编号：YY001-20221107001

标题：Faecal haemoglobin concentrations in women and men diagnosed with colorectal cancer in a national screening programme

简介：Objective: There is evidence that colorectal cancer screening using faecal haemoglobin is less effective in women than men. The faecal haemoglobin concentrations were therefore examined in women and men with screen-detected colorectal cancer. Setting: Scottish Bowel Screening Programme, following the introduction of a faecal immunochemical test from November 2017, to March 2020. Methods: Data were collated on faecal haemoglobin concentrations, pathological stage and anatomical site of the main lesion in participants who had colorectal cancer detected. The data in women and men were compared. Results: For the faecal haemoglobin concentrations studied (>80 μg Hb/g faeces), the distributions indicated lower concentrations in women. Marked differences were found between women and men diagnosed with colorectal cancer. The median faecal haemoglobin concentration for women (n = 720) was 408 μg Hb/g faeces compared to 473 μg Hb/g faeces for men (n = 959) (p = 0.004) and 50.6% of the results were >400 μg Hb/g faeces in women; in men, this was 57.8%. The difference in faecal haemoglobin concentrations in women and men became less statistically significant as stage advanced from stages I-IV. For right-sided, left-sided and rectal colorectal cancer, a similar gender difference persisted in all sites. Differences in faecal haemoglobin between the genders were significant for left-sided cancers and stage I and approached significance for rectal cancers and stage II, but all sites and stages showed lower median faecal haemoglobin concentrations for women. Conclusions: To minimise gender inequalities, faecal immunochemical test-based colorectal cancer screening programmes should evaluate a strategy of using different faecal haemoglobin concentration thresholds in women and men.

全文链接：https://pan.ckcest.cn/rcservice//doc?doc_id=107402

编号：YY001-20221107002

标题：Decreased haemoglobin levels are associated with lower muscle mass and strength in kidney transplant recipients

简介：Background: Post-transplant anaemia and reduced muscle mass and strength are highly prevalent in kidney transplant recipients (KTRs). Decreased haemoglobin levels, a marker of anaemia, could adversely affect muscle mass and strength through multiple mechanisms, among others, through diminished tissue oxygenation. We aimed to investigate the association between haemoglobin levels with muscle mass and strength in KTRs. Methods: We included stable KTRs from the TransplantLines Biobank and Cohort study with a functional graft ≥1 year post-transplantation. Muscle mass was assessed using 24 h urinary creatinine excretion rate (CER) and bioelectrical impedance analysis (BIA). Muscle strength was assessed with a handgrip strength test using a dynamometer and, in a subgroup (n = 290), with the five-times sit-to-stand (FTSTS) test. We used multivariable linear and logistic regression analyses to investigate the associations of haemoglobin levels with muscle mass and strength. Results: In 871 included KTRs [median age 58 (interquartile range (IQR), 48-66)] years; 60% men; eGFR 51 ± 18 mL/min/1.73 m2) who were 3.5 (1.0-10.2) years post-transplantation, the mean serum haemoglobin level was 13.9 ± 1.8 g/dL in men and 12.8 ± 1.5 g/dL in women. Lower haemoglobin levels were independently associated with a lower CER (std. β = 0.07, P = 0.01), BIA-derived skeletal muscle mass (std. β = 0.22, P < 0.001), handgrip strength (std. β = 0.15, P < 0.001), and worse FTSTS test scores (std. β = -0.17, P

= 0.02). KTRs in the lowest age-specific and sex-specific quartile of haemoglobin levels had an increased risk of being in the worst age-specific and sex-specific quartile of CER (fully adjusted OR, 2.09; 95% CI 1.15-3.77; P = 0.02), handgrip strength (fully adjusted OR, 3.30; 95% CI 1.95-5.59; P < 0.001), and FTSTS test score (fully adjusted OR, 7.21; 95% CI 2.59-20.05; P < 0.001). Conclusions: Low haemoglobin levels are strongly associated with decreased muscle mass and strength in KTRs. Future investigation will need to investigate whether maintaining higher haemoglobin levels may improve muscle mass and strength in KTRs.

全文链接：https://pan.ckcest.cn/rcservice//doc?doc_id=107403

编号：YY001-20221107003

标题：Maternal haemoglobin levels in pregnancy and child DNA methylation: a study in the pregnancy and childhood epigenetics consortium

简介：Altered maternal haemoglobin levels during pregnancy are associated with pre-clinical and clinical conditions affecting the fetus. Evidence from animal models suggests that these associations may be partially explained by differential DNA methylation in the newborn with possible long-term consequences. To test this in humans, we meta-analyzed the epigenome-wide associations of maternal haemoglobin levels during pregnancy with offspring DNA methylation in 3,967 newborn cord blood and 1,534 children and 1,962 adolescent whole-blood samples derived from 10 cohorts. DNA methylation was measured using Illumina Infinium Methylation 450K or MethylationEPIC arrays covering 450,000 and 850,000 methylation sites, respectively. There was no statistical support for the association of maternal haemoglobin levels with offspring DNA methylation either at individual methylation sites or clustered in regions. For most participants, maternal haemoglobin levels were within the normal range in the current study, whereas adverse perinatal outcomes often arise at the extremes. Thus, this study does not rule out the possibility that associations with offspring DNA methylation might be seen in studies with more extreme maternal haemoglobin levels.

全文链接：https://pan.ckcest.cn/rcservice//doc?doc_id=107384

编号：YY001-20221107004

标题：Haemoglobin transfusion threshold in traumatic brain injury optimisation (HEMOTION): a multicentre, randomised, clinical trial protocol

简介：Introduction: Traumatic brain injury (TBI) is the leading cause of mortality and long-term disability in young adults. Despite the high prevalence of anaemia and red blood cell transfusion in patients with TBI, the optimal haemoglobin (Hb) transfusion threshold is unknown. We undertook a randomised trial to evaluate whether a liberal transfusion strategy improves clinical outcomes compared with a restrictive strategy. Methods and analysis: HEMOglobin Transfusion Threshold in Traumatic Brain Injury OptimizatiON is an international pragmatic randomised open label blinded-endpoint clinical trial. We will include 742 adult patients admitted to an intensive care unit (ICU) with an acute moderate or severe blunt TBI (Glasgow Coma Scale ≤12) and a Hb level ≤100 g/L. Patients are randomly allocated using a 1:1 ratio, stratified by site, to a liberal (triggered by Hb ≤100 g/L) or a restrictive (triggered by Hb ≤70 g/L) transfusion strategy applied from the time of randomisation to the decision to withdraw life-sustaining therapies, ICU discharge or death. Primary and secondary outcomes are assessed centrally by trained research personnel blinded to the intervention. The primary outcome is the Glasgow Outcome Scale

extended at 6 months. Secondary outcomes include overall functional independence measure, overall quality of life (EuroQoL 5-Dimension 5-Level; EQ-5D-5L), TBI-specific quality of life (Quality of Life after Brain Injury; QOLIBRI), depression (Patient Health Questionnaire; PHQ-9) and mortality. Ethics and dissemination: This trial is approved by the CHU de Québec-Université Laval research ethics board (MP-20-2018-3706) and ethic boards at all participating sites. Our results will be published and shared with relevant organisations and healthcare professionals.
全文链接：https://pan.ckcest.cn/rcservice//doc?doc_id=107385

编号：YY001-20221107005
标题：Haemoglobin value and red blood cell transfusions in prolonged weaning from mechanical ventilation: a retrospective observational study
简介：Introduction: The role of haemoglobin (Hb) value and red blood cell (RBC) transfusions in prolonged weaning from mechanical ventilation (MV) is still controversial. Pathophysiological considerations recommend a not too restrictive transfusion strategy, whereas adverse effects of transfusions are reported. We aimed to investigate the association between Hb value, RBC transfusion and clinical outcome of patients undergoing prolonged weaning from MV. Methods: We performed a retrospective, single-centred, observational study including patients being transferred to a specialised weaning unit. Data on demographic characteristics, comorbidities, current and past medical history and the current course of treatment were collected. Weaning failure and mortality were chosen as primary and secondary endpoint, respectively. Differences between transfused and non-transfused patients were analysed. To evaluate the impact of different risk factors including Hb value and RBC transfusion on clinical outcome, a multivariate logistic regression analysis was used. Results: 184 patients from a specialised weaning unit were analysed, of whom 36 (19.6%) failed to be weaned successfully. In-hospital mortality was 18.5%. 90 patients (48.9%) required RBC transfusion during the weaning process, showing a significantly lower Hb value (g/L) (86.3±5.3) than the non-transfusion group (95.8±10.5). In the multivariate regression analysis (OR 3.24; p=0.045), RBC transfusion was associated with weaning failure. However, the transfusion group had characteristics indicating that these patients were still in a more critical state of disease. Conclusions: In our analysis, the need for RBC transfusion was independently associated with weaning failure. However, it is unclear whether the transfusion itself should be considered an independent risk factor or an additional symptom of a persistent critical patient condition.
全文链接：https://pan.ckcest.cn/rcservice//doc?doc_id=107386

编号：YY001-20221107006
标题：Haemoglobin status to determine nutritional anaemia and its association with breakfast skipping and BMI among nursing undergraduates of Farasan Island, KSA
简介：The present study was conducted to determine nutritional anaemia using haemoglobin levels of female nursing undergraduates studying at Farasan Island with the purpose to intervene at a point, before the potential problems become serious later in life. In total, 130 apparently healthy, female students of Department of Nursing were recruited by a random sampling method to collect information on socio-demographic, lifestyle and anthropogenic characteristics, and dietary habits including breakfast skipping. Haemoglobin content was estimated using Sahli's Haemoglobinometer and observations were interpreted as per WHO's criteria for anaemia. Body

mass index (BMI) was recorded using a digital weighing machine. Correlation between haemoglobin concentration, breakfast skipping and body mass index of study participants was assessed by Pearson's correlation. Data analyses were done using Origin software. Overall, 51· 6 % (n = 67) students were all together anaemic with 28· 5 % (n = 37) had mild anaemia, 15· 4 % (n = 20) moderate and 7· 69 % (n = 10) had severe anaemia. Of these, 20· 8 % (n = 27) were underweight, 63· 8 % (n = 83) normal weight and 15· 4 % (n = 20) were above normal weight (over weight and obese). The Hb content showed a positive correlation with the BMI and exhibited an increasing trend with increase in the BMI among study participants (P < 0· 05). Questionnaire analyses revealed that the majority (96· 9 %, n = 126) of students were taking junk food as bulk of their meal. A strong negative correlation was recorded between Hb contents and breakfast skipping tendencies (r = -0· 987, P < 0· 05). Findings of the present study are of high significance for public health professionals and educators to prioritise actions that could motivate these future nurses to adapt healthy lifestyles to strategically combat nutritional anaemia.

全文链接：https://pan.ckcest.cn/rcservice//doc?doc_id=107387

编号：YY001-20221107007

标题：Association between haemoglobin concentration and intradialytic hypotension in patients undergoing maintenance haemodialysis: a retrospective cohort study

简介：Objectives: Haemoglobin concentration is a potentially modifiable factor that may help lower the risk of intradialytic hypotension (IDH), but its association with IDH is not well understood. This study aimed to clarify the relationship between haemoglobin concentration and IDH. Design: Retrospective cohort study. Setting: We evaluated patients undergoing maintenance haemodialysis in December 2017 at Rakuwakai Otowa Kinen Hospital. Participants: A total of 543 patients were included. We defined exposure according to the following five categories depending on haemoglobin concentrations by 1.0 increments: <9.0, ≥9.0 to <10.0, 10.0 to <11.0, ≥11.0 to <12.0 and ≥12.0 g/dL. Primary outcome measure: The primary outcome of interest was the development of IDH, defined as any nadir <100 mm Hg if the pre-dialysis systolic blood pressure (SBP) was ≥160 mm Hg or any nadir <90 mm Hg if the pre-dialysis SBP was <160 mm Hg (IDHnadir). Results: Overall, IDHnadir occurred in 14.3% (465/3250) of the sessions. With a haemoglobin concentration of ≥10.0 to <11.0 g/dL set as reference, the adjusted ORs for IDHnadir were 0.82 (95% CI, 0.32 to 2.15), 1.16 (95% CI, 0.56 to 2.39), 1.26 (95% CI, 0.68 to 2.36) and 3.01 (95% CI, 1.50 to 6.07) for haemoglobin concentrations of <9.0, ≥9.0 to <10.0, ≥11.0 to <12.0 and ≥12.0 g/dL, respectively. In the cubic spline analysis, a high haemoglobin concentration was associated with the development of IDHnadir. Conclusion: High haemoglobin concentration is associated with IDH, and thus, the upper limit of haemoglobin concentration should be closely monitored in patients with IDH.

全文链接：https://pan.ckcest.cn/rcservice//doc?doc_id=107388

编号：YY001-20221107008

标题：Utility of pre-operative haemoglobin concentration to guide peri-operative blood tests for hip and knee arthroplasty: A decision curve analysis

简介：Objective: Assess the prognostic value of pre-operative haemoglobin concentration (Hb) for identifying patients who develop severe post-operative anaemia or require blood transfusion following primary total hip or knee, or unicompartmental knee arthroplasty (THA, TKA, UKA).

Background: Pre-operative group and save (G&S), and post-operative Hb measurement may be unnecessary for many patients undergoing hip and knee arthroplasty provided individuals at greatest risk of severe post-operative anaemia can be identified. Methods and materials: Patients undergoing THA, TKA, or UKA between 2011 and 2018 were included. Outcomes were post-operative Hb below 70 and 80 g/L, and peri-operative blood transfusion. Logistic regression assessed the association between pre-operative Hb and each outcome. Decision curve analysis compared strategies for selecting patients for G&S and post-operative Hb measurement. Results: 10 015 THA, TKA and UKA procedures were performed in 8582 patients. The incidence of blood transfusion (4.5%) decreased during the study. Using procedure specific Hb thresholds to select patients for pre-operative G&S and post-operative Hb testing had a greater net benefit than selecting all patients, no patients, or patients with pre-operative anaemia. Conclusions: Pre-operative G&S and post-operative Hb measurement may not be indicated for UKA or TKA when adopting restrictive transfusion thresholds, provided clinicians accept a 0.1% risk of patients developing severe undiagnosed post-operative anaemia (Hb < 70 g/L). The decision to perform these blood tests for THA patients should be based on local institutional data and selection of acceptable risk thresholds.

全文链接：https://pan.ckcest.cn/rcservice//doc?doc_id=107389

编号：YY001-20221107009

标题：PlyAB Nanopores Detect Single Amino Acid Differences in Folded Haemoglobin from Blood

简介：The real-time identification of protein biomarkers is crucial for the development of point-of-care and portable devices. Here, we use a PlyAB biological nanopore to detect haemoglobin (Hb) variants. Adult haemoglobin (HbA) and sickle cell anaemia haemoglobin (HbS), which differ by just one amino acid, were distinguished in a mixture with more than 97 % accuracy based on individual blockades. Foetal Hb, which shows a larger sequence variation, was distinguished with near 100 % accuracy. Continuum and Brownian dynamics simulations revealed that Hb occupies two energy minima, one near the inner constriction and one at the trans entry of the nanopore. Thermal fluctuations, the charge of the protein, and the external bias influence the dynamics of Hb within the nanopore, which in turn generates the unique ionic current signal in the Hb variants. Finally, Hb was counted from blood samples, demonstrating that direct discrimination and quantification of Hb from blood using nanopores, is feasible.

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编号：YY001-20221107010

标题：Comparison with first round findings of faecal haemoglobin concentrations and clinical outcomes in the second round of a biennial faecal immunochemical test based colorectal cancer screening programme

简介：Objective: How faecal haemoglobin concentrations (f-Hb) vary from one round to the next in a colorectal cancer (CRC) screening programme, and relate to colonoscopy findings, are unknown. Our aim was to use data from the first two rounds of the faecal immunochemical test (FIT) based Scottish Bowel Screening Programme (SBoSP) to explore these issues. Methods: Faecal haemoglobin concentration (f-Hb) percentiles in the second round were compared with those in the first when the first round yielded a negative FIT result (<80 μg Hb/g faeces), a

positive FIT but no colonoscopy, CRC, all adenoma, and a negative colonoscopy. In addition, the outcomes in the first and second rounds were compared. Results: The profiles of f-Hb in the first and second rounds differed in (a) those who had had a negative FIT result in the first round and (b) those in whom neoplastic pathology had been found. In contrast, the pattern of difference between profiles in those who had had a negative colonoscopy was very similar to that in those in whom an adenoma had been found. In addition, the risk of CRC being diagnosed in the second round after a negative colonoscopy in the first was 3.0%, not very different to that after a negative test result (4.9%). Conclusions: Adenomas may be rarely the cause of a positive FIT result. An alternative explanation as to why these are detected using FIT is required. In addition, a negative colonoscopy for a positive FIT result does not rule out the finding of significant neoplastic pathology in the next round.

全文链接：https://pan.ckcest.cn/rcservice//doc?doc_id=107391

编号：YY001-20221107011

标题：Comparison of the QuikRead go® point-of-care faecal immunochemical test for haemoglobin with the FOB Gold Wide® laboratory analyser to diagnose colorectal cancer in symptomatic patients

简介：Objectives: Faecal immunochemical testing for haemoglobin (FIT) is used to triage patients for colonic investigations. Point-of-care (POC) FIT devices on the market have limited data for their diagnostic accuracy for colorectal cancer (CRC). Here, a POC FIT device is compared with a laboratory-based FIT system using patient collected samples from the urgent referral pathway for suspected CRC. Methods: A prospective, observational cohort study. Patients collected two samples from the same stool. These were measured by POC QuikRead go® (Aidian Oy, Espoo, Finland) and laboratory-based FOB Gold Wide® (Sentinel Diagnostics, Italy). Faecal haemoglobin <10 µg haemoglobin/g of faeces was considered as negative. At this threshold, comparisons between the two systems were made by calculating percentage agreement and Cohen's kappa coefficient. Proportion of negative results were compared with Chi squared testing. Sensitivities for CRC were calculated. Results: A total of 629 included patients provided paired samples for FIT to compare the QuikRead go® and FOB Gold Wide®. The agreement around the negative threshold was 83.0% and Cohen's kappa coefficient was 0.54. The QuikRead go® reported 440/629 (70.0% of samples) as negative compared to 523/629 (83.1%) for the FOB Gold Wide®, this difference was significant (p-value<0.001). Sensitivities for CRC detection by the QuikRead go® and FOB Gold Wide® were 92.9% (95% confidence interval (CI): 68.5-98.7%) and 100% (CI: 78.5-100%) respectively. Conclusions: Both systems were accurate in their ability to detect CRC. Whilst good agreement around the negative threshold was identified, more patients would be triaged to further colonic investigation if using the QuikRead go®.

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编号：YY001-20221107012

标题：Effect of school feeding program on the anthropometric and haemoglobin status of school children in Sidama region, Southern Ethiopia: a prospective study

简介：Ethiopia recently scaled up the implementation of a school feeding program (SFP) as a targeted intervention for protecting disadvantaged school children from hunger and food insecurity. However, the contribution of the program to advancing the nutritional status of

children has not been adequately explored. We assessed the effect of SFP on the anthropometric and haemoglobin status of school children in Sidama Region, Southern Ethiopia. Our prospective cohort study compared the height-for-age z-score (HAZ), BMI-for-age z-score (BAZ) and haemoglobin concentration of SFP beneficiary (n 240) and non-beneficiary (n 240) children, 10-14 years of age. The children were recruited from 8 SFP implementing and 8 control schools using a multistage sampling procedure and were followed for an academic year. The SFP intervention and control schools were matched one-to-one based on agro ecological features and geographical proximity. Exposure, outcome and pertinent extraneous variables were collected through baseline and end-line surveys. Multilevel difference-in-differences (DID) analysis was used to measure the net effect on the outcomes of interest. In the multivariable DID model adjusted for potential confounders including maternal and paternal literacy, household monthly income, wealth index and household food insecurity, the SFP did not show significant effects on the haemoglobin concentration (β = 0· 251, 95 % confidence interval (CI): -0· 238, 0· 739), BAZ (β = 0· 121, 95 % CI: -0· 163, 0· 405) and HAZ (β = -0· 291, 95 % CI: -0· 640, 0· 588) of children.

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编号：YY001-20221107013

标题：Regulation and Role of Neuron-Derived Hemoglobin in the Mouse Hippocampus

简介：Hemoglobin (Hb) is the oxygen transport protein in erythrocytes. In blood, Hb is a tetramer consisting of two Hb-alpha (Hb-α) chains and two Hb-beta (Hb-β) chains. A number of studies have also shown that Hb-α is also expressed in neurons in both the rodent and human brain. In the current study, we examined for age-related regulation of neuronal Hb-α and hypoxia in the hippocampus and cerebral cortex of intact male and female mice. In addition, to confirm the role and functions of neuronal Hb-α, we also utilized lentivirus CRISPR interference-based Hb-α knockdown (Hb-α CRISPRi KD) in the non-ischemic and ischemic mouse hippocampus and examined the effect on neuronal oxygenation, as well as induction of hypoxia-inducible factor-1α (HIF-1α) and its downstream pro-apoptotic factors, PUMA and NOXA, and on neuronal survival and neurodegeneration. The results of the study revealed an age-related decrease in neuronal Hb-α levels and correlated increase in hypoxia in the hippocampus and cortex of intact male and female mice. Sex differences were observed with males having higher neuronal Hb-α levels than females in all brain regions at all ages. In vivo Hb-α CRISPRi KD in the mouse hippocampus resulted in increased hypoxia and elevated levels of HIF-1α, PUMA and NOXA in the non-ischemic and ischemic mouse hippocampus, effects that were correlated with a significant decrease in neuronal survival and increased neurodegeneration. As a whole, these findings indicate that neuronal Hb-α decreases with age in mice and has an important role in regulating neuronal oxygenation and neuroprotection.

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编号：YY001-20221107014

标题：Mutational Landscape of Patients Referred for Elevated Hemoglobin Level

简介：Background: Since the identification of JAK2 V617F and exon 12 mutations as driver mutations in polycythemia vera (PV) in 2005, molecular testing of these mutations for patients with erythrocytosis has become a routine clinical practice. However, the incidence of myeloid mutations other than the common JAK2 V617F mutation in unselected patients referred for

elevated hemoglobin is not well studied. This study aimed to characterize the mutational landscape in a real-world population of patients referred for erythrocytosis using a targeted next-generation sequencing (NGS)-based assay. Method: A total of 529 patients (hemoglobin levels >160 g/L in females or >165 g/L in males) were assessed between January 2018 and May 2021 for genetic variants using the Oncomine Myeloid Research Assay (ThermoFisher Scientific, Waltham, MA, USA) targeting 40 key genes with diagnostic and prognostic implications in hematological conditions (17 full genes and 23 genes with clinically relevant "hotspot" regions) and a panel of 29 fusion driver genes (>600 fusion partners). Results: JAK2 mutations were detected in 10.9% (58/529) of patients, with 57 patients positive for JAK2 V617F, while one patient had a JAK2 exon 12 mutation. Additional mutations were detected in 34.5% (20/58) of JAK2-positive patients: TET2 (11; 19%), DNMT3A (2;3.4%), ASXL1 (2; 3.4%), SRSF2 (2; 3.4%), BCOR (1; 1.7%), TP53 (1; 1.7%), and ZRSR2 (1; 1.7%). Diagnosis of PV was suspected in 2 JAK2-negative patients based on the 2016 World Health Organization (WHO) diagnostic criteria. Notably, one patient carried mutations in the SRSF2 and TET2 genes, and the other patient carried mutations in the SRSF2, IDH2, and ASXL1 genes. Three JAK2-negative patients with elevated hemoglobin who tested positive for BCR/ABL1 fusion were diagnosed with chronic myeloid leukemia (CML) and excluded from further analysis. The remaining 466 JAK2-negative patients were diagnosed with secondary erythrocytosis and mutations were found in 6% (28/466) of these cases. Conclusion: Mutations other than JAK2 mutations were frequently identified in patients referred for erythrocytosis, with mutations in the TET2, DNMT3A, and ASXL1 genes being detected in 34.5% of JAK2-positive PV patients. The presence of additional mutations, such as ASXL1 mutations, in this population has implications for prognosis. Both the incidence and mutation type identified in patients with secondary erythrocytosis likely reflects incidental, age-associated clonal hematopoiesis of indeterminate potential (CHIP).

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编号：YY001-20221107015

标 题 ： Physiological and Pathological Functions of Neuronal Hemoglobin: A Key Underappreciated Protein in Parkinson's Disease

简介：The expression of Hemoglobin (Hb) is not restricted to erythrocytes but is also present in neurons. Hb is selectively enriched in vulnerable mesencephalic dopaminergic neurons of Parkinson's disease (PD) instead of resistant neurons. Controversial results of neuronal Hb levels have been reported in postmortem brains of PD patients: although neuronal Hb levels may decline in PD patients, elderly men with higher Hb levels have an increased risk of developing PD. α-synuclein, a key protein involved in PD pathology, interacts directly with Hb protein and forms complexes in erythrocytes and brains of monkeys and humans. These complexes increase in erythrocytes and striatal cytoplasm, while they decrease in striatal mitochondria with aging. Besides, the colocalization of serine 129-phosphorylated (Pser129) α-synuclein and Hb β chains have been found in the brains of PD patients. Several underlying molecular mechanisms involving mitochondrial homeostasis, α-synuclein accumulation, iron metabolism, and hormone-regulated signaling pathways have been investigated to assess the relationship between neuronal Hb and PD development. The formation of fibrils with neuronal Hb in various neurodegenerative diseases may indicate a common fibrillization pathway and a widespread target that could be applied in neurodegeneration therapy.

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