffractometer (XRD, Panalyical, X'pert Pro) with Cu Kα radiation (λ= 0.1542 nm) was used to characterize the crystallization of the sintered ceramics. Fractured surfaces of the sintered samples were examined using filed emission scanning electron microscopy (FESEM, Philips, XL-40FEG). Shrinkage behavior of the samples during heating from room temperature to 1200 °C was measured using a horizontal loading dilatometer with alumina rams and boats (DIL-402C, Netzsch Instrument). The sintered samples were electroded with DC-sputtered films of gold on both sides for electrical property measurement

using an impendence analyzer (Agilent, 4263B, Palo Alto, USA).

3. Results and discussions

The densification behavior of SnO_2 consisting of different concentrations of GMV glass as sintering aid was examined by dilatometer as shown in Figure 1 As seen from the diagram, as quantity of glass additives increased shrinkage curves were shifted towards much lower temperatures than the typical sintering temperature of pure SnO_2 . The shrinkage of pure SnO_2 appears to occur slowly at approximately 1100 °C. However, doped with 3 and 5 wt % of glass additives of SnO_2 ceramics showed an apparent shrinkage above 850 °C. As the quantity of glass additives increased greater than 10 wt %, SnO_2 exhibited a large shrinkage of approximately 8 % at 850 °C. The results showed that GMV glass is an effective sintering aid for SnO_2. The DTA curve revealed that the GMV glass softened at 435 °C and melted at 608 °C, respectively. The decrease of sintering temperature was caused by the viscous liquid phase effect of GMV glass and served as a bond for the SnO_2 particles, therefore the shrinkage of SnO_2 occurred at much lower temperatures.

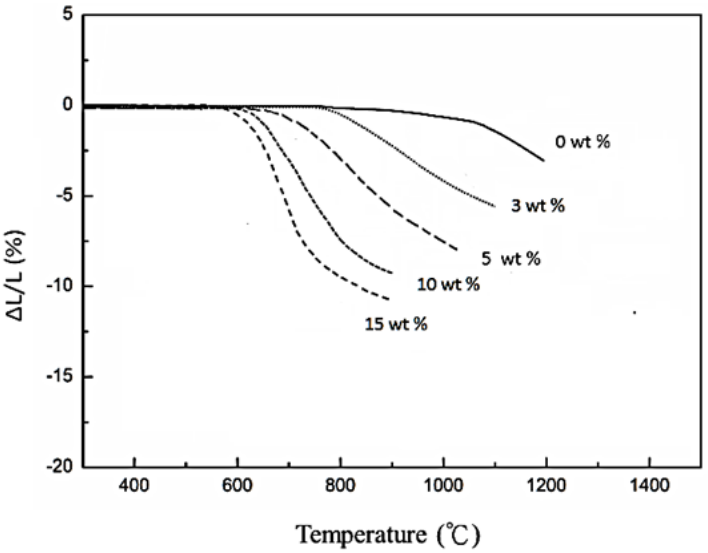

Figure 1 The shrinkage behavior of the SnO_2 with and without GMV glass additives as a function of firing temperature.

XRD patterns of SnO_2 with various sintering temperature of 15 wt % GMV glass doping is showed in Figure 2. It was observed that the main crystal phase is pure SnO_2. No any other oxide phase or glass phase was detected in every sample of SnO_2 with different contents of glass addition. The results of Figure 2 imply that GMV glass did not affect the crystal structure of SnO_2 phase. The

GMV glass also did not form a new compound with SnO_2.

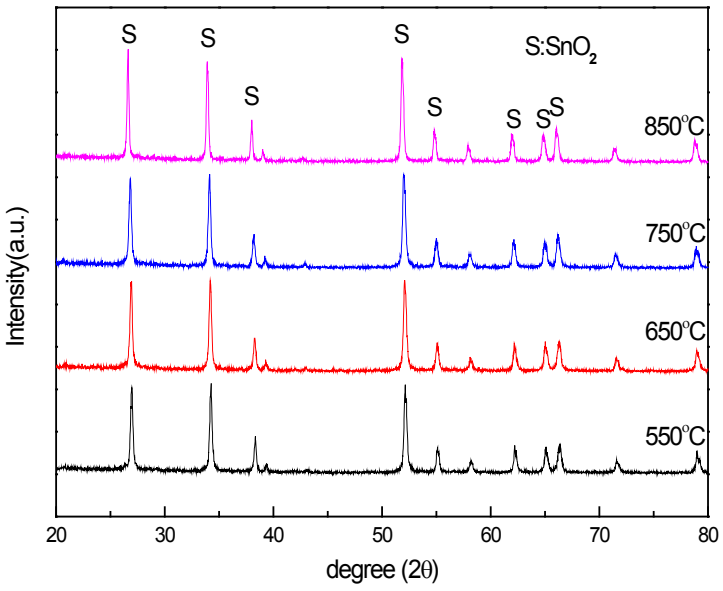

Figure 2 X-ray diffraction patterns of SnO_2 with 15 wt % GMV glass concentrations doping sintered at 550 to 850 °C.

The FESEM micrographs of cross-sectional SnO_2 ceramics sintered at 850 °C with 0, 3, 10 and 15 wt % GMV glass are shown in Figure 3 An obvious porous microstructure with the smallest grain size was observed in the sample without glass additives. It is clearly that increased the glass additives greatly promoted the densification and the grain size of SnO_2. Figure 4 illustrated the bulk density and the grain size of SnO_2 as a function of glass concentrations. It was showed that the density increased from 4.85 to 6.26 g/cm^3 and the grain size increased from 0.1 to 1.2 μm as glass concentration increased from 0 to 15 wt%.

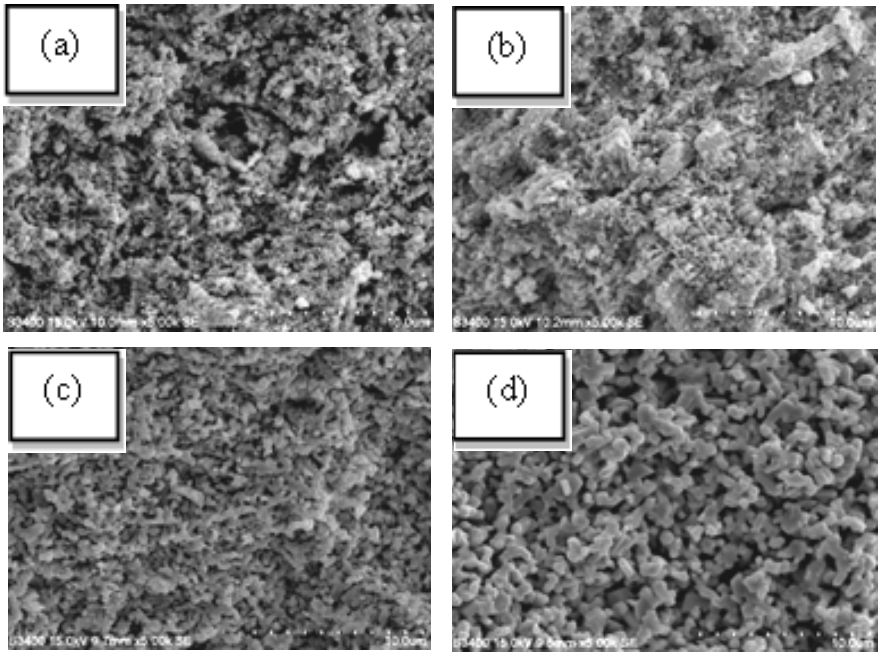

Figure 3 FESEM photo images of SnO_2 with GMV glass concentrations at (a) 0, (b) 3, (c)10, and 15 wt %.

Figure 5 is quantitative energy dispersive X-ray spectrometer (EDS) analyses of the SnO_2 crystalline phase from the FESEM analysis. The results revealed the presence of Ge, Mo and V ions in SnO_2 crystalline phase, indicating that the SnO_2 shows a certain limited solubility in the liquid at the sintering temperature; the essential part of such lower sintering process is the dissolution and reprecipitation of SnO_2 particles to give increased grain size and densification [11].

The theoretical and the measured dielectric properties of the SnO_2 with different concentrations of GMV glass sintered at 850°C are summarized in Table 1. The theoretical dielectric constant, ε_γ, was calculated using the logarithmic mixing rule [12] of Eq. (1) with the data of SnO_2 ($\varepsilon_1 = 24$) and GMV glass ($\varepsilon_2 = 11$).

$$\log\varepsilon_\gamma = v_1 log\varepsilon_1 + v_2 log\varepsilon_2 \qquad (1)$$

where v_1 and v_2 represent the volume fractions of SnO_2, and glass phase in the mixture, respectively. The volume fractions of SnO_2 in the samples were determined from the corresponding peak areas of the XRD patterns. Whereas, the dielectric constant of GMV glass was measured after the as-quenched ribbon was heat treated at 850 °C. The measured dielectric constant of SnO_2 was found to agree well with the theoretical values. As the GMV glass concentration increased to 10 wt %, the dielectric constant showed an increase to approximately 18 and then decreased after the maximum. The increase of the dielectric constant in the sample with low GMV glass concentrations is due to the matrix of SnO_2 phase. The presence of glass phases in high GMV concentration samples decreased the dielectric constant of SnO_2. While the dielectric loss almost linearly decreased with the increase of GMV glass concentrations. As well known, the value of dielectric loss is mainly caused by the extrinsic effect that is related to the microstructure of materials such as porosities, grain boundaries, grain sizes and impurities [13]. In this work, SnO_2 ceramics with high concentration of GMV additives showed a better microstructure in term of homogeneous grain size and less porosity, therefore resulting in lower dielectric losses.

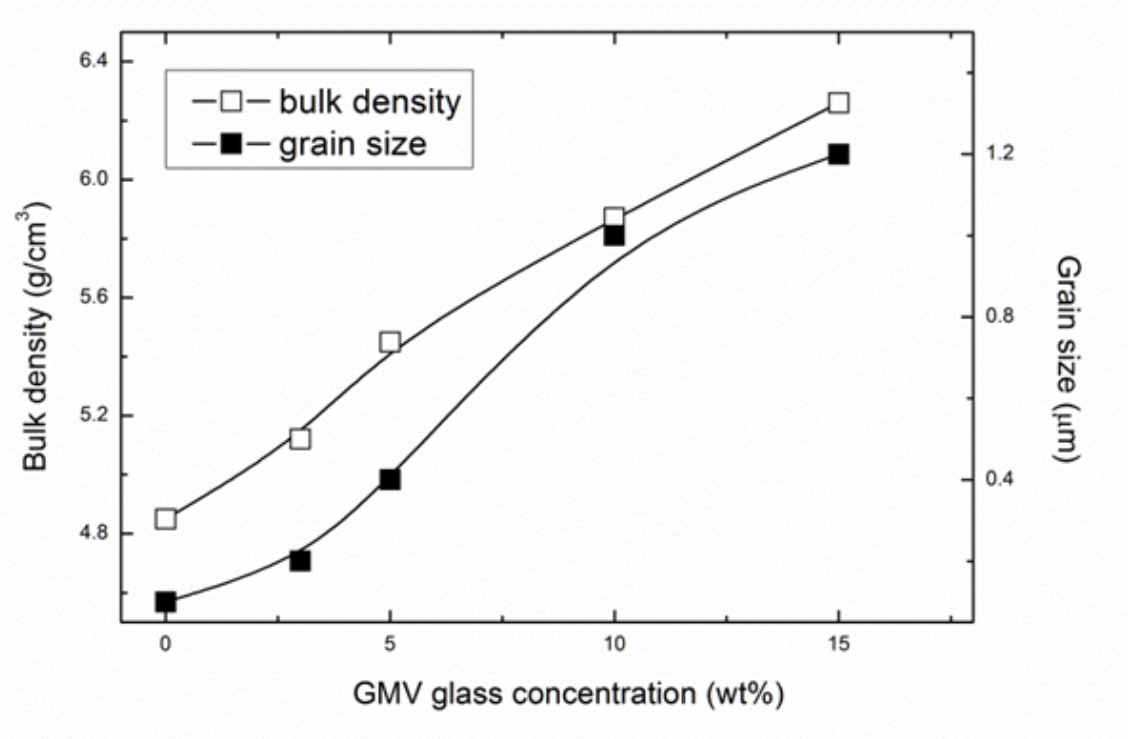

Figure 4 The bulk density and the grain size of SnO_2 as a function of GMV glass concentration.

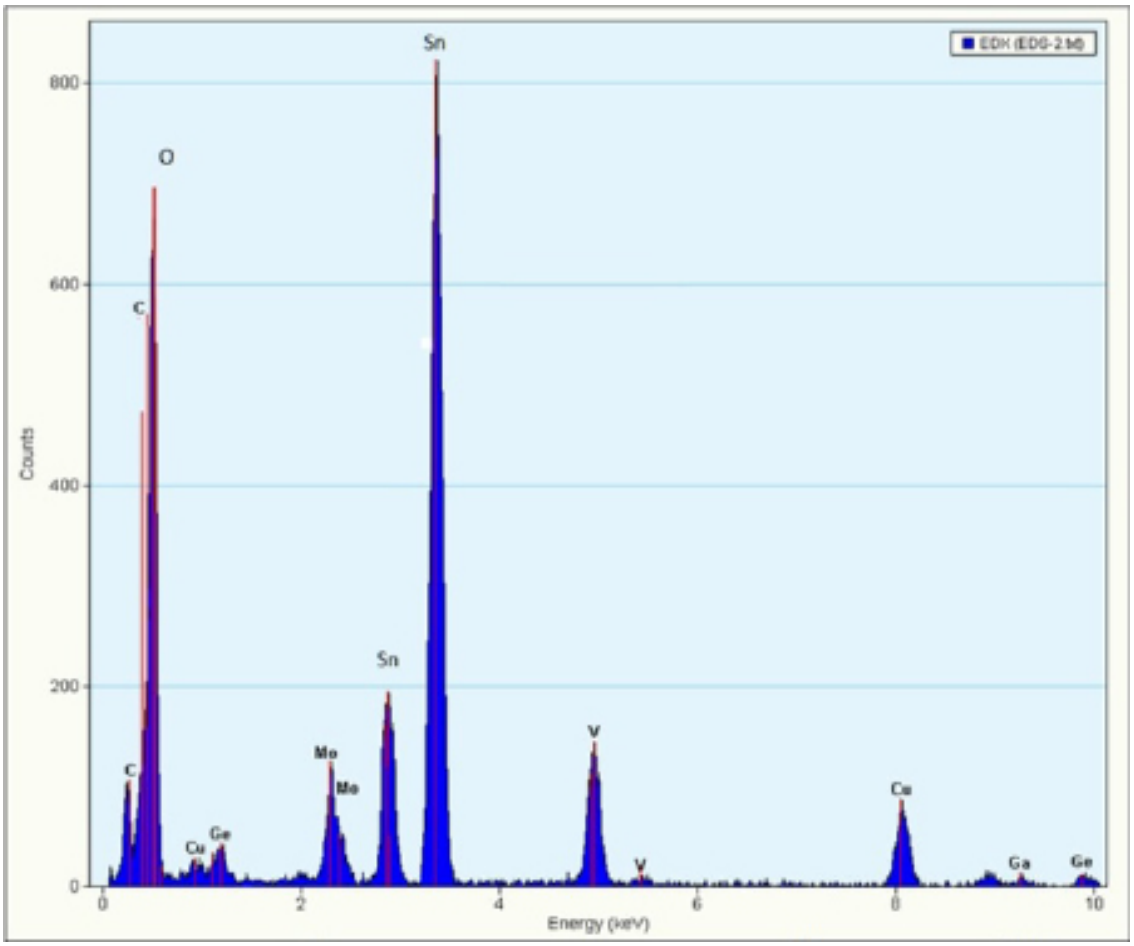

Figure 5 The energy dispersive X-ray (EDS) spectra of (a) SnO_2 phases presented in Figure 3.

Table 1 The dielectric properties of SnO_2 with different GMV glass concentrations.

GMV glass concentration (wt%)	εγ (theoretical)	εγ (measured)	tanδ (Dielectric loss)
0	10	8	0.265
3	12	9	0.085
5	15	12	0.068
10	18	15	0.042
15	13	10	0.033

4. Conclusions

This research demonstrated that the glass additives containing of GeO_2, MoO_3 and V_2O_5 has an effect on lowering sintering temperature of SnO_2 from 1200 to 850 °C as a combination of viscous flow and liquid phase sintering effects. This allows the low temperature processing of SnO_2 sensor for gas detection application to be feasible. The densification and the grain size of SnO_2 were found to increase with the glass concentration as a result of the mass transfer through the liquid phase. The dielectric constants of SnO_2 decreased to 13 with the glass concentration increased to 15 wt % because of the presence of the lower dielectric constant of glass phase. While the dielectric loss of SnO_2 decreased with the glass concentration due to the denser and homogenous microstructure of SnO_2 . In this study, the glass additive not only can be used as sintering aid to enhance the densification of SnO_2 , but also be able to modify the dielectric constant of SnO_2 with a desirable dielectric property by varying the glass concentration.

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BACK

Autism and current treatment: Review article

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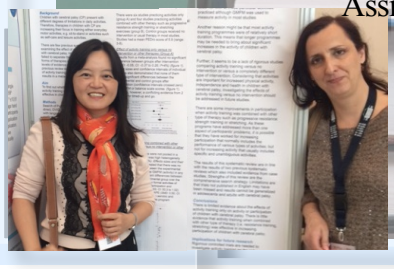

Abstract

Purposes: The aim of the current paper is to review studies implementing interventions to address motor impairments/ activity limitations in children with autism spectrum disorders. Also, the aim is to draw conclusions about which of these interventions is the most frequently used and which the most effective in children with autism spectrum disorders.

Design: Narrativec review for children with autism spectrum disorders.

Search: Searches were conducted of MEDLINE (1966 to May 2015), PUBMED (1966 to May 2015), and PEDro (1966 to May 2015) databases. Studies including children under 18 years of age, diagnosed with autism and participating in any exercise related to physical therapy, such as yoga, hydrotherapy and regular exercise.

Outcome measures: The outcome measurement can be any assessment that reflected the activities performed in the intervention.

Conclusion: This review provides only some moderate evidence that aquatic-hydrotherapy programs can improve swimming skills and fitness and decrease the motor impairments of children with autism spectrum disorders.

Keywords:autism, physical therapy, exercise therapy, rehabilitation, children.

Introduction

Autism spectrum disorders (ASDs) are a neurodevelopmental disorder in children with a range of impairments in behavior, cognition, social interaction, communication and motor delay [1, 2]. The incidence of autism spectrum disorders is 1 in 110 children and five times more in boys (1 in 54) than girls (1 in 252). There is no clear etiology in genetics issue for the occurrence of autism spectrum disorders, but if one child with autism spectrum disorders, his/her sibling has a 31 % risk of developing autism spectrum disorders [1]. There are three types of autism spectrum disorders based on the severity of symptom, ie, autism, pervasive developmental disorders-not otherwise specified (PDD-NOS) and Asperger syndrome. The common significant impairments in all three subtypes are a lack of social interaction as well as behavior and interest restrictions [1, 3].

Although social impairments and behavior restrictions are the defining features in children with autism spectrum disorders, motor impairments, such as poor upper and lower limb coordination, are noticed in the current practice. Children with autism spectrum disorders normally present a range of motor delay in gross motor function which includes the development of supine, prone, sitting and walking and in fine motor function which includes reaching, clapping, pointing, playing with blocks and puzzles and turning doorknobs. Additionally, motor impairments or activity limitations in children with autism spectrum disorders have been recognized as not solely attributed to cognitive delays [1]. Since the presence of motor impairments and activity limitations, physical therapists are increasingly becoming part of the treatment team for children with autism spectrum disorders.

Generally, children learn new skills by observing and imitating others during daily life. During interactive games, they often must imitate one's movements and produce a response appropriately. However, children with autism spectrum disorders present impairments in imitation and difficulties in motor planning. These

imitation impairments are often seen in orofacial, manual and posture adjustment. Furthermore, such poor coordination and slow movements in children with autism spectrum disorders could cause the lack of social participation and increased anxiety during playtime [4, 5]. All these difficulties in children with autism spectrum disorders suggest that physical therapists can play a significant role in their treatment.

Considering the above, the aim of the current paper is to review studies implementing interventions with an aim to address motor impairments/ activity limitations in children with autism spectrum disorders. Although a particular emphasis was given for yoga interventions, the aim is to draw conclusions about which of these interventions is the most frequently used and which the most effective in children with autism spectrum disorders.

METHOD

Identification and selection of studies

Searches were conducted of MEDLINE (1966 to May 2015), PUBMED (1966 to May 2015), and PEDro (1966 to May 2015) databases, with language in English using words related to autism. Studies including children under 18 years of age, diagnosed with autism and participating in any exercise related to physical therapy, such as yoga, hydrotherapy and regular exercise. The outcome measurement could be any assessment that reflected the activities performed in the intervention.

Assessment of characteristics of studies

Participants Studies involving children (up to 18 yrs) of either gender, regardless of the level of initial disability were included.

Intervention The experimental group had to receive any exercise related to physical therapy, such as yoga, hydrotherapy and regular exercise. The control group had to receive either no intervention or other intervention. Participants could be receiving usual therapy. Activity trained

using any exercise, duration and frequency of the intervention were recorded so that the similarity of intervention between studies could be examined.

Outcome Measures Measures that best reflected the activity trained were used in the report.

Results

Example 1-Yoga

Characteristics of yoga studies

Three studies were included in the review. Of the three included studies, one investigated yoga versus morning activity and two investigated the effect yoga after training. The summary of the studies is presented in table 1.

Participants Three studies investigated children and adolescents with the mean age of participants ranging from 3 to 16 years, with 84% male of participants.

Intervention The experimental group received yoga activities. The frequency and duration of intervention varied, with the total duration ranging from 1800

Table 1 Characteristics of yoga (n = 3)

Study	Design	Participants	Intervention	Outcome measures
Koenig et al[6]	CCT	n = 46 Age (y) = 5 - 12 Male: Female = 27: 9	Exp = Get Ready to Learn Yoga 15-20 min x 5/wk x 16 wk (Total: 1200-1600 min) Con = Morning activity 15-20 min x 5/wk x 16 wk (Total: 1200-1600 min)	ABC-Community, score Timing = 0, 16 wk
Radhakrishna et al[7]	Case series	n = 6 Age (y) = 8 - 14 Male: Female = 5: 1	Exp = ABA and IAYT ABA : 180 min/d x 5/wk x 82 wk (Total: 73800 min) IAYT: 60 min/d x 5/wk x 82 wk (Total : 24600 min)	ARI Form E-2, score Timing = 2, 78 wk
Radhakrishna et al[7]	Case series	n = 24 Age (y) = 3 – 16 Male: Female = 22: 2	Exp = Yoga , Dance and Music 45 min x 5/wk x 8 wk (Total: 1800 min)	BASC-2, score Timing = 0, 8 wk

Abbreviations: Con, control group; Exp, experimental group; CCT, Clinical controlled trial; ABA, Applied Behavior Analysis; IAYT, Integrated Approach to Yoga Therapy; ARI Form E-2, Autism Research Institute Form E-2; BASC-2, Behavior Assessment System for Children, Second Edition; ABC-Community, Aberrant Behavior Checklist–Community

to 98,400 minutes. The control group in one study received morning activity training which was consistent with the experimental group [6]. The other two studies were no control group[7, 8].

Measures Behavior was measured using three self-rating forms, such as Aberrant Behavior Checklist–Community, Autism Research Institute Form E-2 and Behavior Assessment System for Children (2nd edition).

Data analysis

Information about the method (ie, design, participants, intervention, measures) and outcome data (ie, number of participants and mean (SD) of outcomes) were extracted. Where possible, data were pooled and the mean between group differences were calculated for the yoga intervention. Where this was not possible, we calculated the mean difference (% difference) for each study and presented the between baseline and post training analysis reported.

Effect of yoga

The results of the between-group analyses (table 2) and between baseline and post training (table 3) were examined.

Effect of yoga versus morning activity: Only one study compared yoga with morning activity and reported a statistically significant between-group difference in activity in favor of yoga [6],

Table 2 Effect of yoga vs morning activity (n = 1)

Study	Outcome measure	Mean difference between groups/ Exp minus Con	Significance of the difference between groups	Percentage increase
Koenig et al[6]	ABC-Community, score	8.29	$p = 0.029$	18

Abbreviations: Con, control group; Exp, experimental group; ABC-Community, Aberrant Behavior Checklist–Community

Table 3 Effect of yoga after training (n = 3)

Study	Outcome measure	Mean difference within group/Post minus Baseline	Significance of the difference within group	Percentage change
Koenig et al[6]	ABC-Community, score	-12.75 (SD = 2.85)	*p* = NA	25
Radhakrishna et al[7]	ARI Form E-2, score	1.33 (SD = 0.21)	*p* = NA	51
Rosenblatt et al[8]	BASC-2, score	-16.76 (SD = 1.27)	*p* = NA	5

Abbreviations: Post,post training; ABC-Community, Aberrant Behavior Checklist–Community; ARI Form E-2, Autism Research Institute Form E-2;BASC-2, Behavior Assessment System for Children, Second Edition; NA, not available

immediately after the intervention period. This difference represented 18% greater increase in behavior change compared with morning activity.

Effect of yoga after training: Three studies were unable to provide a statistical result between baseline and post training[6-8]. All three studies presented the behavior change after training, which were 5, 25 and 51% difference compared with baseline.

Example 2- Aquatic-Hydrotherapy

The characteristics of the studies are presented in table 4. All studies had the improvement in the swimming skills, fitness and decrease in motor impairments. One of studies reported that participants have the change in their behavior after the intervention1[13].

Table 4 Characteristics of aquatic-hydrotherapy (n = 6)

Study	Design	Participants	Intervention	Outcome measures
Fragala-Pinkham et al.[9]	Non-randomized A–B group design	n = 16 Age (y) = 6-11 Male: Female = 11:5 Classification = ASD(6), CP(2), MM(2), DD(6)	Aquatic aerobic exercise program 45 min x 2/wk x 14 wk (Total: 1260 min)	HMW,MC-U,M-PEDI, FTS, HRm
Yilmaz et al.[10]	Single Case	n = 1 Age (y) = 9 Classification = ASD	Hydrotherapy(HM) 60 min x 3/wk x 10 wk (Total: 1800 min)	SMWT, Balance, Thrust test, SBJ, Grip strength, Muscle strength, Speed, SRT, AOR
Pan[11]	Crossover CT	n = 30 Age (y) = 7-12 Classification = 15 ASD , 15 NO ASD (group A: ASD, n = 7; non-ASD, n = 7) (group B: ASD, n = 8; non-ASD, n = 8)	Aquatic program, floor and group activities. 60 min x 2/wk x 14 wk (Total: 1680 min)	PACER, Curl-up, SRT, BIA, HAAR
Ennis[12]	Case series	n = 11 Age (y) = 3-9 Classification = ASD	Aquatic program 60 min x 2/wk x 10 wk (Total: 1200 min)	WOTA Peds-QL
Pan[13]	Crossover CT	n = 16 Age (y) = 6-9 Classification = ASD	WESP 90 min x 1/wk x 10 wk (Total: 900 min)	HAAR, SSBS–2
Fragala-Pinkham et al.[14]	CT	n = 12 (Ex group = 7, Con Group = 5) Age (y) = 6-12 Classification = ASD	Aquatic program 40 min x 2/wk x 14 wk (Total: 1120 min)	SCS ,YMCA Water Skills Checklist, HMW, MC-UPush up, M-PEDI

Abbreviations: CT= (non-randomized) controlled trial, ASD=autism spectrum disorders, CP=cerebral palsy, MM=myelomeningocele, DD=developmental delay, HMW=Half-mile walk/run, MC-U=Modified curl-up, M- PEDI= Multidimensional Pediatric Evaluation of Disability Inventory, FTS=Floor to Stand test, HRm =Heart Rate monitors, HM= Halliwick Method, SMWT= Six minute walking test, SBJ=Standing Broad Jump, SRT=Sit and Reach Test, AOR =Aquatic Orientation Checklist, PACER = Progressive Aerobic Cardiovascular Endurance Run, BIA=bioelectrical impedance analysis, HAAR = Humphries' Assessment of Aquatic Readiness, WOTA=Water Orientation Test of Alyn, Peds-QL= Pediatrics Quality of Life Inventory, WESP= water exercise swimming program, SSBS-2= School Social Behavior Scales, SCS=Swimming Classification Scale

Example 3- Therapeutic riding

The characteristics of the studies are presented in table 5. Most studies reported improvements in the social skills, sensory integrative functions and attention, while three studies also reported improvements in the motor skills[17-19]. One study reported a change in children's expressive language skills[18] and another one in their self-care[19].

Table 5 Characteristics of therapeutic riding (n = 5)

Study	Design	Participants	Intervention	Outcome measures
Bass et al.[15]	RCT	n = 34 Age (y) = 4-10 Male: Female = 29:5 Classification = ASD	TR 60 min x 1/wk x 12 wk (Total: 720 min)	SRS, SP
Ward et al[16]	Single-group pre-post design	n = 21 Age(y) = 8 Male: Female = 15:6 Classification = ASD	TR 10 Wk	GARS-2, SPSC
Wuang et al[17]	crossover CT	n = 60 (Con=30, Exp=30) Age(y) = 6-8 Male: Female = 13:47 Classification = ASD	SDHRP 60 min x 2/wk x 20xk (Total: 2400 min)	BOTMP, TSIF
Gabriels et al[18]	Single-group pre-post design	n = 42 (26= Non waitlist, 16 waitlist) Age (y) = 6-16 Male : Female = 36: 6 Classification= ASD	TR 60 min x 1/wk x 10 wk (Total: 600 min)	ABC-C, VABS-II, BOTMP
Ajzenman et al[19]	Single-group pre-post design	n = 6 Age(y) = 5-12 Classification = ASD	HPOT 45 min x 1/wk x 12 wk (Total: 540 min)	VABS-II , CACS

Abbreviations: RCT= randomized controlled trial, CT= controlled trial, ASD=autism spectrum disorders, TR=therapeutic riding, SRS= Social Responsiveness Scale, SP= Sensory Profile, GARS-2= Gilliam autism rating scale-2, SPSC= Sensory profile school companion (Dunn2006), SDHRP= Simulated Developmental Horse-Riding Program, BOTMP = Bruininks-Oseretsky Test of Motor Proficiency, TSIF=Test of Sensory Integration Function, ABC-C= Aberrant Behavior Checklist, VABS-II= Vineland Adaptive Behavioral Scales–Interview Edition, HPOT= Hippotherapy, CACS =Child Activity Card Sort

Example 4- Exercise programs

Table 6 presents the characteristics of the studies that implemented exercise programs. Three studies reported improvements mainly in the motor skills such as increased muscle strength, fitness or walking distance [20-22] . In one study, children with autism also demonstrated changes in their problematic behavior [20] and in another study in their academic performance [23].

Table 6 Characteristics of exercise programs (n = 4)

Study	Design	Participants	Intervention	Outcome measures
Magnusson et al.[20]	Single-group pre-post design	n = 6 Age (y) = 9-15 Male: Female = 4:2 Classification = ASD	Cardio and resistance training 60 min x 2/wk x 8-12 wk (Total: 960 min)	MBP ,1RM BP, 1RM LG, Curl Up Test, SRT, MRT, parents reported behavior.
Todd and Reid[21]	Case series	n = 3 Age (y) = 15,16,20 Males Classification = ASD	Snowshoeing and walking /jogging 30 min x 2/wk x 6 months (Total: 1440)	Self-Monitoring Board, Edible Reinforcement, Verbal Cuing
Casey et al[22]	Single subject design	n = 2 Age (y) = 7-10 Males Classification = ASD	Therapeutic Skating 60 min x 3/wk x 12 wk (Total: 2160 min)	PBS, BBT, FT, FST, TUG, TUDS, 6MWTand personal goals (PGA.
Oriel et al[23]	Crossover CT	n = 9 Age (y) = 3-6 Male : Female = 7:2 Classification = 7ASD, 1 = ID, 1 = DD	Aerobic exercise before classroom activities (15 minutes of running/jogging)	Number of stereotypic behaviors, percentage of on-task behavior, and correct/ incorrect responses

Abbreviations: CT = controlled trial, MBP =Modified Bruce Protocol, BP=Bench Press, LG= Leg Press, SRT =Sit and Reach Test, MRT=Modified Romberg Test, PBS=Pediatric Balance Scale, BBT=Berg Balance Scale, FT=Flamingo Test, FST= floor to Stand Test, TUG=Timed Up and Go, TUDS= Timed Up and Down Stairs test, 6MWT =Six-Minute Walk Test, PGAS= Participant Goal Attainment Scaling, ASD= Autism Spectrum Disorders, ID= intellectual disability, DD= developmental delay

Discussions

This review aimed at searching only databases that most likely would include the relevant papers. We may thus have missed articles that may be available only through e.g. Cochrane. We did not extend our search beyond papers in English, so all included studies were written in English.

This narrative review reported 4 types of intervention resulting in 18 papers related to physical therapy for children with autism. All articles were published after 2006. Overall, the methodological quality was rather low. Of all four intervention categories (yoga, hydrotherapy, riding and exercise), there was one randomized controlled trial. As the interventions and outcomes differed in all categories, this limits comparisons in the evidence synthesis.

The effectiveness of the interventions was considered moderate when it was based on consistent findings from low quality randomized controlled trials, control trials or one high quality randomized controlled trials, limited when it was based on one low quality randomized controlled trials or one control trial or consistent findings from pre-post designs and insufficient when it was based on other research designs (e.g. case studies) [24]. Accordingly, there is only moderate evidence from three control trials for improvements in swimming skills and fitness as well as decreases of motor impairments for the aquatic-hydrotherapy programs from this review[11, 13-14]. For therapeutic riding, there is relatively limited evidence for improvements in sensory integration functions, attention and social motivation from one low quality randomized controlled trial[15], and for improvements in the motor skills from one control trial and two single-group designs[17-19]. Regarding to the exercise programs, limited evidence is provided from one control trial that academic performance can be increased in children with autism spectrum disorders[23].

In general, as clinical implications can only be drawn from low quality studies, well-designed, randomized trials on current and focused interventions related to physical therapy in children with autism are needed in the future.

Conclusions

This review provides only some moderate evidence that aquatic-hydrotherapy programs can improve swimming skills and fitness and decrease the motor impairments in children with autism spectrum disorders. There is limited evidence for the rest of interventions. High quality randomized trials on current and focused interventions related to physical therapy are needed in the future.

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BACK

義大醫院、義守大學近期活動

義大醫院

針對高風險單位推動組合式照護措施降低侵入性導管相關感染成果分享(CAUTI/VAP)

主講人：馬偕醫院一般內科及感染科 李聰明醫務專員

日期： 104年7月2日(四)

地點： 義大醫院六樓會議廳

台灣緊急傷病患轉診概況

主講人：長庚紀念醫院急診醫學部 陳日昌主任

日期： 104年7月11日(六)

地點： 義大醫院六樓會議廳

臨床及院內感染分離菌種抗生素感受性分析

主講人：義大醫院感管實驗科 賴重旭主任

日期： 104年8月1日(六)

地點： 義大醫院六樓會議廳

臨床抗生素使用原則

主講人：義大醫院感染科 黃俊凱主任

日期： 104年8月22日(六)

地點： 義大醫院六樓會議廳

義守大學

2015傳播與媒體生態學術研討會暨2015年中華傳播學會年會「從高雄出發－跨文化與新媒體想像」

主講人：除邀集國內傳播相關學界之專家學者共襄盛舉外，亦開放給國外與港澳傳播學界學者、媒體實務界人士、傳播系所研究生與學生參與

日期： 2015年7月3日(五)至2015年7月5日(日)

地點： 義守大學國際學院四樓

義大職治營-為即將踏入大學的高中學生們，對職能治療學系認識及進修與未來的出路。

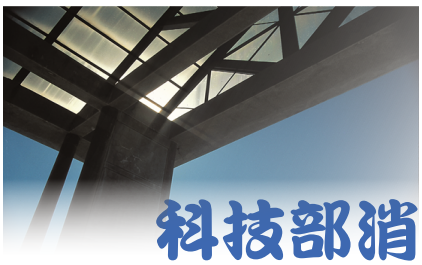
講題： 職治營「勇往職前・無所不能」

主講人：職能治療學系系學會(總召：秦嘉壕)
義守大學職治三同學

日期： 104年7月6日(一)至104年7月7日(二)

地點： 醫學院區A棟(A0101)、A0513、A0514

BACK



科技部消息

＊科技部104年開發型（第3期）及應用型（第2期）產學合作研究計畫

一、104年開發型（第3期）及應用型（第2期）產學合作研究計畫，即日起受理申請，計畫申請人請於104年7月3日（星期五）下午5時前完成線上申請作業，申請機構則應於104年7月10日（星期五）下午5時前備函送達本部，逾期送達者恕不受理。

二、本部補助產學合作計畫相關文件，請於本部網站（http：//www.most.gov.tw/）之「最新消息」或「學術研究/補助獎勵辦法及表格/補助專題研究計畫/產學合作研究計畫」下載利用。

訊息相關網址：

http://www.most.gov.tw/lp.aspx?CtNode=1134&CtUnit=658&BaseDSD=5&mp=1

三、計畫截止日：

104年7月3日(五)

＊人文司105年度「人文創新與社會實踐」計畫，自即日起接受申請，構想申請書至104年7月31日截止(以郵戳為憑)收件

一、在全球化競爭與追求經濟發展的同時，社會亦產生貧富差距擴大、生態環境破壞和民主發展停滯等問題，人文社會

科學的創新應可提出解決全球社經發展負面衝擊之有效方式，計畫主持人所在之申請機構須搭配本計畫之申請，提供資源投入及制度革新之規劃，以落實本計畫之目標。

二、訊息相關網址：

http://web1.most.gov.tw/wlp.aspx?CtUnit=31&mp=1&CtNode=42

三、計畫截止日：

104年7月31日(五)

＊人文司105年度「族群研究與原住民部落與社會發展研究」、「全球架構下的臺灣發展：典範與挑戰」及「心智科學腦影像研究」等3項專題研究計畫

一、「族群研究與原住民部落與社會發展研究」、「全球架構下的臺灣發展：典範與挑戰」及「心智科學腦影像研究」等3項專題研究計畫，均為徵求多項子計畫整合型計畫，個別型研究計畫或單一整合型計畫請勿提出。

二、訊息相關網址：

http://web1.most.gov.tw/wlp.aspx?CtUnit=31&mp=1&CtNode=42

三、計畫截止日：

104年7月31日(五)

＊公開徵求2016年「臺法幽蘭計畫」，至2015年8月26日申請截止！

一、依科技部與法國在臺協會 (Bureau Franais de Taipei, BFT) 簽訂之「幽蘭計畫」協議，公開徵求2016/2017年臺灣與法國兩國人員交流計畫及2016年雙邊研討會。

二、訊息相關網址：

http://www.campusfrance.org/fr/orchid

三、計畫截止日：

104年8月26日(三)

＊徵求2016-2017年科技部與日本理化學研究所(RIKEN)雙邊共同合作研究計畫

一、台方計畫主持人請依公告及案內附件說明，依科技部(以下簡稱本部)所定申請資格及要件程序向本部提出計畫申請；日方計畫主持人則請向RIKEN Global Relations and Research Coordination Office 詢問相關事宜。

二、受理及核定作業時程：

1.受理申請截止日期：2015年8月31日(以各申請人任職機構將申請案彙整後線上送達本部之日期及申請人任職機構發文日為憑)。

2.審查結果預定公告日期：2015年12月上旬。

3.計畫執行期間：2016年4月1日至2017年3月31日。 (或至2018年3月31日)

三、申請補助相關細節，以及申請所需下載填用表件如附件。

訊息相關網址：

http://web1.most.gov.tw/wlp.aspx?CtUnit=31&mp=1&CtNode=42

四、計畫截止日：

104年8月31日(一)

* 公開徵求2016~2017年臺灣-義大利雙邊共同合作研究計畫

一、為推動與南歐國家之科技合作，於2007年10月26日與義大利國家研究委員會(The National Research Council of Italy, CNR)簽署雙邊科學合作協議(Agreement on Scientific Cooperation)，雙方同意促進兩國科技交流，而以共同合作計畫、研究人員互訪及雙邊學術研討會為主要合作活動；並於同日簽訂合作計畫(Cooperative Programme of the Agreement on Scientific Cooperation)，以作為未來雙方共同推動合作之作業準則。

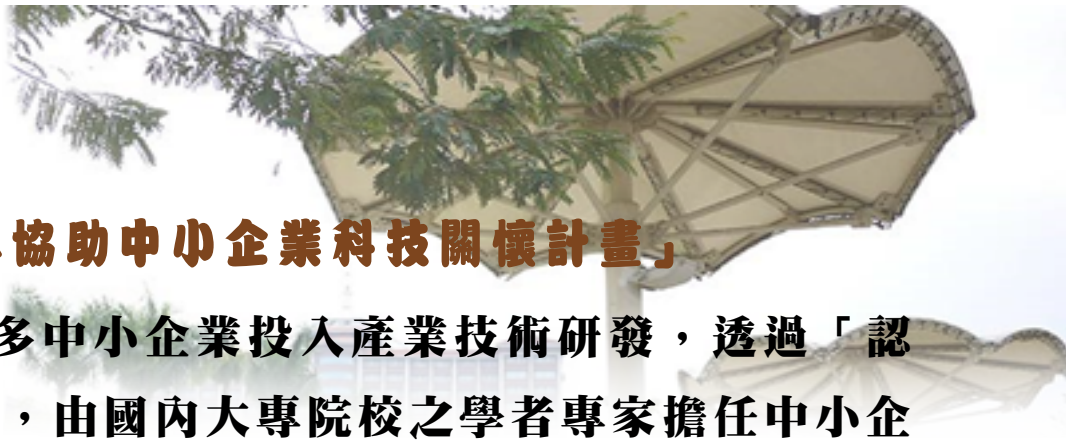
二、訊息相關網址：

http://web1.most.gov.tw/wlp.aspx?CtUnit=31&mp=1&CtNode=42

三、計畫截止日：

104年9月30日(三)

BACK



產學消息

* 經濟部「學界協助中小企業科技關懷計畫」

一、旨在鼓勵更多中小企業投入產業技術研發，透過「認養計畫」之推動，由國內大專院校之學者專家擔任中小企業的短期顧問，協助廠商標定問題並進行技術諮詢與服務。

二、申請資格：

●參與專家資格：全國各公私立大專院校任教之現職專任教師。

●參與廠商資格：依法辦理公司登記或商業登記且符合「中小企業認定標準」之公司或企業。

三、受理期間：本計畫採逐月審查，分個案及專案計畫，額滿為止。受理期間為2～3月。

四、相關聯結：http://sita.stars.org.tw/index.aspx

* 經濟部工業局「協助傳統產業技術開發計畫」（CITD）

一、為落實照顧傳統產業政策，經濟部工業局度積極透過「協助傳統產業技術開發計畫」，將近投入新台幣4億元，協助並鼓勵傳統產業進行新產品開發、產品設計及聯合開發，預計將嘉惠290家以上傳統產業業者，提升其競爭力。

二、申請資格：須為民間傳統產業業者(詳細資格條件請參閱網站)

三、受理期間：每年兩次，約為12月～隔年1月、4月～5月

四、相關連結：

http://www.citd.moeaidb.gov.tw/CITDweb/Web/Default.aspx

＊ 經濟部技術處「業界科專計畫」（ITDP）

一、為鼓勵企業從事技術創新及應用研究，建立研發能量與制度，經濟部開放企業界申請「業界科專」計畫，藉以政府的部分經費補助，降低企業研發創新之風險與成本，且研發成果歸廠商所有，以積極鼓勵業者投入產業技術研發工作，在業界提出申請及執行計畫過程中，輔導業界建立研發管理制度、強化研發組織、培育及運用科技人才、誘發廠商自主研發投入與後續投資，並促進產、學、研之間的交流與合作，健全業界整體發展能力，達到政府「藏技於民」的美意。

二、申請資格：依公司法設立之本公司或從事與創新服務研究發展活動相關具稅籍登記之事務所及醫療法人、財務健全、其專業團隊具從事提供　知識之創造、流通或加值之工作經驗且有實績者，均可提出計畫申請。

三、受理期間：計畫為政府持續推動與支持之計畫，廠商可隨時提出申請，並無特定的申請截止日期。

四、相關連結：http://innovation1.tdp.org.tw/index.php

＊ 高雄市政府「地方產業創新研發推動計畫」（高雄市政府地方型SBIR）

一、為協助各直轄市、縣(市)政府，經濟部特配合匡列相對經費，俾利各直轄市、縣(市)政府擁有加倍之經費得以辦理地方特色產業創新研發計畫之推動，帶動中小企業積極投入地方特色產業之研發，而提升具地方特色產業聚落創新研發之能量，以鼓勵中小企業創新研發之政策得以在地方紮根。基此，特規劃由各直轄市、縣(市)政府辦理「地方產業創新研發推動計畫」（地方型SBIR）。

二、申請資格：依公司法設立之中小企業，且其本公司住所設於高雄市並取得高雄市政府核發之營利事業登記證者；或依法取得高雄市政府核發工廠登記證之工廠。(詳細資格條件請參閱網站)

三、受理期間：約為每年4～6月（依網站公告為主）

四、相關連結：http://96kuas.kcg.gov.tw/sbir/main.php

＊ 屏東縣政府「地方產業創新研發推動計畫」（屏東縣政府地方型SBIR）

一、為協助各直轄市、縣(市)政府，經濟部特配合匡列相對經費，俾利各直轄市、縣(市)政府擁有加倍之經費得以辦理地

方特色產業創新研發計畫之推動，帶動中小企業積極投入地方特色產業之研發，而提升具地方特色產業聚落創新研發之能量，以鼓勵中小企業創新研發之政策得以在地方紮根。基此，特規劃由各直轄市、縣(市)政府辦理「地方產業創新研發推動計畫」（地方型SBIR）。

二、申請資格：依公司法設立之中小企業，且其本公司住所設於高雄市並取得高雄市政府核發之營利事業登記證者；或依法取得高雄市政府核發工廠登記證之工廠。(詳細資格條件請參閱網站)

三、受理期間：約為每年4～6月（依網站公告為主）

四、相關連結：

http://www.ptsbir.org.tw/html/front/bin/home.phtml

＊經濟部技術處「鼓勵中小企業開發新技術計畫」(SBIR)

一、SBIR計畫就是「小型企業創新研發計畫（Small Business Innovation Research）」，它是經濟部為鼓勵國內中小加強創新技術或產品的研發，依據「經濟部促進企業開發產業技術辦法」所訂定的計畫，期望能以此協助國內中小企業創新研發，加速提升中小企業之產業競爭力，以迎接面臨之挑戰。

二、申請資格：依公司法設立之中小企業

三、受理期間：

計畫為政府持續推動與支持之計畫，廠商可隨時提出申請，並

無特定的申請截止日期

四、相關連結：http://www.sbir.org.tw/SBIR/Web/Default.aspx

* 科技部「補助產學合作研究計畫」

一、整併原有的大產學、小產學及數位產學相關補助要點，並建構產業需求導向之產學合作模式，以整合運用研發資源，發揮大學及研究機構之研發力量，以期能透過產學的團隊合作與相互回饋的機制，提升國內科技研發的競爭力。分為「先導型」、「應用型」及「開發型」計畫。

二、申請資格：

●申請機構（以下稱計畫執行機構）：係指公私立大專校院、公立研究機構及經本會認可之財團法人學術研究機構。

●合作企業：係指依我國相關法律設立之獨資事業、合夥事業及公司，或以營利為目的，依照外國法律組織登記，並經中華民國政府認許，在中華民國境內營業之公司，並以全程參與本會產學合作研究計畫為原則。

三、受理期間：

●先導型產學合作計畫，申請日期約為每年2月。

●應用型產學合作計畫，申請日期約為2月及5月。

●開發型產學合作計畫，申請日期約為2月、5月及10月。

四、相關連結：

http://www.most.gov.tw/lp.aspx?ctNode=1134&CtUnit=658&BaseDSD=5&mp=1

＊科技部「產學技術聯盟合作計畫（產學小聯盟）」

一、鑑於過往學術研究成果與業界之間的落差，且國內產業界以中小企業為多，亟需研發能量挹注，本會透過本專案鼓勵學術界研究人員以其過去研發之成果為主軸，提出協助與服務產業界為目標之計畫（可由單一或多位研究人員提出），將其所累積之研發能量，藉由業界的參與共同組成會員形式之產學技術聯盟，有效落實產學之間互動，提昇業界競爭能力。

二、申請資格：

●申請機構（以下稱計畫執行機構）：公私立大專院校及公立研究機關(構)。

●計畫主持人及共同主持人之資格：比照本會補助專題研究計畫作業要點第三點規定。

三、受理期間：

計畫申請人於每年12月中前研提正式計畫申請書(線上申請)。

＊科技部「前瞻技術產學合作計畫（產學大聯盟）」

一、為引導學界研發能量投入產業界，協助產業升級，特與經濟部共同推動補助「前瞻技術產學合作計畫」，以鼓勵國內企業籌組聯盟，有效縮小產學落差，促使大專校院及學術研究機構與國內企業共同投入前瞻技術研發，以強化關鍵專利布局、產業標準建立或系統整合，並協助國內企業進行長期關鍵技術研發人才培育。

二、申請資格：

●申請機構必須為國內公私立大專院校及公立研究機構，或經本會認可之財團法人學術研究機構及醫療社團法人學術研究機構。

●申請人須符合「科技部補助專題研究計畫作業要點」規定之計畫主持人資格。

三、受理期間：每年2月左右

四、相關連結：

http://www.most.gov.tw/lp.aspx?ctNode=1662&CtUnit=730&BaseDSD=7&mp=1

* 經濟部工業局「主導性新產品開發輔導計畫」

一、政府為鼓勵民營事業研究開發主導性新產品，發展高科技之新興產業，提升技術層次，調整工業結構，提高國際競爭力，促進經濟成長，依據行政院「加速製造業升級及投資方案」第三項措施「加速資本及技術密集工業之發展」，訂定「主導性新產品開發輔導辦法」，以提供研究開發補助經費方式，鼓勵國內新興高科技工業具有研究發展潛力之廠商，參與本項輔導計畫。

二、申請資格：依公司法設立之公司(詳細資格條件請參閱網站)

三、受理期間：

計畫為政府持續推動與支持之計畫，廠商可隨時提出申請，並無特定的申請截止日期

四、相關連結：http://outstanding.itnet.org.tw/phtml

＊ 行政院勞工委員會職業訓練局「補助大專校院辦理就業學程實施計畫」

一、由申請補助單位運用既有制度或課程，結合「業界實務課程與講座」、「職場體驗」及「職涯相關教育」等面向，針對特定職能所設計之整合性課程。各項訓練內容學科數由申請補助單位自行規劃，並決定是否計入必修或選修學分。

二、申請資格：台灣地區依中華民國大學法設立之公私立大學

三、受理期間：每年1～3月

四、相關聯結：

http://youngjob.etraining.gov.tw/etraining_102/Web/Index.aspx

＊ 教育部「大專畢業生創業服務計畫」

一、為縮短大專校院學生畢業與就業間連結之平台落差，建立產學合作創業就業機制，結合各部會產業發展之資源，引導大專校院學生就業機會，實施大專畢業生創業服務計畫。

二、申請資格：

●設有育成單位之公私立大專校院。

●創業團隊由各大專校院畢業生至少三人組成，其中應有三分二以上成員為近三學年度(應屆及前二學年度)畢業生，每人限參與一組團隊，且各團隊之代表人應為近三學年度畢業者。(團隊及團員未曾接受本計畫之補助)

三、受理期間：每年5～6月

四、相關聯結：

http://ustart.moe.edu.tw/picpage.aspx?CDE=CGE20090519101140JR5

BACK

義守大學 研究發展處

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