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장소: 판교 차바이오컴플렉스 지하 1층 대강당

후원
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※ 리리카® 캡슐, 리리카® CR 서방정의 가장 흔하게 보고된 이상반응은 어지러움 및 졸음이었고, 이상반응은 대체로 경증, 중등증으로 나타남

References 1. 리리카 제품설명서 요약 정보 개정년월일: 2017.05.11 (75mg, 150mg, 300mg) 2018.02.26 (25mg, 50mg) **2.** 리리카 CR 서방정 제품설명서 요약 정보 2018.07.18 **3.** Attal, N., et al European journal of neurology, 2010 Sep;17(9):1113-e88 **4.** Martinez, V., et al Douleurs: Evaluation-Diagnostic-Traitement, Volume 11, Issue 1, February 2010, Pages 3-21

리리카® 제품설명서 요약정보

[성분 함량] LYRICA® capsules 25mg, 50mg, 75 mg, 150 mg, 300 mg (프레가발린) **[원료약품의 분량]** 25mg: 1캡슐(138 mg)당 프레가발린(EP) 25 mg을 함유, 50mg: 1캡슐(248 mg)당 프레가발린(EP) 50 mg을 함유, 75 mg: 1 캡슐(100 mg)당 프레가발린(EP) 75 mg을 함유, 150 mg: 1 캡슐(200 mg)당 프레가발린(EP) 150 mg을 함유, 300 mg: 1 캡슐(400 mg)당 프레가발린(EP) 300 mg을 함유 **[효능·효과]** 1. 성인에서말초와 중추 신경병증성 통증의 치료 2. 간질: 성인에서 이차적 전신증상을 동반하거나 동반하지 않은 부분발작의 보조제 3. 섬유근육통의 치료 **[용법·용량]** 이 약은 프레가발린으로서 1일 총 투여용량을 1일 2회로 나누어 음식물과 상관없이 경구 투여한다. 이 약은 주로 신장으로 배설되므로, 신기능이 저하된 환자에 대해서는 용량이 조절되어야 한다(. '5. 신기능 장애환자'항 참고) 1. 신경병증성 통증 1) 말초 신경병증성 통증 -성인: 이 약은 시작용량으로 1일 150 mg을 투여할 수 있다. 개개 환자에서의 반응과 내약성에 근거하여 3일 내지 7일 후에 1일 300 mg까지 증량할 수 있다. 필요하다면, 이후 7일 간격으로 1일 최대 600 mg까지 증량할 수 있다. 2) 중추 신경병증성 통증 -성인: 이 약은 시작용량으로1일 150 mg을 투여할 수 있다. 개개 환자에서의 반응과 내약성에 근거하여 1주일 후에 1일 300 mg까지 증량할 수 있다. 추가로 1주일 후에 목표 1일 용량인 600 mg까지 증량할 수 있다. 목표 1일 용량에서 내약성을 나타내지 않을 경우 용량 감소가 고려될 수 있다. ('4.투여의 중단'항 참고) 2. 간질 -성인: 이 약은 시작용량으로 1일 150 mg을 투여할 수 있다. 개개 환자에서의 반응과 내약성에 근거하여 일주일 후에 1일 300 mg까지 증량할 수 있다. 필요하다면, 이 후 7일 간격으로 1일 최대 600 mg까지 증량할 수 있다. 3. 섬유근육통: 섬유근육통에대한 이 약의 권장 용량은 1일 300 mg ~ 450 mg 이다. 이 약은 시작 용량으로 75 mg 씩 1일 2회 (1일 150 mg)를 투여하며, 유효성과 내약성에 근거하여 1주일 이내에 150 mg 씩 1일 2회 (1일 300 mg) 까지 증량할 수 있다. 1일 300 mg의 용량에서 충분한 유익성을 경험하지 못한 환자의 경우에는 1주일 이내에 225 mg씩 1일 2회 (1일 450 mg) 까지 증량할 수 있다. 1일 600 mg의 용량에서도 임상 연구가 실시되었으나, 이 용량에서의 부가적인 유익성이나 충분한 내약성에 대한 증거는 없다. 용량 의존적인 이상반응을 고려하면, 1일 450 mg을 초과하는 용량 투여는 권장되지 않는다. 4. 투여의 중단: 현재의 임상적 경험에 따르면, 이 약의 투여를 중단할 경우, 적어도 1주일 이상의 간격을 두고 점진적으로 중단하여야 한다. 5. 신기능 장애환자: 이 약은 전신순환을 거친 후 미변화체의 형태로 주로 신장으로 배설된다. 이 약의 클리어런스는 크레아티닌 클리어런스에 직접적인 영향을 받으므로, 신기능이 저하된 환자에서의 용량감소는 크레아티닌 클리어런스에 근거하여 개별화되어야 한다. 이 약은 혈액투석에 의해 혈장에서 효과적으로 제거된다. (4시간 이내에 50%정도). 혈액투석을하는 환자에서 프레가발린의 1일 투여용량은 신기능에 근거하여 조정되어야 한다. 신기능에 따른 1일 투여용량 외에 매 4시간 마다 혈액투석을 실시한 후에는 추가로 보충 용량을 즉시 투여하여야 한다. 6. 간기능 장애환자: 간기능 장애환자에서의 용량조정은 필요치 않다. 7. 소아 및 청소년 환자: 만 12세 미만의 소아와 만 12 ~ 17세의 청소년 환자에 대하여 안전성 및 유효성 자료가 충분하지 않으므로, 투여는 권장되지 않는다. 8. 고령자에 대한 투여 (만 65세 이상): 신기능이 저하된 고령자의 경우에는, 용량 감소가 필요할 수도 있다. **[사용상의 주의사항]** 1. 경고 -자살충동과 자살행동 1) 항간질 약을 복용한 환자에서 자살충동 또는 자살행동을 보이는 위험성이 증가되므로 항간질약을 치료받은 환자는 자살충동 또는 자살행동, 우울증의 발현 또는 악화 및 기분과 행동의 비정상적 변화에 대하여 모니터링되어야 한다. 2) 항간질약을 처방받는 간질과 다른 많은 질병은 그 자체가 이환 및 사망, 치료기간 동안의 자살충동과 자살행동의 위험성증가와 관련된다. 따라서, 처방자는 항간질약 처방시 환자의 치료기간 동안 자살충동 또는 자살행동과 치료될 질병간의 연관성 유무 및 이 약의 유효성을 함께 고려한다. 2. 다음 환자에는 투여하지 말 것 1) 프레가발린 또는 이 약의 성분에 과민한 환자 2) 이 약은 유당을 함유하고 있으므로, 갈락토오스 불내성 (galactose intolerance), Lapp유당분해효소 결핍증 (Lapp lactase deficiency) 또는 포도당-갈락토오스 흡수장애 (glucose-galactose malabsorption)등의 유전적인 문제가 있는 환자에게는 투여하면 안된다. 3. 다음 환자에는 신중히 투여할 것 1) 당뇨환자: 최근 프레가발린의 투여로 체중이 증가된 당뇨환자는 혈당강하제의 용량 조정이 필요할 수 있다. 2) 혈관부종을 포함한 과민반응이 시판 후 경험에서 보고된 바 있다. 안면, 입주위 및 상기도 부종과 같은 혈관부종의 증상이 나타난 경우에는 즉시 프레가발린을 중단해야 한다. 3) 고령자: 프레가발린의 투여는 고령의 환자에서 우연한 상해의 빈도를 증가시킬 수 있는 어지러움 및 졸음과 연관되었다. 시판 후 조사에서 의식 소실, 혼돈, 정신 장애가 보고된 바 있다. 따라서 이 약의 잠재적인 효과에 익숙해질 때까지 주의하도록 환자에게 주지 시켜야 한다. 4) 시판 후 경험에서, 프레가발린을 투여한 환자에서 일시적 시야흐림과 시력의 다른 변화가 보고되었다. 프레가발린의 중단으로 이러한 증상이 사라지거나 개선될 수 있다. 5) 프레가발린을 보조제로서 투여하여 발작을 조절한 후 프레가발린을 단독요법으로 투여하기 위해 병용중인 항간질약을 중단한 경험에 대한 자료는 충분치 않다. 6) 프레가발린을 단기간 또는 장기간 치료하다 중단한 후에, 일부 환자에서 불면증, 두통, 구역, 불안, 설사, 인플루엔자유사증후군, 안절부절, 우울, 통증, 발작, 다한증 및 어지러움과 같은 금단 증상이 관찰되었다. 7) 프레가발린은 약물 남용과 관련된 수용체에 작용한다고 알려져 있지 않다. 하지만 시판후 자료에서 오용 및 남용 사례들이 보고되었다. 다른 모든 CNS 활성 약물과 마찬가지로, 환자들의 약물 남용 병력을 주의 깊게 검토하고 그들의 프레가발린 오용 및 남용 징후(예, 내성의 발전, 투여용량 증량, 약물추구 행위)를 관찰해야 한다. 8) 신기능 장애에 대한 약물 중단의 효과가 체계적으로 연구된 바는 없으나, 프레가발린의 중단이나 용량 감소 후에 신기능이 개선되었다는 보고가 있었다. 9) 프레가발린 노출과 울혈성 심부전 사이에 인과 관계가 확인된 바는 없으나, 시판후 조사에서 프레가발린을 투여한 일부 환자의 울혈성심부전이 보고된 바 있다. 임상적으로 유의한 심장 또는 말초혈관 질환이 없는 환자에 대한 단기 시험에 의하면, 고혈압이나 울혈성심부전 같은 심혈관계 합병증과 말초성 부종 사이에 명백한 관련이 나타나지 않았다. 중증의 울혈성심부전 환자에 대한 자료가 충분치 않으므로 이러한 환자들에게는 신중히 투여해야 한다. 4. 이상반응: 가장 흔하게 보고된 이상반응은 어지러움 및 졸음이었고, 이상반응은 대체로 경증에서 중등도로 나타났다. 모든 대조임상 시험에서 이상반응으로 인한 투여의 중단은 프레가발린을 투여한 환자의 14%, 위약을 투여한 환자의 5%에서 나타났다. 투여의 중단을 가져온 가장 흔한 이상반응은 어지러움 및 졸음이었다. **가장 최근 개정된 제품설명서의 내용은 당사 홈페이지(www.pfizer.co.kr)를 통해 확인하실 수 있습니다. 개정년월일: 2017.05.11 (75mg, 150mg, 300mg) 2018.02.26 (25mg, 50mg)**

리리카® CR 서방정 제품설명서 요약정보

[성분 함량] LYRICA® Tablets 165mg, 330mg (프레가발린) **[원료약품의 분량]** 165mg: 1정 (1158.75mg) 중 프레가발린 (EP) 165mg을 함유, 330mg: 1정 (1158.75mg) 중 프레가발린 (EP) 330mg을 함유 **[효능·효과]** 성인에서말초 신경병증성 통증의 치료 **[용법·용량]** 이 약은 1일 1회 저녁 식사 후 투여한다. 이 약은 통째로 삼켜야 하며, 쪼개거나 으깨거나 씹어서는 안 된다. 이 약은 주로 신장으로 배설되므로, 신기능이 저하된 환자에 대해서는 용량이 조절되어야 한다(. '3. 신기능 장애환자'항 참고) 만약 저녁식사 후 1시간 이내에 이 약을 복용하는 것을 잊은 경우, 취침 전 간식을 섭취하고 이 약을 복용하도록 권고한다. 만약 취침 전 이 약 복용을 잊은 경우, 아침식사를 하고 이 약을 복용하도록 권고한다. 만약 아침식사를 하고 이 약을 복용하는 것을 잊은 경우, 통상적인 복용 시간, 즉 저녁식사 후 이 약을 복용하도록 권고한다. 이 약은 시작용량으로 1일 1회 165 mg을 투여할 수 있다. 개개 환자에서의 반응과 내약성에 근거하여 3일 내지 7일 후에 1일 1회 330 mg까지 증량할 수 있다. 필요하다면, 이후 7일 간격으로 1일 최대 660 mg까지 증량할 수 있다. 1. 리리카 캡슐에서 리리카 CR 서방정으로 전환: 리리카 캡슐에서 리리카 CR 서방정으로 전환 시, 전환하는 날에 리리카 캡슐의 아침 용량을 처방된 대로 복용하고 저녁 식사 후 리리카 CR 서방정 투여를 시작한다. 2. 투여의 중단: 현재의 임상적 경험에 따르면, 이 약의 투여를 중단할 경우, 적어도 1주일 이상의 간격을 두고 점진적으로 중단하여야 한다. 3. 신기능 장애환자: 크레아티닌 클리어런스가 30 mL/min 미만 또는 혈액투석을 받고 있는 환자에서 이 약의 투여는 권장되지 않는다. 이러한 환자는 리리카 캡슐을 투여받아야 한다. 용량 의존적 이상반응을 고려하였을 때, 프레가발린이 주로 신장으로 배설되므로 신기능이 저하된 환자에서는 용량을 조절한다. 신장애 환자에서의 용량조절은 크레아티닌 클리어런스에 근거한다 4. 간기능 장애환자: 간기능 장애환자에서의 용량조정은 필요치 않다. 5. 소아 및 청소년 환자: 만 12세 미만의 소아와 만 12-17세의 청소년 환자에 대하여 안전성 및 유효성 자료가 충분하지 않으므로, 투여는 권장되지 않는다. 6. 고령자 (만 65세 이상): 신기능이 저하된 고령자의 경우에는, 용량 감소가 필요할 수도 있다. **[사용상의 주의사항]** 1. 경고 1) 자살충동과자살행동 (1) 항간질약을 복용한 환자에서 자살충동 또는 자살행동을 보이는 위험성이 증가되므로 항간질약을 치료받은 환자는 자살충동 또는 자살행동, 우울증의 발현 또는 악화 및 기분과 행동의 비정상적 변화에 대하여 모니터링되어야 한다. (2) 항간질약을 처방받는 간질과 다른 많은 질병은 그 자체가 이환 및 사망, 치료기간 동안의 자살충동과 자살행동의 위험성증가와 관련된다. 따라서 처방자는 항간질약 처방시 환자의 치료기간 동안 자살충동 또는 자살행동과 치료될 질병간의 연관성 유무 및 이 약의 유효성을 함께 고려한다. 2. 다음 환자에는 투여하지 말 것 1) 프레가발린 또는 이 약의 성분에 과민한 환자 3. 다음 환자에는 신중히 투여할 것 1) 당뇨환자: 최근 프레가발린의 투여로 체중이 증가된 당뇨환자는 혈당강하제의 용량 조정이 필요할 수 있다. 2) 혈관부종을 포함한 과민반응이 시판 후 경험에서 보고된 바 있다. 안면, 입주위 및 상기도 부종과 같은 혈관부종의 증상이 나타난 경우에는 즉시 프레가발린을 중단해야 한다. 3) 고령자: 프레가발린의 투여는 고령의 환자에서 우연한 상해의 빈도를 증가시킬 수 있는 어지러움 및 졸음과 연관되었다. 시판 후 조사에서 의식 소실, 혼돈, 정신 장애가 보고된 바 있다. 따라서 이 약의 잠재적인 효과에 익숙해질 때까지 주의하도록 환자에게 주지 시켜야 한다. 4) 시판 후 경험에서, 프레가발린을 투여한 환자에서 일시적 시야흐림과 시력의 다른 변화가 보고되었다. 프레가발린의 중단으로 이러한 증상이 사라지거나 개선될 수 있다. 5) 프레가발린을 보조제로서 투여하여 발작을 조절한 후 프레가발린을 단독요법으로 투여하기 위해 병용중인 항간질약을 중단한 경험에 대한 자료는 충분치 않다. 6) 프레가발린을 단기간 또는 장기간 치료하다 중단한 후에, 일부 환자에서 불면증, 두통, 구역, 불안, 설사, 인플루엔자유사증후군, 안절부절, 우울, 통증, 발작, 다한증 및 어지러움과 같은 금단 증상이 관찰되었다. 7) 프레가발린은 약물 남용과 관련된 수용체에 작용한다고 알려져 있지 않다. 하지만 시판후 자료에서 오용 및 남용 사례들이 보고되었다. 다른 모든 CNS 활성 약물과 마찬가지로, 환자들의 약물 남용 병력을 주의 깊게 검토하고 그들의 프레가발린 오용 및 남용 징후(예, 내성의 발전, 투여용량 증량, 약물추구 행위)를 관찰해야 한다. 8) 신기능 장애에 대한 약물 중단의 효과가 체계적으로 연구된 바는 없으나, 프레가발린의 중단이나 용량 감소 후에 신기능이 개선되었다는 보고가 있었다. 9) 프레가발린 노출과 울혈성 심부전 사이에 인과 관계가 확인된 바는 없으나, 시판후 조사에서 프레가발린을 투여한 일부 환자의 울혈성심부전이 보고된 바 있다. 임상적으로 유의한 심장 또는 말초혈관 질환이 없는 환자에 대한 단기 시험에 의하면, 고혈압이나 울혈성심부전 같은 심혈관계 합병증과 말초성 부종 사이에 명백한 관련이 나타나지 않았다. 중증의 울혈성심부전 환자에 대한 자료가 충분치 않으므로 이러한 환자들에게는 신중히 투여해야 한다. 4. 이상반응: 대상포진 후 신경통에 대한 대조 임상시험: 1건의 이중눈가림, 위약-대조, 무작위배정 철회 임상시험이 대상포진 후 신경통 환자들을 대상으로 수행되었으며, 총 801명의 환자가 이 약을 투여 받았다. 용량 최적화 단계인 6주의 단일 맹검 단계 후, 13주의 이중맹검 단계가 이어졌다. 단일 맹검 단계: 이상반응은 대부분 경증에서 중등도였고, 35명의 시험대상자(4.4%)는 중증으로 간주된 이상반응을 경험했다. 가장 높은 빈도로 보고된 이상반응은 어지러움, 졸음 및 말초부종이었다. 이중 맹검 단계: 이상반응은 대부분 경증에서 중등도였고, 이 약 투여군 4.3%(9명/208명), 위약 투여군 1.5%(3명/205명)에서 중증으로 간주된 이상반응을 경험했다. 가장 높은 빈도로 보고된 이상반응은 말초부종, 체중증가, 구역 및 어지러움이었고 이 약 투여군과 위약 투여군의 이상반응 발생빈도는 유사했다. **가장 최근 개정된 제품설명서의 내용은 당사 홈페이지(www.pfizer.co.kr)를 통해 확인하실 수 있습니다. 최초품목허가일: 2018.07.18**

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PP-LYR-KOR-0971-Sep 2018

2019 Bundang CHA Medical Center
CGbio Regenerative Medicine Symposium

일시: **2019년 9월 6일(금) 12:00-17:40**
장소: **판교 차바이오컴플렉스 대강당**

12:00-12:50 **Registration**

12:50-13:00 **Opening Remark** 분당차병원 병원장 **김재화**

Congratulatory Remark I 대한척추신경외과학회 회장 **김은상**

Congratulatory Remark II 시지바이오 대표이사 **유현승**

Session I
좌장: 분당차병원 연구부원장 **안희정** / 연세의대 세브란스병원 신경외과 **김긍년**

13:00-13:07 Stem Cell Therapy for Intervertebral Disc Repair …· 차의과학대 분당차병원 신경외과 **한인보** 8

13:07-13:10 **Q & A**

13:10-13:25 Significant Therapeutic Effects of Adult Human Multipotent Neural Cells on Spinal Cord Injury …… 성균관의대 삼성서울병원 신경외과 **이선호** 10

13:25-13:30 **Q & A**

13:30-13:45 From Bench to Bedside-commercialization of a Drug Delivery Platform …… *AmacaThera, University of Toronto, Canada* **Mike COOKE**, PhD 12

13:45-13:50 **Q & A**

13:50-14:05 Investigation on Adipose Derived Stromal Vascular Fraction as a New Treatment Modality in Degenerative Disc Disease …… 시지바이오 **이지혜** 14

14:05-14:10 **Q & A**

14:10-14:20 **Coffee Break**

Session II
좌장: 서울대 치의학대학원 **오석배** / 인하의대 의생명학 **최병현**

14:20-14:40 Novel Strategies for Inhibiting TRPV1 Activation in Animal Models of Pain …… 가천의대 생리학 **김용호** 16

14:40-14:45 **Q & A**

14:45-15:05 Injectable Biomaterial Therapy to Align Regenerating Nerves after Spinal Cord Injury …… **Abdolrahman Omidinia ANARKOLI**, PhD 18
DWI, Aachen University, Germany

15:05-15:10 **Q & A**

15:10-15:30 Biodegradable Hybrid Nanoscaffolds to Advance In Vivo Drug Delivery and Stem Cell-based Therapeutics in CNS Injuries …… **Ki-Bum LEE**, PhD 20
Rutgers, The State University of New Jersey, USA

15:30-15:35 **Q & A**

15:35-15:55 Can Optogenetics Replace DBS Surgery in Parkinson Disease? …… 울산의대 서울아산병원 신경외과 **전상용** 22

15:55-16:00 **Q & A**

16:00-16:10 **Coffee Break**

Session III 좌장: 강원대학교병원 신경외과 **김충효** / 서울대 화학생물공학부 **김병수**

16:10-16:30 Neurotrophic Effect of Dedifferentiated Schwann Cells with Neural Crest Stem Cell-lke Properties on the Injured Spinal Cord ····· 인제의대 부산백병원 병리과 **양영일** 24

16:30-16:35 **Q & A**

16:35-16:55 Targeting mTOR Substrate S6 Kinase 1 for Spinal Cord Injury Repair ····· *Sun Yat-sen University, China* **Ying DING** 26

16:55-17:00 **Q & A**

17:00-17:20 Translational Research in Spinal Cord Injury ····· 경북대학교병원 신경외과 **김경태** 28

17:20-17:25 **Q & A**

17:25-17:35 Application of Bio-ceramic (BGS-7) Based on Additive Manufacturing ····· 시지바이오 **임준영** 30

17:35-17:40 **Q & A**

17:40- **Closing Remarks** 차의과학대 분당차병원 신경외과 **한인보**

CHA 의과학대학교
CHA 분당차병원

Moderator

CURRICULUM VITAE

김 은 상

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유 현 승

현재: 시지바이오 대표이사

학위 및 경력

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2017	바이오융합의료기기 노보시스 국내 첫 허가
2019	과기정통부 장관 표창 수상

CURRICULUM VITAE

안 희 정

근무처: 차의과학대학교 분당차병원 병리학교실 교수
제 1연구부원장

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미국 NYU 및 Cornell Medical Center 연수
현재 차의과학대학교 병리과 교수

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1990~1994	강남세브란스병원(신경외과 전공의)
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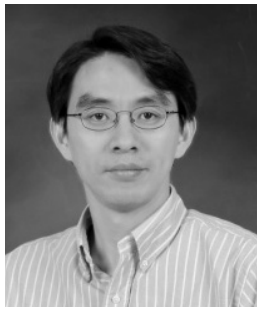
1999~1999	연세대학교 의과대학 용인세브란스병원 신경외과 임상전임강사
2000~2002	건양대학교 의과대학 신경외과 조교수
2002~2006	연세대학교 의과대학 신경외과 조교수
2003~2005	미국 마이아미대학 연수
2006	연세대학교 의과대학 신경외과 부교수
2012	연세대학교 의과대학 신경외과 교수
2016	연세대학교 의과대학 신경외과 과장

CURRICULUM VITAE



Seog Bae OH, DDS/PhD

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ACADEMIC EDUCATION

1984~1990	DDS, College of Dentistry, Seoul National University, Seoul, Korea
1990~1992	MS, Graduate School, Seoul National University, Seoul, Korea
1992~1997	PhD, Graduate School, Seoul National University, Seoul, Korea
1998~2000	Postdoctoral fellow in Department of Neurobiology, Pharm. & Physiol. Sci. University of Chicago, USA (Advisor: Dr. Richard Miller)
2000~2002	Research Associate in Department Mol. Pharm. & Biol. Chem. Northwestern University Medical School, USA (Advisor: Dr. Richard Miller)

RESEARCH & PROFESSIONAL EXPERIENCE

2002~Present	Professor in Department of Neurobiology and Physiology, School of Dentistry Seoul National University, Assistant Professor (2002), Tenured Associate Professor (2006) and Professor (2011)
2007~2010	Honorary Visiting professor, University of Manchester, UK
2008~2009	Visiting Professor, Department of Neurobiology Harvard Medical School, USA
2013~Present	Professor in Department of Brain and Cognitive Sciences College of Natural Sciences, Seoul National University

CURRICULUM VITAE

Bryan Choi, PhD

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EDUCATION

1987~1991 BS. Department of Molecular Biology, Seoul National University
1991~1993 MS. Department of Molecular Biology, Seoul National University
1993~1999 PhD. Department of Molecular Biology, Seoul National University

EXPERIENCES AND EMPLOYMENT

2000~2002 Postdoctoral Fellow, Institute of Chemistry and Cell Biology (ICCB), Harvard Medical School, USA
2002~2002 Researcher, Target Validation Team, LG Biomedical Institute in San Diego, USA
2003~2004 Research Professor, Catholic Neuroscience Center, Catholic University, Korea
2004~2007 Research Professor, College of Medicine, Inha University, Korea
2007~2008 Research Professor, Cell Therapy Center, Ajou University Hospital, Korea
2009~2015 Head of Research and Education Division, National Center of Efficacy Evaluation for the Development of Health Products Targeting Digestive Disorders (NCEED)
2016~2017 Vice-president & CSO, CureCell Inc., Korea
2008~Present Professor, Department of Biomedical Sciences, College of Medicine, Inha University, Korea
2011~Present Vice-director, Strategic Center for Regenerative Medicine (SCRM), Korea (former, Global Stem Cell and Regenerative Medicine Acceleration Center)
2018~Present Director of R&D Center, ATEMs Inc., Korea

SOCIETIES & ASSOCIATIONS

Present, Director of International Affairs & Chair of International Affairs Committee, Korean Tissue Engineering and Regenerative Medicine Society (KTERMS)
Present, Associate Editor, Tissue Engineering and Regenerative Medicine (TERM)
Present, Director of Legislation, Korean Society of Cartilage and Osteoarthritis (KSCO)
Present, Deputy Secretary General, Council for Advanced Regenerative Medicine (CARM)
Present, Member of Commercialization Committee, International Society for Cellular Therapy (ISCT)
Present, Member of Strategic Advisory Council, ISCT
Present, Asia Regional Vice-President Elect, ISCT

CURRICULUM VITAE

Choonghyo Kim, M.D

Associate professor, Department of Neurosurgery,
Kangwon National University College of Medicine, Chunchon, Kangwon, Korea
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ACADEMIC EDUCATION

1991~1992	Premedical Course, Seoul National University College of Natural Sciences, Seoul, Korea
1993~1996	M.D. Seoul National University College of Medicine, Seoul, Korea,
2003~2005	M.S. Seoul National University College of Medicine, Seoul, Korea,
2008~2018	PhD. Seoul National University, Department of Neuroscience, Seoul, Korea,
2011~2013	Visting Scholar, Center for Brain and Spinal Cord repair, Department of Neurosurgery, Ohio State University, OH, USA

POSTGRADUATE TRAINING and APPOINTMENT

1997~1998	Internship, Seoul National University Hospital, Seoul, Korea
1998~2001	Army surgeon, Armed forces, Korea
2001~2005	Residency, Department of Neurosurgery, Seoul National University Hospital, Seoul, Korea
2005~2006	Clinical fellow, Department of Neurosurgery, Seoul National University Bundang Hospital, Seongnam, Korea
2006~2008	Full-time Instructor, Department of Neurosurgery, Kangwon National University College of Medicine, Chunchon, Korea
2009~2014	Assistant Professor, Department of Neurosurgery, Kangwon National University College of Medicine, Chunchon, Korea
2014	Associate Professor, Department of Neurosurgery, Kangwon National University College of Medicine, Chunchon, Korea

CURRICULUM VITAE

Byung-Soo Kim, PhD

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Education

1990	BS, Chemical Technology, Seoul National University, Seoul, Korea
1992	MS, Chemical Technology, Seoul National University, Seoul, Korea
1999	PhD, Chemical Engineering, University of Michigan

Career

1999~2000	Postdoctoral Research Fellow, Harvard Medical School
2001~2009	Assistant Professor, Associate Professor, Hanyang University, Seoul, Korea
2009~present	Professor, Seoul National University, Seoul, Korea

Research interest

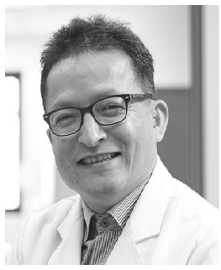
Regenerative medicine, Tissue engineering, Stem cells

Session I

좌장: 분당차병원 연구부원장 **안 희 정**

연세의대 세브란스병원 신경외과 **김 긍 년**

CURRICULUM VITAE



INBO HAN, MD, PhD

Professor
Department of Neurosurgery, CHA University School of Medicine,
CHA Bundang Medical Center Education and Training, Seongnam, Korea
E-mail: hanib@cha.ac.kr

ACADEMIC EDUCATION:

1997	MD. Yonsei University, Seoul, Korea
2010~2012	Research fellowship. Laboratory of Spinal Cord Injury & Stem Cell Biology Brigham & Women's Hospital/Harvard Medical School, USA
2014	PhD. Yonsei University, Seoul, Korea

Professional Experiences

2007~2012	Assistant Professor, CHA University School of Medicine
2013~2017	Associate Professor, CHA University School of Medicine
2018~Present	Professor, Department of Neurosurgery, CHA University School of Medicine

Awards

2009, 2013	Best Researcher in CHA University
2017	Best Researcher in Korean Peripheral Nerve System Society
2017	Best Paper in Korean Neurosurgical Society
2017	Best Paper in Korean Spine Neurosurgical Society
2018	Best Paper in Korean Spine Neurosurgical Society

Professional Activities

Scientific Chair	Biospine Asia-Pacific
Scientific Chair	Korea Spinal Neurosurgery Research Society
Education Director	Korean Tissue Engineering and Regenerative Medicine Society
Advertisement Director	Korean Society for Biomaterials
Research Director	Korean Spinal Osteoporosis Society
Member Management Director	Korean Society of Peripheral Nervous System

13:00-13:07

Stem Cell Therapy for Intervertebral Disc Repair

INBO HAN, MD, PhD

Department of Neurosurgery, CHA University School of Medicine, Seongnam, Korea

Matrilin-3 is an essential extracellular matrix component present only in cartilaginous tissues. Matrilin-3 exerts chondroprotective effects by regulating an anti-inflammatory function and extracellular matrix components. Matrilin-3 treatment of adipose-tissue-derived mesenchymal stem cells (Ad-MSCs) in serum-free media induced collagen II and aggrecan expression, and matrilin-3 in chondrogenic media also enhanced in vitro chondrogenic differentiation. Next, the in vivo effect of matrilin-3 codelivery with Ad-MSCs on cartilage regeneration was assessed in an osteochondral defect model in Sprague Dawley rats: Ad-MSCs and hyaluronic acid were implanted at the defect site with or without matrilin-3 (140, 280, and 700 ng). Safranin O staining revealed that matrilin-3 (140 and 280 ng) treatment significantly improved cartilage regeneration and glycosaminoglycan accumulation. Codelivery of matrilin-3 with Ad-MSCs significantly influenced articular cartilage regeneration, supporting the potential use of this tissue-specific protein for a cartilage-targeted stem cell therapy.

MEMO

CURRICULUM VITAE

이 선 호

근무처: 성균관대학교 의과대학 삼성서울병원 신경외과 부교수
E-mail: sobotta@skku.edu

학력 사항

1997	경북대학교 의과대학 졸업
2005	경북대학교 의과대학 신경외과 전문의

경력 사항

2007~2008	경북대학교병원 신경외과 임상조교수
2008~2009	성균관대학교 의과대학 삼성서울병원 신경외과 임상조교수
2010~2013	성균관대학교 의과대학 삼성서울병원 신경외과 조교수
2014~현재	성균관대학교 의과대학 삼성서울병원 신경외과 부교수

학회 활동

대한척추신경외과학회 역사편찬 위원회 부위원장
대한척추신경외과 학술지 및 Journal of Advanced Spine Surgery 편집위원
대한척추신경외과 교과서 위원회 위원
대한경추연구회 회원관리이사
대한척추종양연구회 연구이사
대한척추신경외과 기초연구회 감사

연구 분야

신경재생연구, 줄기세포, 빅데이터, 기계학습

13:10-13:25

Significant Therapeutic Effects of Adult Human Multipotent Neural Cells on Spinal Cord Injury

Kee-Hang Lee[1,2,5,6], Hee-Jang Pyeon[2,3,5,6], Hyun Nam[2,4,5,6], Jeong-Seob Won[1,2,5], Ji-Yoon Hwang[2,4,5], Kyung-A Lee[3], Je Young Yeon[2,4], Seung-Chyul Hong[2,4], Do-Hyun Nam[2,4], Kyunghoon Lee[3,5,*], Sun-Ho Lee[1,2,4,*] and Kyeung-Min Joo[1,2,3,5,*]

[1]Department of Health Sciences and Technology, SAIHST, Sungkyunkwan University, Seoul; [2]Stem Cell and Regenerative Medicine Center, Research Institute for Future Medicine, Samsung Medical Center, Seoul; [3]Department of Anatomy & Cell Biology, Sungkyunkwan University School of Medicine, Suwon; [4]Department of Neurosurgery, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul; [5]Single Cell Network Research Center, Sungkyunkwan University School of Medicine, Suwon; [6]These Authors Contributed Equally to This Work.

For the successful clinical application of regenerative treatment to spinal cord injury (SCI), safe and ethical stem cells with proved treatment effects and therapeutic mechanisms are required. In this study, we preclinically demonstrated the significant treatment effects and pro-angiogenic paracrine mechanisms of adult human multipotent stem cells (ahMNCs) on SCI. Upon ahMNCs were cultured from voluntarily donated human surgical samples and they did not show any noteworthy preclinical side effects including tumor formation, ahMNCs could be a clinically applicable stem cell therapeutics for SCI patients who have no alternative regenerative treatment modalities.

MEMO

CURRICULUM VITAE

Mike Cooke, PhD

AmacaThera CEO, 661 University Avenue, Suite 1300,
Toronto, ON, M5G 0B7, Canada

Dr Cooke completed his PhD in stem cell biology at the University of Durham (UK) where he studied methods for controlling cell fate. Dr Cooke conducted his post-doctoral research in Professor Molly Shoichet's laboratory at the University of Toronto (Canada). During his post-doctoral work, Dr Cooke investigated combining a hydrogel (HAMC) with neural stem/progenitor cells for repair of the stroke injured mouse brain. He was successful in demonstrating that cells combined with HAMC could lead to functional recovery of the stroke injured mouse brain. More recently, Dr Cooke has co-founded AmacaThera with Prof Shoichet to commercialize novel hydrogels. The lead product is focused at improving post-operative pain management and has applicability to any surgical incision. AmacaThera successfully raised CAD$3.25M in January 2019.

13:30-13:45

From Bench to Bedside-commercialization of a Drug Delivery Platform

Mike Cooke, PhD

AmacaThera CEO, University of Toronto, Canada

The translation of basic research into products that can ultimately be used in patients is of great importance. This talk describes the pathway taken by AmacaThera to commercialize a drug delivery technology. From initial conception through an iterative process, AmacaThera has explored a wide range of potential applications, from stem cell transplantation to the delivery of small molecules. AmacaThera's core technology is a hydrogel blend of hyaluronan and methylcellulose that can be injected into a tissue to localize and sustain therapeutic release. Our engineered hydrogel comprises a physical blend of hyaluronan (HA) and methylcellulose (MC), termed HAMC. We are developing a single-dose product that combines off-patent drugs with HAMC, for infiltration into a surgical site to produce post-operative analgesia. To date, we have evaluated the end-user unmet need, estimated the market size, demonstrated proof-of-principle in three independent, pre-clinical rodent models of surgical pain, and developed a strategy for manufacturing and regulatory approval. Our aim is to initiate a phase I clinical trial in 2020.

MEMO

CURRICULUM VITAE

Ji-hye Lee, PhD

현재: 연구소/학술임상팀/학술파트장
Medical & Scientific Affairs, CGBio, Co., Ltd., South Korea

Ji-hye Lee is currently working as a part leader of scientific part in the Medical & scientific affairs at CGbio. She received her PhD. from Hanyang University, South Korea. She worked as a postdoctoral researcher in the department of orthopedic surgery at Seoul national university hospital.

13:15-13:30

Investigation on Adipose Derived Stromal Vascular Fraction as a New Treatment Modality in Degenerative Disc Disease

Ji-hye Lee, PhD

Medical & Scientific Affairs, CGBio, Co., Ltd., South Korea

Adipose derived Stromal Vascular Fraction (SVF) contains various cells and it has been reported to have therapeutic effects in regenerative medicine fields. Nowadays, various types of automatic SVF isolating equipment are commercially available and we succeeded in SVF isolation from lipoaspirates by recently developed, automatic, one-step SVF isolating euipment, Cellunit™ (CGBio, Co., Ltd., South Korea). The equipment introduced top-type bowl and we could achieve better cell yields due to its bowl design difference. To evaluate the basic mechanism of SVF, we transplanted the fat only or fat + SVF on the dorsal region of the nude mice and histologically analyzed after 2 weeks. In fat + SVF group showed a significant increase in laminin, fibronectin, and CD31 which compared to that of the fat only group. To confirm the clinical usefulness of SVF, SVF was injected into the atrophic scar on the facial region, and 66.7% of the patients had recovered over 50% of the total area. Recent clinical study has shown that the level of $TcPO_2$ is significantly improved from 4 weeks to 12 weeks after SVF injection in 10 patients with a severe ischemic diabetic foot. These result showed that the injection of SVF accelerates the angiogenesis and enhances the microcirculation. On the other hands, a study on the efficacy of SVF for prevention of abdominal incision scar is still on-going. In addition to indications mentioned above, we are currently investigating efficacy and safety of SVF on disc degeneration. In this ongoing study, we targeted 10 disc degenerative patients who were eligible for posterior lumbar interbody fusion and applied autologous adipose derived SVF with bone graft materials. We are evaluating fusion rate, ODI and safety and briefly report its interim results. Based on this interim results, we will be able to discuss about potential of SVF application as a DDD treatment option.

MEMO

Session II

좌장: 서울대 치의학대학원 **오 석 배**

인하의대 의생명학 **최 병 현**

CURRICULUM VITAE

Yong Ho Kim, PhD

Assistant Professor, SPaC Lab/Sensory Physiology and Cognition Lab
Department of Physiology, Gachon University College of Medicine,
Incheon, Korea

Education

2006~2012 MS. & PhD. integrated course in Department of Physiology, School of Dentistry, Seoul National University, Korea (Supervisor: DDS/PhD. Professor. Seog Bae Oh)

2001~2006 BS. Department of life science, Myoung Ji University, Seoul, Korea

Research Experience

2016~Present Assistant Professor, Department of Physiology, College of Medicine, Gachon University.

2012~2016 Postdoctoral Researcher, School of Dentistry, Seoul National University, Seoul, Korea

2013~2013 Postdoctoral Visiting Scientist, National Institute for Physiological Sciences, Japan. (Lab of Dr. Hidemasa Furue)

2008~2009 Exchange Graduate Student, University of Manchester, UK (Lab of Dr. Alan North; supervised by Dr. Joan Sim)

2002~2004 Research Assistant, Biotechnology lab, Myoung Ji University, Seoul, Korea

Honors and Awards

2001~2004 Departmental Honors, Myoung Ji University, Seoul, Korea

2006 Graduate with honors, Myoung Ji University, Seoul, Korea

2006 Oral Presentation Awards, 9th Annual Meeting of the Korean Society for Brain and Neural Science

2007 Research Day Awards, School of Dentistry, Seoul National University, Seoul, Korea

2008~2009 Seoul Science Fellowship, Seoul, Korea

2008 Pre-doctoral Fellowship, International collaboration grant Supported by Korea Research Foundation

2009 Research Day Awards, School of Dentistry, Seoul National University, Seoul, Korea

2011 Outstanding Research Award, the 4th Asian pain symposium, Shanghai

2011 AKN Research Award in American society for neuroscience meeting, Association of Korean Neuroscientists Meeting, Washington D.C

2012 Outstanding Research Award, School of Dentistry, Seoul National University, Seoul, Korea

2013~2018 President's Postdoctoral Fellowship, National Research Foundation of Korea

14:20-14:40

Novel Strategies for Inhibiting TRPV1 Activation in Animal Models of Pain

Yong Ho Kim, PhD

Department of Physiology, Gachon University College of Medicine, Incheon, Korea

Transient Receptor Potential Vanilloid 1 (TRPV1) is a non-selective Ca^{2+}-permeable cation channel that can be activated in peripheral terminals of nociceptive fibers by diverse stimuli including noxious heat, protons, and chemicals such as capsaicin or resiniferatoxin (RTX). It is a key molecule involved in the development of peripheral and central sensitization contributes to chronic pain. Recently, several studies reported that TRPV1 antagonists are potential drugs for pain treatment. However, it has an obstacle for drug development due to side effects such as hyperthermia and the increase in heat pain threshold. Here, we suggest novel strategies for inhibiting TRPV1 activation without side effects. First, we can develop activation modality-specific TRPV1 antagonists since the hyperthermic effect has the highest sensitivity to the extent of TRPV1 blockade in the proton mode. Second, we can also modulate TRPV1 indirectly using receptor-mediated inhibition mechanisms such as ChemR23/GPR37-dependent inhibition of TRPV1 in nociceptive neurons. Third, we could control TRPV1 functional expression by modulating TRPV1 membrane trafficking in primary nociceptive neurons. Finally, inhibition of spinal TRPV1 can alleviate mechanical pain while avoiding the hyperthermic side effect of systemic treatment. In conclusion, novel strategies and approaches to develop the next generation of mode-specific TRPV1 antagonists are required since the full adoption of TRPV1 antagonists into clinical practice would depend on the development of effective measures to counter drug-induced hypertherm.

MEMO

CURRICULUM VITAE

ABDOLRAHMAN OMIDINIA-ANARKOLI, PhD

DWI-Leibniz Institute for Interactive Materials, Forckenbeck Straße. 50,
Aachen 52074, Germany
E_mail: Omidinia@dwi.rwth-aachen.de

2014~present	DWI Leibniz Institute for Interactive Materials TH University, Aachen, Germany PhD. in Chemical Engineering Thesis Topic: Fiber spinning for tissue engineering applications Supervisor: Prof. Dr.-Ing. Laura De Laporte
2011~2013	Isfahan University of Technology, Isfahan, Iran M.Sc. in Chemical Engineering Thesis Title: Fabrication and morphological study of electrospun Poly (vinyl alcohol)-Gelatin -Sodium alginate nanofibers for tissue engineering applications Supervisor: Prof. Saied Nouri Khorasani
2006~2010	Shahreza Azad University, Isfahan, Iran B.Sc. in Chemical Engineering

PUBLICATIONS

A. Omidinia Anarkoli, J. Ephraim, L. De Laporte. SAS fibers regulate nerve cellular behavior. In preparation.

A. Omidinia Anarkoli, R. Rimal, Y. Chandorkar, D. Gehlen, J. Rose, K. Rahimi, T. Haraszti, L. De Laporte. Solvent Induced Nanotopographies of Single Microfibers Regulate Cell Mechanotransduction. ACS Applied Materials and Interfaces, 2019.

A. Omidinia Anarkoli, U. Tuvshindorj, S., J. Rose, T. Haraszti, L. De Laporte. An injectable hybrid hydrogel with oriented short fibers induces unidirectional growth of functional nerve cells. Small, 2017.

M. Mehrasa, A. Omidinia Anarkoli, M. Rafienia, N. Ghasemi, N. Davary, S. Bonakdar, M. Naeimi, M. Agheb, M. Reza Salamat. Incorporation of zeolite and silica nanoparticles into electrospun PVA/collagen nanofibrous scaffolds: The influence on the physical, chemical properties and cell behavior. International Journal of Polymeric Materials and Polymeric Biomaterials, 2016.

A. Omidinia Anarkoli, S. Nouri Khorasani, M. Pezeshki Modaress. Morphological Characterization of Blended Polyvinyl alcohol/Sodium Alginate Electrospun Nanofibers: Effects of Polyvinyl alcohol with Two Different Molecular Weight (Abstract Article). Artificial Organs, 2013. 2

13:15-13:30

Injectable Biomaterial Therapy to Align Regenerating Nerves after Spinal Cord Injury

ABDOLRAHMAN OMIDINIA-ANARKOLI, PhD

DWI, Aachen University, Germany

To regenerate complex tissues with an oriented extracellular matrix (ECM), such as the spinal cord, injectable hydrogels, which can be applied in a minimally invasive manner and yet provide structural guidance, are required. While most injectable hydrogels consist of an isotropic network, we recently developed the Anisogel, a tunable, injectable hydrogel system, which allows precise engineering of the construct's anisotropy in situ after injection. The Anisogel comprises a soft hydrogel surrounding short rod-shapes elements, which orient in the direction of a low external magnetic field (~50 mT), before complete gelation of the enclosing matrix. For example, fibers are rendered magnetic by incorporating a low amount of superparamagnetic iron oxide nanoparticles (SPIONs) and cut short using a cryotome device. They are produced via a high-throughput Solvent Assist Spinning (SAS) technique, which enables continuous fiber production with variable diameter (1-50 µm) and, notably, precise surface morphology. Depending on the employed solvent type, microfibers with smooth, grooved, or porous surface topography can be fabricated using the SAS method. In addition, the topography properties, such as the pore size and aspect ratio, and the groove width, can be tuned. Therefore, the Anisogel provides control over the anisotropic structure of the 3D microenvironment at two different scales: (i) the macroscopic unidirectional architecture resulting from the microscale oriented fibers (diameter ~5-7 µm, length= 100 µm) and (ii) the nano-micro anisotropic features, induced by the surface morphology of the fibers. While the unidirectional macroscopic structure of the hydrogel prompts linear nerve growth inside the Anisogels, short fibers with grooved morphology (grooves width ~1-2 µm) lead to an increase in neurite length. Importantly, we demonstrate for the first time that the 3D Anisogel supports spontaneous neural signal propagation in the direction of the oriented fibers. This newly designed hydrogel overcomes one of the main limitations of the existing injectable regenerative biomaterials and fills a major need in the field. It can be applied as a therapeutic material and as a tool to investigate the effect of different design parameters of an anisotropic matrix on physiological and pathological processes *in vivo*.

MEMO

CURRICULUM VITAE

Ki-Bum Lee, PhD

Department of Chemistry & Chemical Biology,
Inst. for Advanced Materials, Devices & Nanotech.
The Rutgers Stem Cell Research Center, Rutgers, The State University of New Jersey
123 Bevier Road, Piscataway, NJ 08854-8087

EDUCATION

2004~2007	PhD. Chemical Biology (Advisor: Peter G. Schultz) The Scripps Research Institute, La Jolla, CA
2004	MS. Bioinorganic/Nano Chem (Advisor: Chad A. Mirkin) Northwestern University, Evanston, IL
2000	Physical Chemistry, KAIST (Korea Advanced Institute of Science and Technology), Korea
1998	BS. Chemistry, Kyung Hee University, Seoul, Korea

ACADEMIC POSITION

2016~Present	Professor
2013~2016	Associate Professor (with tenure)
2008~2013	Assistant Professor
	Rutgers, The State University of New Jersey, Piscataway, NJ
	Department of Chemistry and Chemical Biology
	Rutgers faculty in the following Programs, Depts, and Institutes:
	Biomedical Engineering Dept. Graduate Program (2008-present)
	Graduate Program in Molecular Biosciences (2009-present)
	The Rutgers Stem Cell Research Center (2008-present)
	Human Genetics Institute of New Jersey (2014-present)
	Rutgers Brain Health Institute (2015-present)
	New Jersey Center for Biomaterials (RUNEG) (2015-present)
	Center for Integrative Proteomics Research (2016-present)
	Quantitative Biomedicine Graduate Program (2016-present)
	Cancer Institute of New Jersey (Full Member) (2018-present)
	Chemical and Biochemical Engineering Department (2019-present)
2017	Visiting Professor
	Kyoto University, Kyoto, Japan [Japan Society for the Promotion of Science (JSPS) Fellowship]
2013	Visiting Professor
	Princeton University (Princeton Neuroscience Institute)
	Biophysics and Computation in Neurons and Networks
2007	Visiting Professor
	UCLA Medical School, Los Angeles, CA
	Department of Molecular and Medical Pharmacology

15:10-15:30

Biodegradable Hybrid Nanoscaffolds to Advance In Vivo Drug Delivery and Stem Cell-based Therapeutics in CNS injuries

Ki-Bum Lee, PhD

Department of Chemistry & Chemical Biology, The State University of New Jersey, USA

This presentation will focus on the interface between nanoscience and stem cell biology. Even though it is well established that stem cell fate is controlled by interactions that occur between microenvironment cues and intrinsic cellular programs, our understanding of the function of the microenvironment in stem cells is hampered by the limitations of conventional methods and the lack of extensive knowledge of multiple regulatory signals.

Addressing these challenges, the main goals of our recent research program are: (i) to develop a multifunctional/biodegradable nanomaterial-based bioscaffold technology platform for spatiotemporally controlled delivery of therapeutic molecules *in vivo*; (ii) to incorporate nanomaterial-based bioscaffold to aid in enhanced transplantation of patient-derived neural stem cells (NSCs); and (iii) to evaluate the combined therapeutic effects of spatiotemporal delivery of therapeutic molecules and stem cell therapy for the effective treatment of central nervous system (CNS) injury using a rodent SCI model. A similar approach includes combinatorial nanoarrays of hybrid nanostructures using chemically modified graphenes and Biodegradable Hybrid Nanoscaffolds (BHI), which were developed and utilized to deliver genetic materials into stem cells for controlling their neural-differentiation pathways and neuronal behaviors in vitro and *in vivo*.

In this presentation, a summary of the most updated results from these efforts and future directions will be discussed.

KEYWORDS: Bio-inspired Hybrid Nanomaterials, Stem Cell Differentiation, and Neuro-degenerative Medicine

MEMO

CURRICULUM VITAE

전 상 용

근무처: 울산대학교 의과대학 서울아산병원 신경외과 교수

학력 사항

1982~1984	서울대학교 의과대학 의예과
1984~1988	서울대학교 의과대학 의학사
1994~1996	서울대학교 의과대학 의학석사
1996~2001	서울대학교 의과대학 의학박사

경력 사항

1988~1989	서울대학교병원 인턴
1992~1996	서울대학교병원 레지던트
1996~1997	서울대학교병원 전임의
1997~1999	아산재단 서울아산병원 전임의
1999~2001	울산대학교 의과대학 서울아산병원 신경외과 전임강사
1999~1999	Henry Ford Hospital, Detroit, USA 단기연수
2001~2006	울산대학교 의과대학 서울아산병원 신경외과 조교수
2002~2003	University of Southern California 연수
2006~2011	울산대학교 의과대학 서울아산병원 신경외과 부교수
2011~현재	울산대학교 의과대학 서울아산병원 신경외과 교수

15:35-15:55

Can Optogenetics Replace DBS Surgery in Parkinson's Disease?

Sang Ryong Jeon, MD, PhD

Depatment of Neurological Surgery, ASAN Medical Center, University of Ulsan College of Medicine, Seoul, Korea

Deep brain stimulation (DBS) is being widely performed in patients with advanced Parkinson's disease (PD). Given the nature of electricity, electrical DBS can stimulate neurons adjacent to the target site, which elicit nonspecific stimulation and resulting undesirable side effects. Furthermore, high tesla MRI, which is actively developing nowadays, has a barrier to be used in DBS patients due to metal components of DBS electrode and cable.

In these reasons, next generation CNS modulation method is necessary. Optogenetics has the characteristics of switch on-off in action potential of neurons by certain wave length light and theoretically can target specific neuron. Optic fiber is not metal also. Therefore, the authors studied the possibility of replacement DBS surgery using optogenetic technique. 6-Hydroxydopamine (6-OHDA)-induced hemiparkinsonian rats were injected with halorhodopsin carrying virus, received optic fiber insertion and illuminated with 590 nm of light. We verified therapeutic effect of PD in subthalamic nucleus (STN), entopeduncular nucleus (EP, homologous to primates' GPi) targets, and even for L dopa induced dyskinesia.

To develope the optogenetic modulation as clinically useful device, there are several practical obstacles including neuron specific promoter, implantable light source as well as clarification of safety of long term optic stimulation. However, this methodology has very superior advantages compared to current DBS system. We expect optogenetic modulation could be introduced in clinics in the future.

MEMO

Session III

좌장: 강원대학교병원 신경외과 **김 충 효**

서울대 화학생물공학부 **김 병 수**

CURRICULUM VITAE

Young-Il Yang, PhD

Paik Institute for Clinical Research and Department of Pathology,
Inje University School of Medicine, Busan, Korea
E-mail: pathyang@inje.ac.kr

EDUCATION

1983-1989	MD. Inje University School of Medicine, Busan, Korea
1991~1993	MS. Department of Pathology, Inje University School of Medicine, Busan, Korea (Advisor: Dr. Jong-Eun Joo) Thesis: Prognostic Implications of DNA Ploidy and S-phase Fraction Comparing with Other Prognostic Factors in Advanced Colorectal Adenocarcinomas
1995~1999	PhD. Department of Pathology, Dong-Guk University School of Medicine, Seoul, Korea (Advisor: Dr. Jong-Ran Kim) Thesis: The Correlation of Intracellular HBcAg Expression with Mutations in the Basal Core Promoter and Precore Regions in Chronic Hepatitis B

ACADEMIC AND PROFESSIONAL EXPERIENCES

2003~Present	Director. Cell & Gene Therapy Lab. Paik-Inje Clinical Research, Inje University, Busan, Korea
2004~Present	Professor. Department of Pathology, Inje University School of Medicine, Busan, Korea
2004~Present	Director. Paik Institute for Clinical Research School of Medicine, Inje University, Busan, Korea
2005~Present	Professor, Musculoskeletal & CNS Division, Department of Pathology, Busan Paik Hospital, Inje University, Busan, Korea

16:10-16:30

Neurotrophic Effect of Dedifferentiated Schwann Cells with Neural Crest Stem Cell-Like Properties on the Injured Spinal Cord

Young-Il Yang, PhD

Department of Pathology, Inje University School of Medicine, Busan, Korea

The neural crest stem cells (NCSCs) are an embryonic cell population that generates diverse progenies from peripheral neuroglia to mesenchymal cells. Compelling evidence indicates the persistence of NCSCs in various adult tissues, where they therefore contribute to postnatal neurogenesis and gliogenesis. However, it is still unclear regarding the existence of NCSC-like cells in the adult peripheral nerve (PN). Here, we succeeded in reprogramming Schwann cells (SCs) into dedifferentiated SCs (dSCs) with NCSC-like hallmarks *in vitro* using a 3-dimensional hydrogel-supported organ culture of sciatic nerve, and then isolated these NCSC-like stem cells. Isolated dSCs displayed an embryonic NCSC-like phenotype at the mRNA- and protein-level. They maintained their capacity for continuous cell turnover, clonogenicity, and spheroid formation in vitro, indicative of uncommitted NC lineage cells. Intriguingly, dSCs expressed neurotrophic mRNAs and neurotrophic factors that induced cell proliferation and neuritogenesis of neural stem cells. Transplanted dSCs evidently improved the structural and functional recovery of the injured cord by the secretion of a set of neurotrophic factors. Overall, dSCs could be used as a promising tool for regenerative therapeutics.

MEMO

CURRICULUM VITAE

Ying Ding, PhD

Department of Histology and Embryology, Zhongshan School of Medicine,
Sun Yat-sen University, Guangzhou, Guangdong, China

Ying Ding, PhD. is Associate Professor, Master/Doctor's Supervisor, Department of Histology and Embryology, Zhongshan School of Medicine, Sun Yat-Sen University. She is a member of the Guangdong Provincial Anatomical Society Council, the Guangdong Provincial Rehabilitation Medicine Association and the Guangdong Provincial Experimental Medicine Professional Committee of Chinese and Western Medicine Association. Her research mainly focuses on the stem cells therapy for spinal cord injury and the mechanism of tissue engineering stem cells-derived neural network transplantation combined with electroacupuncture treatment repairing spinal cord injury. So far, she has obtained some grants from National Natural Science Foundation and the Natural Science Foundation of Guangdong Province. She has totally published 24 SCI-E papers.

Education

2004~2009	PhD. Department of Histology and Embryology, Zhongshan School of Medicine, Sun Yat-Sen University, China Thesis Topic: Electroacupuncture Promotes the Differentiation of TrkC Gene Modified Bone Marrow Mesenchymal Stem Cells into Neurons in Injured Spinal Cord
1999~2002	Master of Medicine, Department of Histology and Embryology, Zhongshan School of Medicine, Sun Yat-Sen University, China Thesis Topic: Co-transplantation of Schwann Cells Promotes the Survival and Differentiation of Neural Stem Cells Transplanted into the Injured Spinal Cord
1994~1999	Bachelor of Medicine, Medical College of Weifang, China

Teaching Experience

2011~present	Associate Professor, Department of Histology and Embryology, Zhongshan School of Medicine, Sun Yat-Sen University, China
2015~2016	Visiting scholar, The Spinal Cord and Brain Injury Research Group, Stark Neurosciences Research Institute, Department of Neurological Surgery, Indiana University School of Medicine, China
2006~2011	Lecturer, Department of Histology and Embryology, Zhongshan School of Medicine, Sun Yat-Sen University, China
2002~2005	Teaching assistant, Department of Histology and Embryology, Zhongshan School of Medicine, Sun Yat-Sen University, China

16:35-16:55

Targeting mTOR Substrate S6 Kinase 1 for Spinal Cord Injury Repair

Ying Ding, PhD

Department of Histology and Embryology, Zhongshan School of Medicine, Sun Yat-sen University, Guangzhou, Guangdong, China

The mammalian target of rapamycin (mTOR) positively regulates axon growth in the mammalian central nervous system (CNS). Although axon regeneration and functional recovery from CNS injuries are typically limited, knockdown or deletion of PTEN, a negative regulator of mTOR, increases mTOR activity and induces robust axon growth and regeneration. It has been suggested that inhibition of S6 kinase 1 (S6K1, gene symbol: RPS6KB1), a prominent mTOR target, would blunt mTOR's positive effect on axon growth. In contrast to this expectation, we demonstrate that inhibition of S6K1 in CNS neurons promotes neurite outgrowth *in vitro* by twofold to threefold. Biochemical analysis revealed that an mTOR-dependent induction of PI3K signaling is involved in mediating this effect of S6K1 inhibition. Importantly, treating female mice *in vivo* with PF-4708671, a selective S6K1 inhibitor, stimulated corticospinal tract regeneration across a dorsal spinal hemisection between the cervical 5 and 6 cord segments (C5/C6), increasing axon counts for at least 3 mm beyond the injury site at 8 weeks after injury. Concomitantly, treatment with PF-4708671 produced significant locomotor recovery. Pharmacological targeting of S6K1 may therefore constitute an attractive strategy for promoting axon regeneration following CNS injury, especially given that S6K1 inhibitors are being assessed in clinical trials for non-oncological indications.

MEMO

CURRICULUM VITAE

Kyoung-Tae Kim, MD, PhD

Associate professor, Department of Neurosurgery,
Kyungpook National University School of Medicine, Daegu, Korea

EDUCATION/TRAINING

1996~2002 MD. Chung-Ang University School of Medicine, Seoul, Korea
2008~2011 PhD. Chung-Ang University Graduate School of Medicine, Seoul, Korea

Personal Statement

I am a neurosurgeon with advanced training in spine surgery and also a PhD in neuroscience. I am working as an associate professor in the Department of Neurosurgery, Kyungpook National University (KNU) and Kyungpook National University Hospital (KNUH). The KNUH has one of the biggest trauma emergency centers in Korea. My practice is focused on the management of adult degenerative spine and spinal cord injury (SCI). As a neuroscientist and principal investigator at KNU, I run an active basic/clinical research program. Also, I worked as a visiting professor at the International Collaboration on Repair Disorders (ICORD), University of British Columbia (UBC).

Positions and Employment

2002~2003 Internship, Chung-Ang University Hospital, Seoul, Korea
2003~2007 Residency, Department of Neurosurgery, Chung-Ang University Hospital, Seoul, Korea
2008~2010 Spine Fellow, Department of Neurosurgery, Chung-Ang University Hospital, Seoul, Korea
2010~2011 Clinical Instructor, Department of Neurosurgery, Chung-Ang University Hospital, Seoul, Korea
2011~2017 Assistant Professor, Department of Neurosurgery, Kyungpook National University School of Medicine, Daegu, Korea
2017~2019 Visiting Professor, International Collaboration on Repair Disorders (ICORD), UBC, Vancouver, Canada
2017 Associate Professor, Department of Neurosurgery, Kyungpook National University School of Medicine, Daegu, Korea

17:00-17:20

Translational Research in Spinal Cord Injury

Kyoung-Tae Kim, MD, PhD

Department of Neurosurgery, Kyungpook National University, Daegu, Korea

Traumatic spinal cord injury (SCI) researchers have mainly used rat and mice for in vivo SCI experiments. Such small rodent SCI models are invaluable for the field, and much has been learned about the biologic and physiologic aspects of SCI from these models. However, it has been difficult to reproduce the efficacy of treatments found to produce neurologic benefits in rodent SCI models when these treatments are tested in human clinical trials. A larger animal model may have advantages for translational research, as it has anatomical similarities with humans that may be more relevant for pre-clinically evaluating novel therapies. Here, we review work done in our large animal model of SCI that employs the Yucatan miniature pigs. This large animal SCI model may be a useful intermediary in the pre-clinical testing of novel pharmacological treatments and cell-based therapies, and also for "bedside back to bench" translation of human clinical observations that require testing in an applicable animal model.

MEMO

CURRICULUM VITAE

Junyoung Lim, PhD

3D-Innovation Center, CGBio, Co., Ltd., South Korea

Junyoung Lim is currently working as a Center chief of 3D-innovation center at CGbio from 2016. He worked in Planning Department 3D Printing Medical Devices based on Metal at Medyssey from 2014 to 2016. And he worked in R&D of Medical Devices Regulation at KMDIA from 2010 to 2014.

17:25-17:35

Application of Bio-Ceramic (BGS-7) Based on Additive Manufacturing

Junyoung Lim, PhD

3D-Innovation Center, CGBio, Co., Ltd., South Korea

Introduction: The defects of the bone tissue are manifested by inherited or acquired factors, and acquired bone tissue damage can be caused not only by degenerative diseases caused by aging but also by accidents such as traffic accidents and leports. Development of artificial tissue and replacement for bone tissue is very important because the defect of bone tissue may cause secondary damage to other organs. Especially, cheekbones defect has a lot of aesthetic effects, which can lead to deterioration of quality of life. Therefore, research and development of artificial tissue for reconstruction of cheekbones should be continuously performed.

Methods: It is the apatite-wollastonite crystallized glass developed by Kokubo in 1982 that took advantage of bioactive glass and hydroxyapatite ceramics. Biologically active crystallized glass (BGS-7) has a property of directly binding to bone and has better bioactivity than calcium phosphate-based ceramics. However, above all, it is superior in strength to hydroxyapatite ceramics, which is the most widely used bioactive ceramics, and has similar physical properties to the above-mentioned apatite-wollastonite crystallized glass. Especially, commercialization of a part to withstand loads such as spacers It is a very favorable material. We have tried ceramics for cheek bone defect patients through 3D printing.

Results: BGS-7 is effective in promoting mechanical stability at the transplant site and has a wide range of human body due to its direct attachment to the surrounding bone. Since BGS-7 binds to the bone by surface reaction after transplantation, it is preferable that the BGS-7 be grafted to the bone defect site as customized. Since the conventional ceramic manufacturing technology can not satisfy both the anatomical custom design and the mechanical characteristics, it has been suggested as an alternative to the manufacturing of the customized medical device using the ceramic. Since it is a medical device manufactured by modeling based on a medical image of a patient, it is possible to improve the satisfaction to both the medical person and the patient, such as shortening the operation time and aesthetic improvement compared to the ready-made article. Clinical application of customized medical devices to patients with defects in cheekbone through 3D printing, satisfying anatomical and clinical requirements.

Conclusion: At present, 3D printing customized medical devices using mostly metals are being applied to clinical applications. Recently, 3D printing applications of bioactive materials have been studied in order to

overcome the disadvantages of inactive materials, and customized medical devices through printing of bioactive crystallization glass, BGS-7, have shown clinically very useful results. With 3D printing technology, it is possible to make bone model, fracture guide and aggregate implant in a short period of time, and it is possible to minimize the operation time and complications by pre-operation simulation. In addition, it will be possible to create new added value in accordance with application fusion technology development and mass production technology.

MEMO

MEMO

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